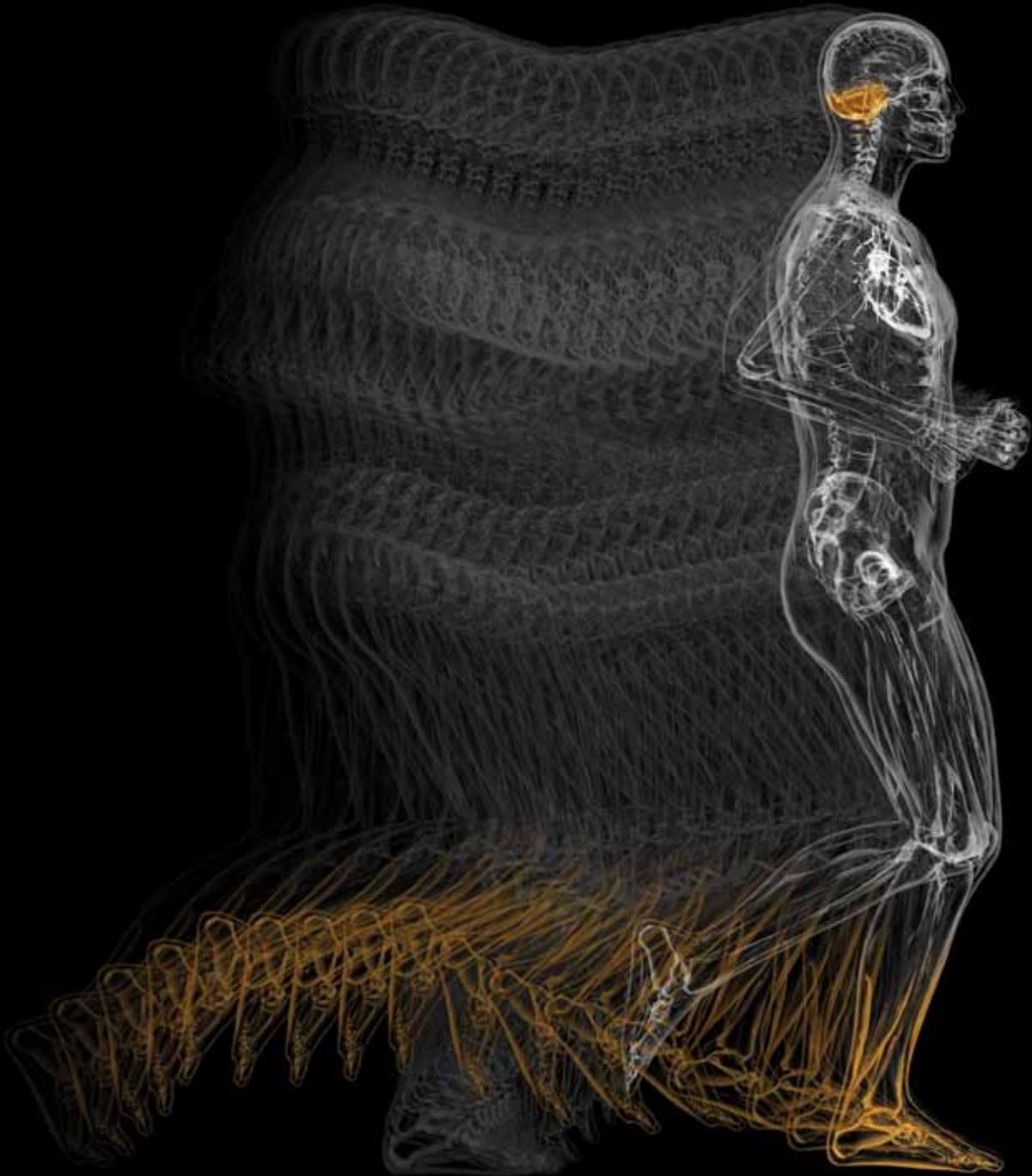


# PROPRIOCEPTION

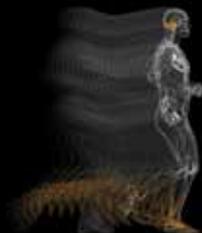
## Making Sense Of Barefoot Running

by Lee Saxby





Barefoot squat



Proprioception

# PROPRIOCEPTION

## Making Sense Of Barefoot Running

### Foreword

By **Professor Dan Lieberman** (Harvard University)

By **Chris McDougall** (Author of Born to Run)

### Chapter 1 p5

#### We Have Forgotten How To Run

Our evolutionary success as humans is directly related to our ability to run. But that natural talent isn't foolproof; 50 years of padded running shoes and poor posture mean about 80% of runners suffer from injury every year.

### Chapter 2 p6

#### The Human Foot Is An Evolutionary Masterpiece

With its complex system of springs, levers and nerve endings, the foot is one of the body's major sensory organs. Humans are naturally good at walking, running and sprinting. Jogging, or, slow, sticky heel-striking in padded shoes is not a natural movement and is responsible for countless runners' injuries.

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#### Proprioception: Our Sixth Sense

Proprioception is the sense of our body's position and orientation. We use this sense to move and the more feedback, the better the movement. About 70% of that feedback comes via pressure receptors, mostly located in the feet. The human foot needs protection, but thick, shock-absorbing soles greatly reduce sensory feedback and therefore limit the quality of movement.

