

## YOU WALK WRONG

**It took 4 million years of evolution to perfect the human foot. But we're wrecking it with every step we take.**

New York Magazine by Adam Sternbergh Published Apr 21, 2008 <http://nymag.com/health/features/46213/>

Walking is easy. It's so easy that no one ever has to teach you how to do it. It's so easy, in fact, that we often pair it with other easy activities—talking, chewing gum—and suggest that if you can't do both simultaneously, you're some sort of insensate clod. So you probably think you've got this walking thing pretty much nailed. As you stroll around the city, worrying about the economy, or the environment, or your next month's rent, you might assume that the one thing you don't need to worry about is the way in which you're strolling around the city.

Well, I'm afraid I have some bad news for you: You walk wrong.

Look, it's not your fault. It's your shoes. Shoes are bad. I don't just mean stiletto heels, or cowboy boots, or tottering espadrilles, or any of the other fairly obvious foot-torture devices into which we wincingly jam our feet. I mean all shoes. Shoes hurt your feet. They change how you walk. In fact, your feet—your poor, tender, abused, ignored, maligned, misunderstood feet—are getting trounced in a war that's been raging for roughly a thousand years: the battle of shoes versus feet.



This shoe and the stilettos and Adidas sneakers on the subsequent pages are trompel'oeil paintings applied directly to the feet. Nice as they look, you can't buy them. *Makeup by John Maurad and Jenai Chin. (Photo: Tom Schierlitz)*

Walking is easy. It's so easy that no one ever has to teach you how to do it. It's so easy, in fact, that we often pair it with other easy activities—talking, chewing gum—and suggest that if you can't do both simultaneously, you're some sort of insensate clod. So you probably think you've got this walking thing pretty much nailed. As you stroll around the city, worrying about the economy, or the environment, or your next month's rent, you might assume that the one thing you don't need to worry about is the way in which you're strolling around the city.

Last year, researchers at the University of the Witwatersrand in Johannesburg, South Africa, published a study titled "Shod Versus Unshod: The Emergence of Forefoot Pathology in Modern Humans?" in the podiatry journal *The Foot*. The study examined 180 modern

humans from three different population groups (Sotho, Zulu, and European), comparing their feet to one another's, as well as to the feet of 2,000-year-old skeletons. The researchers concluded that, prior to the invention of shoes, people had healthier feet. Among the modern subjects, the Zulu population, which often goes barefoot, had the healthiest feet while the Europeans—i.e., the habitual shoe-wearers—had the unhealthiest. One of the lead researchers, Dr. Bernhard Zipfel, when commenting on his findings, lamented that the American Podiatric Medical Association does not “actively encourage outdoor barefoot walking for healthy individuals. This flies in the face of the increasing scientific evidence, including our study, that most of the commercially available footwear is not good for the feet.”

Okay, so shoes can be less than comfortable. If you've ever suffered through a wedding in four-inch heels or patent-leather dress shoes, you've probably figured this out. But does that really mean we don't walk correctly? (Yes.) I mean, don't we instinctively know how to walk? (Yes, sort of.) Isn't walking totally natural? Yes—but shoes aren't.

“Natural gait is biomechanically impossible for any shoe-wearing person,” wrote Dr. William A. Rossi in a 1999 article in *Podiatry Management*. “It took 4 million years to develop our unique human foot and our consequent distinctive form of gait, a remarkable feat of bioengineering. Yet, in only a few thousand years, and with one carelessly designed instrument, our shoes, we have warped the pure anatomical form of human gait, obstructing its engineering efficiency, afflicting it with strains and stresses and denying it its natural grace of form and ease of movement head to foot.” In other words: Feet good. Shoes bad.

Perhaps this sounds to you like scientific gobbledygook or the ravings of some radical back-to-nature nuts. In that case, you should listen to Galahad Clark. Clark is 32 years old, lives in London, and is about as unlikely an advocate for getting rid of your shoes as you could find. For one, he's a scion of the Clark family, as in the English shoe company C&J Clark, a.k.a. Clarks, founded in 1825. Two, he currently runs his own shoe company. So it's a bit surprising when he says, “Shoes are the problem. No matter what type of shoe. Shoes are bad for you.”

This is especially grim news for New Yorkers, who (a) tend to walk a lot, and (b) tend to wear shoes while doing so.

I know what you're thinking: *If shoes are so bad for me, what's my alternative?*

Simple. Walk barefoot.

Okay, now I know what you're thinking: *What's my other alternative?*

Galahad Clark never intended to get into the shoe business, let alone the anti-shoe business. And he likely never would have, if it weren't for the Wu-Tang Clan. Clark went to the University of North Carolina, where he studied Chinese and anthropology. He started listening to the Wu-Tang, the Staten Island rap collective with a fetish for martial-arts films and, oddly, Wallabee shoes. As it happens, Clark's father had invented the Wallabee shoe. “I figured this was my chance to go hang out with them,” Clark says. “One thing led to another, and we developed a line of shoes together. That's what sucked me back into the industry.”

After college, Clark returned to England, where he started working with Terra Plana, a company devoted to ecologically responsible shoes, and started United Nude, a high-design shoe brand, with the architect Rem



D. Koolhaas. Then, in 2000, Clark was approached by Tim Brennan, a young industrial-design student at the Royal College of Art. Brennan was an avid tennis player who suffered from chronic knee and ankle injuries. His father taught the Alexander Technique, a discipline that studies the links between kinetics and behavior; basically, the connection between how we move and how we act. Brennan's father encouraged Tim to try playing tennis barefoot. Tim was skeptical at first, but tried it, and found that his injuries disappeared. So he set out to design a shoe that was barely a shoe at all: no padding, no arch support, no heel. His prototype consisted of a thin fabric upper with a microthin latex-rubber sole. It wasn't exactly a new idea. It was a modern update of the 600-year-old moccasin.

### **The unnatural design feature built into nearly every shoe.**

Brennan brought his shoe to Clark, and after some modifications, they came up with a very flexible leather shoe with a three-millimeter sole made of rubber and puncture-resistant DuraTex that they call the Vivo Barefoot. "There are no gimmicks," Clark says. "It's a back-to-basics philosophy: that the great Lord designed us perfectly to walk around without shoes."

At first glance, this seems like a sensible and obvious approach—to work with the foot, not against it. But it represents a fundamental break from the dominant philosophy of shoe design. For decades, the guiding principle of shoe design has been to compensate for the perceived deficiencies of the human foot. Since it hurts to strike your heel on the ground, nearly all shoes provide a structure to lift the heel. And because walking on hard surfaces can be painful, we wrap our feet in padding. Many people suffer from flat feet or fallen arches, so we wear shoes with built-in arch supports, to help hold our arches up.

There are, of course, a thousand other factors that have influenced shoe design through the ages; for example, people like shoes that look nice. High heels have never, ever been comfortable, but they do make the wearer feel sexy. In fact, the idea of strolling idly through urban environments has only been fashionable, or even feasible, in Western society for about 200 years. Before that, cities had few real sidewalks, the streets were swimming in sewage, and walking as a form of locomotion was associated with poverty and the working class. "Only the upper classes, and especially women, could wear shoes that clearly defined an inability to walk very far," writes Peter McNeil and Giorgio Riello in the essay "Walking the Streets of London and Paris: Shoes in the Enlightenment." Walking was for peasants, who were "barefoot and pregnant"; the rich, or "well-heeled," took carriages.

Of course, more recently we've become interested in shoes that are promoted as being comfortable, whether they're cushioned walking shoes or high-tech sneakers with pumps and torsion bars. Still, the basic philosophy—that shoes have to augment, or in some cases supersede, or in some cases flat-out ignore, the way your foot works naturally—has remained the same. We were not born with air bubbles in our soles, so Nike provided them for us.