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#### Footwear That Makes Sense

To run barefoot is your default setting, but to do this in today's world, you need a shoe that gives a balanced, unrestricted and protected experience, while also allowing maximum sensory feedback between your feet and your brain - from sole to soul.

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#### Reawaken Your Innate Barefoot Running Skill

You have the hardware, but you've forgotten the software. Re-building your barefoot running technique will take time, particularly if you've been wearing padded footwear all your life. But it's an exciting, joyful and probably life-changing journey. We'd like to help take you through it, step-by-step. Literally.

## Foreword 1

# Professor Daniel Lieberman

**Department of Human Evolutionary Biology,  
Harvard University**

**"I've never seen anyone better able to diagnose and correct a runner's form, and he has that ability — special to good coaches — to translate his advice into words that make sense and which you can follow."**

My job as a scientist is to be a skeptic. So when I first started doing research on barefoot running in 2005, I was naturally skeptical about its relevance to my life. At the time, Dennis Bramble and I had just co-authored our Born to Run article in the journal Nature, which made the case that endurance running has played a key role in human evolution for over two million years (1). So although I didn't need to be convinced that barefoot running was "normal," I had no desire whatsoever to run either barefoot or in minimal shoes. But as I started to do experiments on habitually barefoot runners, I noticed that they were running in a wonderfully light and gentle way without any compromise in speed and seemingly without getting injured. Many were formerly shod runners who had tried but failed to cope with a familiar litany of injuries (plantar fasciitis, runner's knee, tibial stress syndrome, Achilles tendonitis) using orthotics, fancy shoes, and even surgery. Finally, they just ditched their shoes, and the results spoke for themselves.

My journey as a minimally shod runner began soon thereafter, and I can aver that it has improved my running immeasurably, and cleared up the plantar fasciitis that used to hobble me. Then, one day after returning from a trip to study barefoot runners in Africa, I found myself taking off even my minimal shoes at the end of a long run. Since then I have not only published research on the biomechanics of barefoot running (2), but also become a devotee of barefoot running myself.

The last few years have seen the start of an exhilarating revolution in the running world as more and more runners try going barefoot or in minimal shoes. If barefoot running is a fad, then it's a two million year-old fad that's here to stay. But, contrary to some reports, running barefoot doesn't necessarily mean running injury free. Good form matters for all runners, and barefoot runners are no exception. Indeed, I've seen some minimally shod runners who might be better off wearing traditional shoes because they are still overstriding and still crashing into the ground, putting massive stresses on their bodies without any of the protection a cushioned running shoe offers. If you are going to run barefoot, you'd better do it right.

Which brings me to Lee Saxby. Of the many coaches I've met, Lee stands out as exceptional. He really understands good running form not only on a scientific level but also from a practical standpoint. I've never seen anyone better able to diagnose and correct a runner's form, and he has that ability —special to good coaches— to translate his advice into words that make sense and which you can follow. Whether you want to run

## Foreword 1

barefoot, in minimal shoes, or in cushioned running shoes, it pays to heed Lee's advice. And I speak from personal experience. A few years after transitioning, I started suffering from some new pains including stiff ankles. Chris McDougall recommended I check out Lee Saxby's advice, which I've followed ever since. And I've never run better.

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1 "Born to Run" was the cover, but the real citation is Bramble, DM and Lieberman, DE (2004) Endurance Running and the Evolution of the genus Homo. Nature 432: 345-352.

2 Lieberman et al (2011) Foot strike patterns and collision forces in habitually barefoot versus shod runners. Nature 463: 531-536.

## Foreword 2

# Chris McDougall

## Author of *Born to Run*

**“Saxby has figured out how to break the key movements down into a sequence of snappy drills. Do them, and you’ll be electrified by how great it feels to run naturally, and how easy it is to learn.”**

The first time I saw Lee Saxby was the last time I ever had a running injury.

About three years ago, I was in the midst of researching my book, *Born to Run*, when I developed a nagging heel pain. This was puzzling: I thought I’d learned ideal running form from Mexico’s Tarahumara Indians and would never be injured again - and yet I was. So I made the usual round of visits to podiatrists and sports medicine physicians, and got the usual useless advice. They said I needed orthotics and Ibuprofen and a night splint. I should stretch my calves, and roll my foot on a golf ball, and take time off. They all warned me about the dangers of distance running, but none of them - not one - ever asked to see me run.

Lee Saxby did. The first thing he did when I arrived at his London headquarters was to take me outside and videotape me as I ran up and down the street. When he played the tape back, I was horrified. In my mind, I was straight-backed and nimble, a gentle forefoot runner with Swan Lake posture. But the guy on the tape was clomping down on his heels and leaning so far back he could be stomping the brakes on the Flintstone-mobile.

It didn’t take long to figure out what had gone wrong. That past winter, we’d had a burst of snow back home in Pennsylvania. Since I believed I’d mastered Tarahumara-style running, I figured I could get away with wearing a thick-soled running shoe. The running shoes were warm and plush, all right, but all that cushioning came at a cost: I could no longer tell which part of my foot was hitting the ground. Bit by bit, I was backsliding to my awful old technique and totally unaware of it.

So how did Lee address the problem? Simple. Unlike every other specialist I’d seen, he didn’t regard running as a danger; he regarded it as a skill. He took me through a series of drills, then brought me outside to tape me again. The difference was astonishing. In less than 30 minutes, he’d totally transformed my gait. “But you’re going to have to lose those things, mate,” he said, pointing to my cushioned running shoes, “or you’re going to be in this fix again.” I took them off and ran barefoot back to my hotel. By the time I got there, not only was my running form better, so was my heel: the pain which had lingered for months was gone - vanished, completely, never to return. Since then, I’ve never run a day without relying on Lee’s instruction: I focus on the form he taught me, and put as little as possible between my foot and the planet.

# Chapter 1

## **We Have Forgotten How To Run**

We all know that regular physical activity is important for a healthy life. In fact, it's a more powerful remedy than any drug you can take for modern day epidemics like diabetes, heart disease and cancer.

There are many different kinds of exercise that fit the bill, but walking and running are the most natural, effective and accessible.

What do we mean by 'natural'? Well, evidence suggests that endurance running was the major evolutionary stimulus in shaping human anatomy and physiology. In other words, the minute we started to move further and more efficiently than anything else was the minute we leapt ahead of the competition. Nature has literally engineered us to run!

But now we reach a bit of a conundrum: if humans have evolved as endurance running specialists, why do about 80% of us injure ourselves every year? Why haven't injuries such as 'runners knee', 'shin splints' and 'plantar fasciitis' become rare and unfortunate occurrences, like scurvy and TB, banished to those parts of the world without access to the latest advances in technology and biomedical science?

The answer is simple.

**We have forgotten how to run.**

## Chapter 2

### **The Human Foot Is An Evolutionary Masterpiece**

Humans have evolved over the last two million years to become the only upright, bipedal, running primates.

This unique form of locomotion creates physical and mental challenges, which our bodies and brains have evolved to deal with.

For example, because humans stand upright, the main stimulus that has moulded our structure is the force of gravity. Thanks to gravity, we have an 's' shaped spine, large hip muscles, short parallel toes, straight legs and long tendons compared to other primates.

One of the main structural features that make humans unique is our feet. The human foot is a complex system of springs and levers, unmatched elsewhere in nature. However, the real beauty is that this system is adjustable, allowing our feet to execute three very different forms of locomotion: WALKING, RUNNING and SPRINTING (see figure 1).

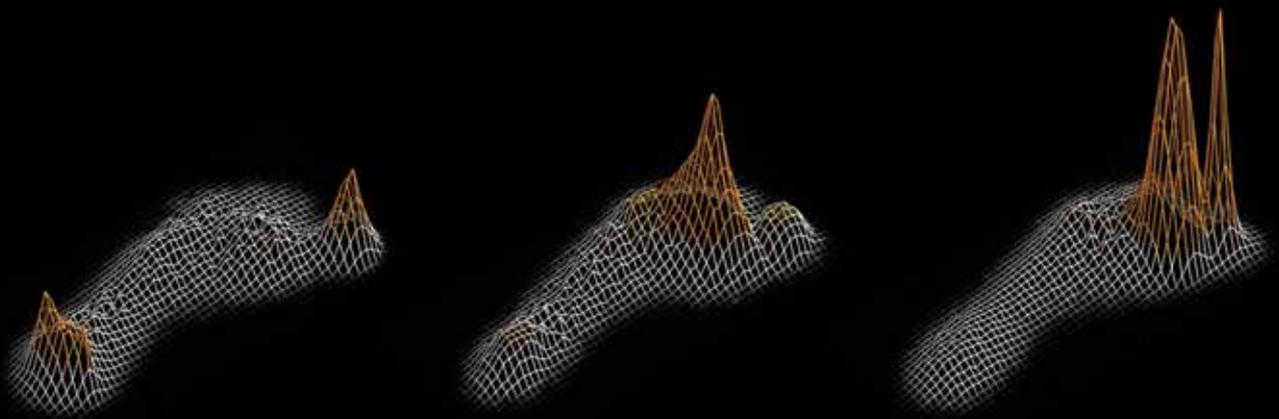
When we walk, the foot and ankle create three 'rockers', or pivot points. These work together to allow smooth horizontal displacement of the body's centre of mass. This is the classic 'heel-toe' biomechanical behaviour and is used by all the great apes (see figure 4).

When we run, the foot's mechanical behaviour essentially reverses. Instead of landing on the heels, we land on the ball of the foot and then the heel. Using the elastic recoil of the Achilles tendon, the plantar fascia (a supportive tissue) and ligaments, our foot and ankle work like a powerful spring. This elasticity greatly reduces the amount of energy required to run and is used by all animals, especially 'running specialists' like horses and dogs. In fact, these animals have taken this feature even further; only the toes or forefoot touches the ground and a tendon runs up the whole lower leg.

When we sprint, we actually use a very similar forefoot landing technique – touching the ground with only the ball of the foot (see figure 1).

# The only natural forms of human locomotion

Humans naturally display three forms of locomotion: walking, running and sprinting. Each form has distinct biomechanical characteristics in terms of the body's posture (kinematics) and the subsequent loading of the body's structure (kinetics). Proprioceptive feedback from the feet informs the brain of the forces encountered (plantar pressure) and triggers a change to the most appropriate form of locomotion. (figure 1)



**Walking**

**Running**

**Sprinting**

As you might expect, your running anatomy (for example, the muscles, tendons and ligaments in your feet and ankles), need regular use in order to stay healthy. In biomechanical terms, that means loading that part of your anatomy with the right forces. However, because the foot and ankle work in a specific way, they can be easily injured if these 'forces' are exaggerated, attenuated, diverted or delayed. It's common sense when you think about it; using your running anatomy unnaturally and/or beyond its structural capabilities is the root cause of all running injuries.