Try this test: Take off your shoe, and put it on a tabletop. Chances are the toe tip on your shoes will bend slightly upward, so that it doesn't touch the table's surface. This is known as "toe spring," and it's a design feature built into nearly every shoe. Of course, your bare toes don't curl upward; in fact, they're built to grip the earth and help you balance. The purpose of toe spring, then, is to create a subtle rocker effect that allows your foot to roll into the next step. This is necessary because the shoe, by its nature, won't allow your foot to work in the way it wants to. Normally your foot would roll very flexibly through each step, from the heel through the outside of your foot, then through the arch, before your toes give you a powerful propulsive push forward into the next step. But shoes aren't designed to be very flexible. Sure, you can take a typical shoe in your hands and bend it in the middle, but that bend doesn't fall where your foot wants to bend; in fact, if you bent your foot in that same place, your foot would snap in half. So to compensate for this lack of flexibility, shoes are built with toe springs to help rock you forward. You only need this help, of course, because you're wearing shoes.

Here's another example: If you wear high heels for a long time, your tendons shorten—and then it's only comfortable for you to wear high heels. One saleswoman I spoke to at a running-shoe store described how, each summer, the store is flooded with young women complaining of a painful tingling in the soles of their feet—what she calls “flip-flop-itis,” which is the result of women's suddenly switching from heeled winter boots to summer flip-flops. This is the shoe paradox: We've come to believe that shoes, not bare feet, are natural and comfortable, when in fact wearing shoes simply creates the need for wearing shoes.

Okay, but what about a good pair of athletic shoes? After all, they swaddle your foot in padding to protect you from the unforgiving concrete. But that padding? That's no good for you either. Consider a paper titled “Athletic Footwear: Unsafe Due to Perceptual Illusions,” published in a 1991 issue of *Medicine and Science in Sports and Exercise*. “Wearers of expensive running shoes that are promoted as having additional features that protect (e.g., more cushioning, ‘pronation correction’) are injured significantly more frequently than runners wearing inexpensive shoes (costing less than \$40).” According to another study, people in expensive cushioned running shoes were twice as likely to suffer an injury—31.9 injuries per 1,000 kilometers, as compared with 14.3—than were people who went running in hard-soled shoes.

### Learning to walk properly

Admittedly, there's something counterintuitive about the idea that less padding on your foot equals less shock on your body. But that's only if we continue to think of our feet as lifeless blocks of flesh that hold us upright. The sole of your foot has over 200,000 nerve endings in it, one of the highest concentrations anywhere in the body. Our feet are designed to act as earthward antennae, helping us balance and transmitting information to us about the ground we're walking on.



But (you might say) if you walk or run with no padding, it's murder on your heels—which is precisely the point. Your heels hurt when you walk that way because *you're not supposed to walk that way*. Wrapping your heels in padding so they don't hurt is like stuffing a gag in someone's mouth so they'll stop screaming—you're basically telling your heels to shut up.

And your heels aren't just screaming; they're trying to tell you something. In 2006, a group of rheumatologists at Chicago's Rush Medical College studied the force of the “knee adduction moment”—basically, the force of torque on the medial chamber of the knee joint where arthritis occurs. For years, rheumatologists have advised patients with osteoarthritis of the knees to wear padded walking shoes, to reduce stress on their joints. As for the knee-adduction moment, they've attempted to address it with braces and orthotics that immobilize the knee, but with inconsistent results. So the researchers at Rush tried something different: They had people walk in their walking shoes, then barefoot, and each time measured the stress on their knees. They found, to their surprise, that the impact on the knees was 12 percent *less* when people walked barefoot than it was when people wore the padded shoes.