Unfortunately, the science behind most modern running shoes is almost entirely based on manipulating these forces via 'motion control' and 'shock absorbing' technologies. And this is why, despite over 25 years of research and application in this field, the percentage of runners suffering from injuries has not decreased. Perhaps even worse, there is little understanding of the mechanics of even the most common running injuries.

For example, did you know that we're more likely to injure ourselves on soft surfaces than hard ones?

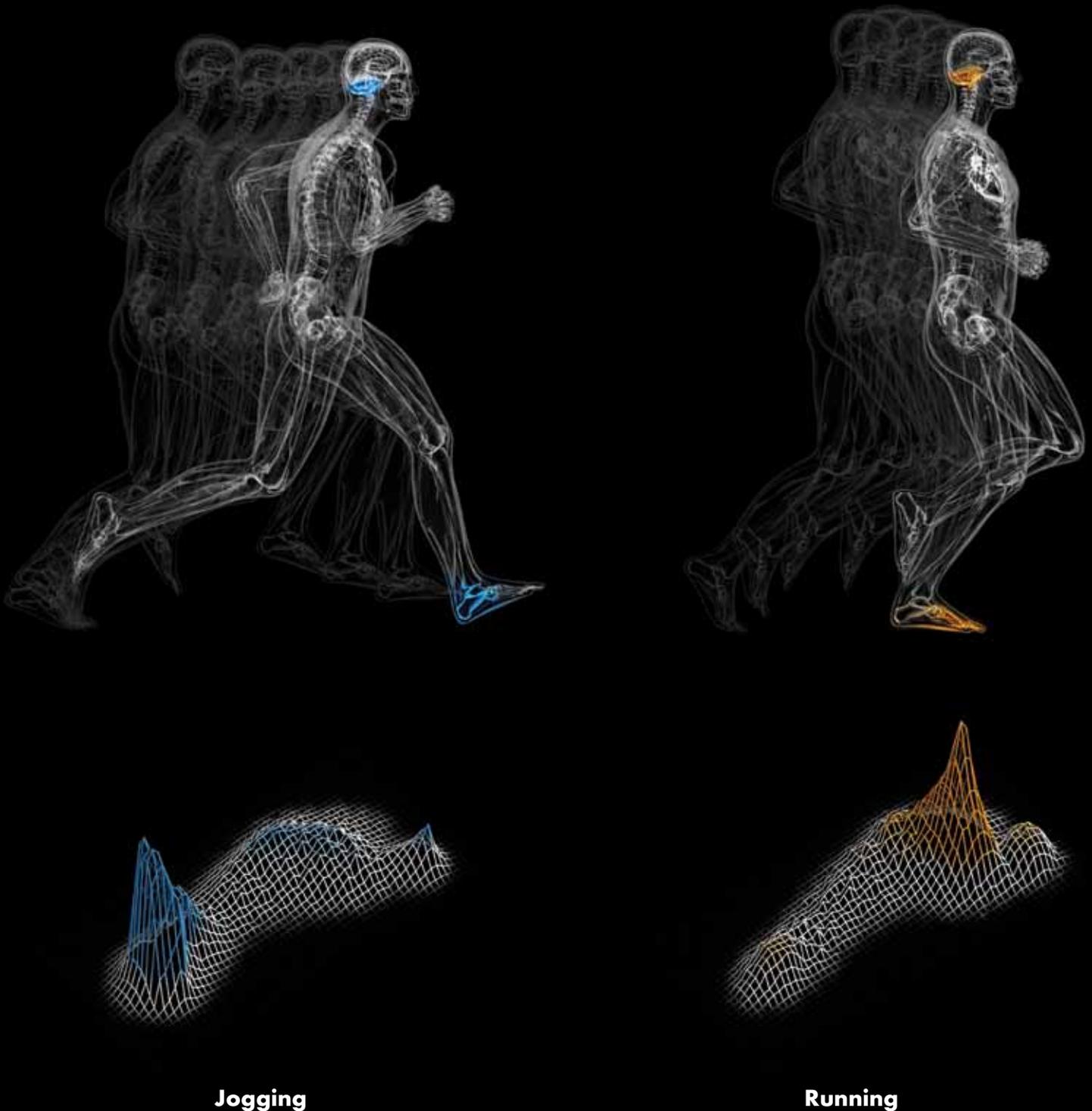
Whether you're in conventional trainers, minimalist shoes or barefoot, softer surfaces reduce the efficiency of our elastic recoil and cause excessive muscle activity, one of the main causes of runners' injuries.

A clear example of the connection between these shock-absorbing technologies and injury can be found in the evolution of jogging.

Jogging is a modern invention. In fact, it only began to gain popularity in the 1960's, around the same time as padded running shoes were becoming more common. The typical jogging style is a hybrid of walking and running; it's essentially a faster version of the heel-toe walking movement described above. However, slow, sticky heel-striking is not a natural movement and, as explained below, is responsible for countless runners' injuries (see figure 2).

## 'Jogging' is only possible because of reduced proprioceptive feedback

Modern human beings display a fourth form of locomotion - "jogging". Jogging is a hybrid walk/run locomotive pattern and is unnatural in terms of posture and forces encountered. This type of movement is only possible because of reduced proprioceptive feedback to the brain, which is caused by inappropriately constructed and excessively cushioned footwear. (figure 2)



When we move from a walk to a run, our feet are meant to let us know when to change from landing on our heel to landing on our forefoot. In other words, it hurts to heel-strike (and therefore jog) in bare feet. All animals use a similar sensory cue to change locomotive patterns. However, padded running shoes restrict our foot's sensory feedback and stop the movement hurting.

Because the heel-toe movement is only designed to cope with the relatively light forces that are present when we walk, using that same form of locomotion as a way to run leads to lots of potential injuries throughout the body.

## Chapter 3

### Proprioception: Our Sixth Sense

Our bodies are incredibly good at moving, often without any conscious involvement. Just think: sitting down, standing up, picking up objects, throwing, catching, jumping, skipping, running... The reason we can make all of these movements without thinking (or falling over) is because of something called 'proprioception' - our body's sense of its own position, balance and movement. Proprioception provides us with 'body awareness' and is commonly referred to as our "sixth sense".

The proprioceptive system uses stretch receptors and pressure receptors situated in our muscles, joints and skin to inform our brain about our physical environment and how we are interacting with it.

A large percentage of these receptors are in our feet; they're the parts of our body most in contact with our physical environment. If we reduce the sensory feedback from our feet to our brains by wearing thick, shock-absorbing soles then the brain has less information to work with, reducing the quality of the movement pattern produced (see figure 6).

The foot has evolved over millions of years to a dextrous and sensitive masterpiece - by patronising it with thick soles and supportive padding we're limiting its potential and risking injury throughout the body.

But here's the catch: if the bare foot is so wonderful, why did humans invent shoes? Although the human foot is a marvel of evolutionary engineering it has one serious design flaw: a lack of protection from the environment.

All other running specialist animals have evolved hooves or pads to protect themselves, but our feet, originally designed to grasp and climb, are instead covered in proprioceptors, sweat glands and soft skin!

This design flaw could have been a serious set back to our plans for world domination. There's no way the bare human foot could have coped with everything from rainforests, through deserts to the arctic.

Fortunately, efficient bipedal locomotion isn't the only thing that sets us apart from other animals; the human brain also helped us survive and thrive as a species. The same brain that learned how to manipulate fire and use tools also gave us the insight to use animal fur and skins to survive in more extreme conditions.

In other words, footwear that insulates and protects the human foot is a part of our evolutionary history.

## Chapter 4

### Footwear That Makes Sense

The perfect running shoe allows the foot to behave exactly as it would if bare, while also providing maximum protection from the environment.

Whatever 'barefoot' running shoe you chose, make sure it fulfils the following four criteria:

#### **1. The shoe must allow for sensory feedback.**

Your body and brain need to receive feedback from your senses in order to know how to move. The sole of your foot is packed with sensory receptors, so the sole of your running shoe must allow feedback from the terrain you're moving on in order to create a natural running style.

#### **2. The shoe must protect your foot from the environment.**

Although your foot needs to be sensitive to the terrain it's moving on, that doesn't mean it should be vulnerable. The sole of your running shoe must be puncture-proof and capable of protecting your foot from extremes of temperature.

#### **3. The shoe's weight must not unbalance your foot's natural position.**

A heavy or unbalanced running shoe will affect your foot's natural centre of gravity and therefore your running style. Ideally, the weight distribution of your shoe should allow you to balance it with your finger halfway between the heel and toe, or just slightly towards the heel.

#### **4. Your foot should not be restricted in any way by the shoe.**

When your foot hits the ground, your toes splay outwards to help balance your stride. The toe box on your shoe must therefore be wide enough to accommodate this spread without any restriction.

**NB.** Bear in mind that point one (sensory feedback) and point two (protection) are often traded off against each other depending on the terrain and climate provided for. For example, road running in a city presents a different challenge to trail running in the mountains!

## Chapter 5

### Re-awaken Your Innate Barefoot Running Skill

So, what now? Even though barefoot is in our blood, that doesn't mean you'll start doing it correctly the second you whip off your shoes and take to the streets. If you've been wearing over-protective footwear all your life, your barefoot running muscles will be weak and your posture will be all out of whack. There's a bit of work to do first.

Running is a skill; once mastered, it will allow anyone to realise the joy of running efficiently and injury free. This book is just the beginning...

Here is a training system that uses physical and mental milestones to help runners transition from conventional trainers to barefoot:

- Like all natural systems, the human brain constructs complex patterns by adding simple patterns together. This is visible in the way babies progress from simple to more complex movements; that is, from creeping to crawling, sitting, standing and eventually walking and running (see figure 3).
- Know the saying, 'you have to learn to walk before you can run'? It couldn't be truer. If our brain doesn't learn these simple movement patterns in the right order and to the right level of competency, our potential performance further down the line is jeopardised - for runners that means poor performance and injury.
- This training system has three distinct movement milestones: walking/squatting, jumping and running. To fully realise the potential of your barefoot life, you must perfect each skill before moving onto the next.

The rest of this book will guide you through the training system and start you on your journey to efficient, injury free running.

## The movement milestones of a child, the foundation for running

The human brain constructs complex movements (like running) by combining simpler movements. The movement milestones of a child clearly demonstrate this. The quality of the complex movement is only as good as the quality of the simpler movements; this is the foundation of any successful movement coaching model. (figure 3)



## **A Quick Movement Mantra**

As you relearn the art of movement, this mantra will help to keep you on track – efficient and injury-free:

**Posture**  
**Rhythm**  
**Relax**

We'll go into more detail further on in the book, but correct posture, an awareness of rhythm and a relaxed form will allow your body to receive the sensory feedback it needs to move efficiently and safely – as nature intended.

This mantra applies whatever you have on your feet: trainers, minimalist shoes or nothing at all!

## **Stage 1a - Barefoot Walking**

### **Can you remember the last time you were truly barefoot?**

Because we overprotect our feet so much, our brains have learned to interpret a lot of their feedback as a warning to 'tread carefully'. In order to start using your feet effectively, your brain therefore has to 'rewire' itself and learn to read these sensations as useful feedback rather than as a potential threat.

The objective of this first stage of training is for you to feel relaxed and confident walking barefoot across a variety of surfaces, both natural (grass, mud and sand) and man-made (concrete and tarmac).

As your feet and your brain begin to communicate properly about the new sensory information available, your movement across these terrains will become safer, confident and more efficient.

### **How to walk barefoot**

In theory, you can learn to walk 'barefoot' in any type of shoe, but you'll make the process much easier for yourself if you wear minimalist shoes or go barefoot. Our bodies are astonishingly adaptable; keep the following four points in mind, and you'll be walking 'barefoot' in no time:

- Your weight should move from heel to big toe, but think of it more as a smooth heel stroke than a jolting heel strike;
- Keep your strides shorter than normal – this will help keep your body in its optimum alignment for efficient locomotion;
- Try not to look down; in fact, keep your gaze somewhere above the horizon and 'lead' with your chest;
- Keep your stride relaxed, balanced and symmetrical.

(see figure 4)

## The proprioceptive feedback in natural walking

The plantar pressures experienced by the foot in a natural walking gait cycle. The orange areas represent progression of body weight and the proprioceptive feedback to the brain. Variations on this pattern are linked to dysfunction and pathology. (figure 4)



It's a bit difficult to describe when you're 'done' with this stage of the training program. Ideally, you should be able to feel your weight move from your heel, right through your foot to your big toe. When you get it right, you'll know.

### **Troubleshooting**

If you're struggling to feel relaxed and natural when walking barefoot, run through this checklist of possible pitfalls:

- is your stride too long? If you can hear your heels smacking on the ground, you're probably walking with a heel strike rather than a heel stroke. Take shorter strides and relax, softening your knee.
- are you leading with your head? If you are, you'll feel tension in your neck, lower back and hamstrings. Focus on leading with your torso.
- are you leading with your pelvis? You'll feel some discomfort in your hips and pelvis if you are. Again, lead with your torso to counter this problem.
- is your weight moving to the outside of your foot? This will cause stiff ankles and knee discomfort. Try to concentrate on stepping off your big toe – don't be afraid to over-exaggerate the movement!

## Stage 1b – Squatting

Cultures that favour bare feet or minimalist footwear rarely have many chairs in their homes, workplaces or public spaces. Instead, people spend a lot of time in a deep, balanced squatting position – while, for example, they eat or work.

Learning to squat properly, both as a held position and as a dynamic exercise, will help you develop your barefoot running style more quickly and with less chance of injury. Here's why:

**Balance** - a proper squat will position your body's centre of mass over the ball of your foot – essential for barefoot movement;

**Strength** - the squat won't come easily to someone who hasn't tried it before, but it will build strength in parts of the body needed for a correct barefoot running style;

**Flexibility** - the squat will also improve the range of movement in your ankles, knees, hips and spine, helping you stretch important tendons, muscles and ligaments.

Balance, strength and flexibility all contribute to the improvement of posture, which, don't forget, is the first rule in our movement mantra.

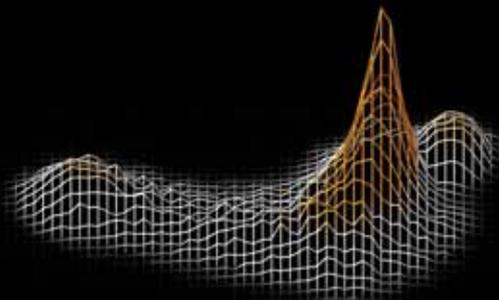
## How To Squat

Although squatting is one of the first steps towards barefoot running, that doesn't mean it's going to be easy! Not only will you need to build your strength up to maintain the position, you'll also be stretching muscles and tendons in a new way. Be patient and take things slowly. Learning to keep your balance while in these positions is the most important take-away for these exercises.

**Sitting Squat** - Keep your weight on the balls of your feet; avoid the temptation to shift it onto your heels. The best way to perfect the deep squat is to practice whenever you get the chance (see figure 5).

## The barefoot squat has the same plantar pressure as running

A natural barefoot squat requires the foot to be flat but the body weight to be predominantly applied to the ball of the foot. Notice the similarity to the healthy running plantar pressure. The barefoot squat encourages and maintains the necessary mobility and stability required for barefoot activities. (figure 5)



If you're watching TV or have a low table you can read from or write on, take the opportunity to build up your strength, flexibility and balance so that running barefoot comes even more naturally.

**Dynamic Squat** – A good dynamic squat is all about posture and balance. The best way to maintain the correct form and build up the appropriate muscles is to use a weighted pole of at least 5kg. As with the sitting squat, keep your weight on the balls of your feet and concentrate on your balance.

Try not to think of the dynamic squat as hard work – it should be a 'bouncy' movement and one that uses as little muscle action as possible. Complete each squat quickly; the 'dynamic' part of this exercise means it's much more about the movement than holding the position.

**Dynamic Squat 1** - Hold out your arms horizontally and balance the pole across your collarbone. As you squat, concentrate on keeping the pole stationary; this will ensure that the rest of your posture falls into place.

**Dynamic Squat 2** – This time, hold the bar horizontally above your head. Follow the same squatting guidelines as above. To begin with, you'll probably find the weight of the bar topples you forwards; thinking about maintaining your body weight over the balls of the feet and keeping your head and chest up will help.

### Troubleshooting

If you're struggling with any of these squats, run through this checklist:

- is your weight on your heels? Or does it move onto them as you squat? Think about keeping your connection through the balls of your feet.
- do you keep losing your balance? You might just need to build up the right muscles for the job. Try squatting without the pole or hold onto a door handle as you practice.

## Stage 2 - Barefoot Jumping

The barefoot jump takes things up a notch. A jump is much more dynamic than walking or squatting, which means there are more forces involved and more skill required. Learning to jump will build on the strength, balance and flexibility gained in Stage 1 as well as improve the elasticity of your tendons and, importantly, teach you about rhythmic motion.

Tendons are a bit like elastic bands. You have them all over your body and they usually connect muscle to bone. When stretched, these 'elastic bands' snap back into place, essentially providing you with 'free' energy. This is known as the 'stretch-shorten' cycle.

How we run affects this cycle because our tendons stretch and recoil most efficiently at a certain 'cadence' (beats per minute). When the cadence is wrong, injury often occurs. We'll cover this concept more fully in Stage 3 of this guide, but it's important to understand while you're learning to jump why elasticity and rhythm are such important factors for running.

### How To Jump

Focus on using the balls of your feet, but don't use your tiptoes. You're not trying to jump too high; instead, keep your bounces small and light, and start with a rhythm at which the jumping feels most efficient and relaxed. You should be able to keep going for quite a while! Eventually, try to reach a rhythm of 180BPM - this is the optimum cadence to harness the elastic recoil of the body and is a fundamental coaching point in efficient, injury free barefoot running.

### Try the following:

**Standard two-leg jump** - put a piece of tape on the floor and do twenty small jumps without looking down. Ideally, you should end up on the same spot. If you don't, work out which part of you need to align in order to fix the problem; for example, are you chasing your head forwards? Once you've perfected this skill, hold the weighted bar above your head to add an extra challenge to the exercise.

**One-leg jump/hopping** – running is essentially a series of one-legged jumps! Do the same exercise as above but this time on one leg. Add the weighted bar once you're able to hop comfortably on the spot.

**Jumping rope** – an excellent conditioning exercise and warm up drill for barefoot runners (try five minutes before running to develop an awareness of your cadence and rhythm). Again, put some tape on the floor and make sure you don't move away from the line as you jump.

**NB.** As a benchmark, if you can manage to jump rope at 180BPM for five two minute rounds with one minute rest, you should easily manage a ten-minute barefoot run at the same cadence.

### **Troubleshooting**

If you're struggling to jump in the manner described above, there are two main things you could be doing wrong:

- if you keep losing your balance or moving away from the tape you need to check your posture. Stay relaxed but make sure that your head and chest are pointed up and are positioned vertically above your hips. Try doing a few squats with a pole to help your body remember the correct form.
- if you're finding the jumps really hard work, chances are you're using too many muscles! Keep your body relaxed and don't try to jump too high.

### **Stage 3 – Barefoot Running**

The exercises in Stage 1 and 2 will improve your posture and help you appreciate the natural rhythm of your body. These activities will also reconnect your feet with your brain and the rest of your body – you'll be using sensory feedback from the soles of your feet to move safely and more efficiently in everything that you do!

Once you are happy walking, squatting and jumping with bare feet it's time to move on to barefoot running.

If you've completed the previous stages properly, you shouldn't encounter any problems as you move to barefoot running. However, it is still a new way of moving so do take things slowly; if you're accustomed to running five miles in regular trainers, don't expect to be able to run the same distance straight away with bare feet or minimalist shoes.

#### **How to run (see figure 6)**

There's a lot to remember when you start running barefoot for the first time. The following checklist will help:

**Posture** – your posture is absolutely the most important thing when you run barefoot. As you run, keep your head and chest upright and relax as much as possible; the whole of your upper body should remain stable but un-tensed. Focus on landing on the ball of your foot. You probably won't be landing on your heels (your brain and feet don't like it), but you still need to avoid landing on the sides of your feet or too close to your toes.

If you're struggling, think back to the connection you made with the balls of your feet as you learned to walk, squat and jump barefoot. When your running posture is correct, your feet should feel like they are landing directly underneath your body as opposed to out in front.

**Bouncy rhythm and short strides** – to reach the correct cadence for a bouncy rhythm, your feet will probably have to touch the ground more often than you're used to. However, because you don't necessarily want to run faster, this means you'll need to take shorter strides. It might take a few weeks to get to this stage, but you eventually want to run at 180BPM.

**Relaxed Body – most of your body** should stay relaxed most of the time when you run. A relaxed body is more rhythmic and uses a lot less energy as it runs. Listen to the sound of your feet as they make contact with the ground. Quiet feet are relaxed feet! If you're finding it difficult to un-tense, focus on specific parts of your body at a time (your hands are a good start). Contract the muscles for five seconds then completely let them go. This contract-relax technique is an excellent way to build awareness of the difference between relaxed and tensed muscles.

A fully relaxed and skillful technique is the sign of a master in any sport, so be patient for this last pointer – it will take time and practice (see figure 6).

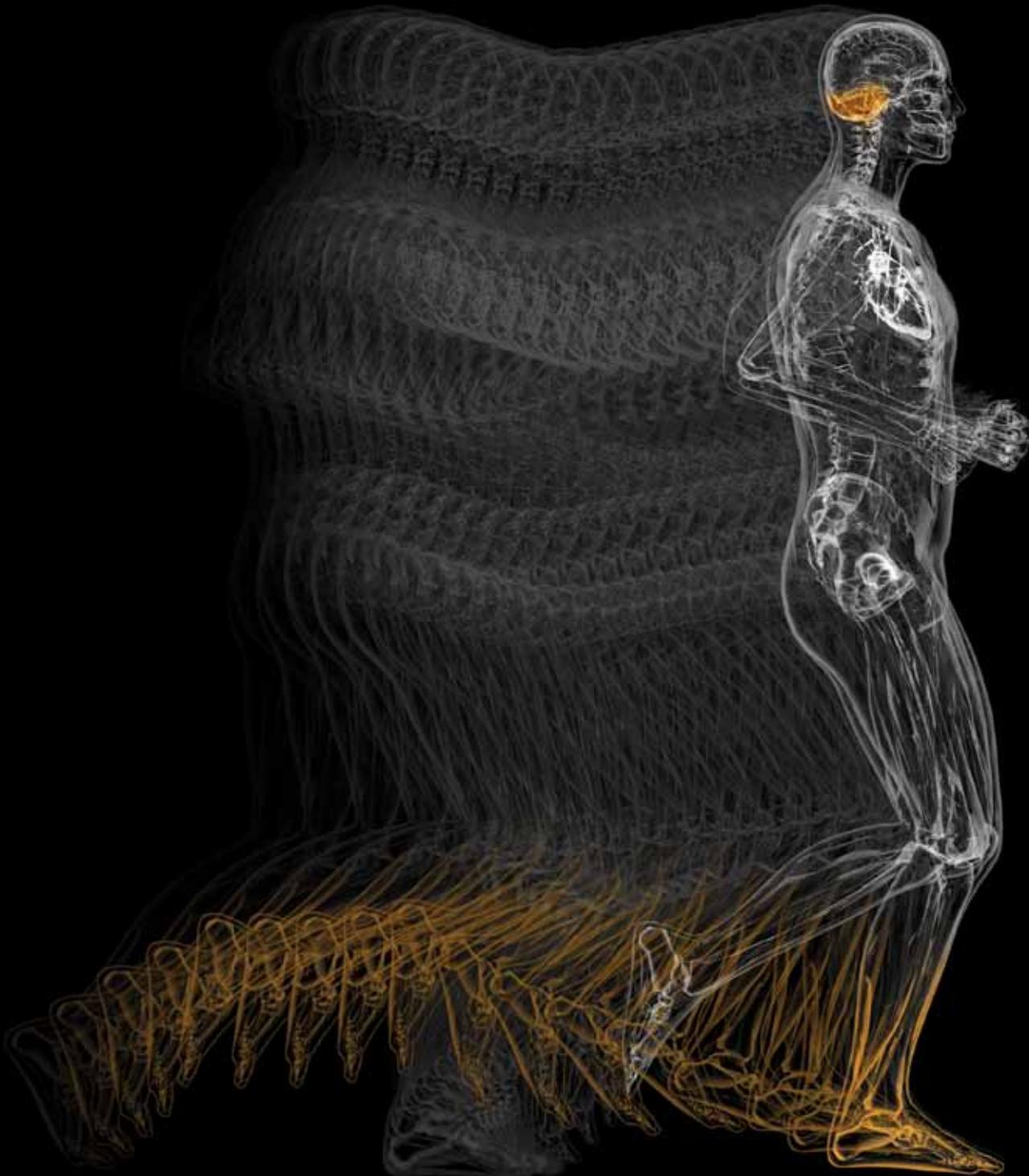
### Troubleshooting

Here are a few of the most common problems for people transitioning to barefoot running:

- are you bent at hip? Make sure you're not head chasing and keep your gaze somewhere above the horizon.
- is your foot landing too far ahead of your body? This will upset your natural movement, so make sure to keep your foot landing directly underneath you.
- are you landing on the wrong part of your foot? Heel striking is out of the equation, but be wary of running on the side of your foot (supinating), or too close to your toes.
- are you reaching too far with your stride? Keep your strides short and rapid, rather than long and heavy.
- do you have a slow 'sticky' rhythm? Shorter strides means you should feel light and bouncy as you run – nothing should shake as you run past!
- do you have a tense upper body and/or shoulders? Relax!

## Proprioceptive feedback in running

Movement is a skill and the foundation of skilled movement is proprioceptive feedback (shown here in orange). Information from your skin, muscles and joints (mainly in your feet) is fed back to the brain to allow your body to adapt to the biomechanical loads and environmental cues experienced while moving. (figure 6)



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### **Lee Saxby**

VIVOBAREFOOT has chosen to partner with Lee Saxby because he understands barefoot running and natural locomotion better than anyone else.

Lee has spent 15 years studying with the leading researchers across the fields of biomechanics, nutrition, athletic training, evolutionary biology and functional medicine.

The coaching drills he uses are based on a deep understanding of the biomechanics of movement and his extensive practical experience of fixing injured runners and developing performance athletes

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