“If you can imagine a really big, insulated shoe on your foot, when you walk, you kind of stomp on your foot,” says Dr. Najia Shakoor, the studies' lead researcher. “The way your foot hits the ground is very forceful. As opposed to a bare foot, where you have a really

natural motion from your heel to your toe. We now think that's associated with more shock absorption: the flexibility your foot provides, as well as a lack of a heel. Most shoes, even running shoes, have a fairly substantial heel built into them. And heels, we now know, can increase knee load." Another factor, she points out, is that when your foot can feel the ground, it sends messages to the rest of your body. "Your body tells itself, *My foot just hit the ground, I'm about to start walking, so let's activate all these mechanisms to keep my joints safe.* Your body's natural neuromechanical-feedback mechanisms can work to protect the rest of your extremities. You have much more sensory input than when you're insulated by a thick outsole."

The same holds true with athletic shoes. In a 1997 study, researchers Steven Robbins and Edward Waked at McGill University in Montreal found that the more padding a running shoe has, the more force the runner hits the ground with: In effect, we instinctively plant our feet harder to cancel out the shock absorption of the padding. (The study found the same thing holds true when gymnasts land on soft mats—they actually *land harder.*) We do this, apparently, because we need to feel the ground in order to feel balanced. And barefoot, we can feel the ground—and we can naturally absorb the impact of each step with our bodies. "Whereas humans wearing shoes underestimate plantar loads," the study concluded, "when barefoot they sense it precisely."

Six students, of which I am one, have gathered in a studio at the Breathing Project in Chelsea, to learn how to walk properly. "Walking itself is the intentional act closest to the unwilling rhythms of the body, to breathing and the beating of the heart," wrote Rebecca Solnit in *Wanderlust: A History of Walking*, and this is what we're aiming for, more or less, as we circle the room slowly, in our bare feet, under the eye of our instructor, Amy Matthews. She's a former dancer who now does private movement therapy, as well as teaching yoga, anatomy, and kinesiology classes as part of her Embodied Asana workshops. This is day two of a ten-week class on the leg that started, conveniently for my purposes, with the foot. Last week, Matthews showed the students how you should roll through each step as you walk, rather than simply clomping your feet up and down—a lesson that everyone is now struggling to apply. When Matthews asks the class how things went over the past week, one woman is not thinking so much about internal rhythms or the beating of the heart. Instead, she says, "I learned one thing: Walking's *hard.*"

### **Are there barefoot walkers in New York City?**

I too have learned one thing—that if you're interested in learning about barefoot walking, or the "barefoot lifestyle," as it's sometimes called, there are lots of people out there who are interested in teaching you. Websites like *barefooters.org*, the official site of the Society for Barefoot Living, will stridently explain that, for example, it is generally not illegal to drive barefoot, despite what you've heard. (This is true.) And that only a few state health departments forbid people from going barefoot in restaurants (also true), never mind all those signs that say no shirt, no shoes, no service, which are the handiwork of fascistic barefoot-haters.

Follow these enthusiasts too far, though, and you fall down a rabbit hole of eccentricity. While there are many legitimate and relatively non-cuckoo clubs for barefoot hiking across the country, my search for some walking-barefoot-in-New York City enthusiasts led me to barefoot.meetup.com, which led me to Keith ("I'm a 43-year-old man looking to meet new friends with my same interests"), which led me to "Dafizzle" ("I like dirty feet and want to meet others who love walking in the city with dirty feet"), which led me to Ricky ("I'm a 24-year-old male looking for females that like to have their feet played with"). Which led me to abandon my search for a barefoot-walking group in New York.

But any worries I have that Amy Matthews's class will be consumed with flaky spirit quests or roving toe-fetishists are quickly dispelled as she pulls out a model of a skeletal foot. We spend the next hour learning about the 24 (or, for some people, 26) bones in the foot,

from the calcaneus (heel bone) to the tips of our phalanges (toe bones). There's so much information to absorb that, by the time we are back up and walking again, I've already more or less forgotten the distinction between the cuneiform and the cuboid. So it's difficult for me to examine other people's feet while they're at a standstill, which is our next assignment. Which I figure is fine, given that, unlike the rest of these people, I consider myself a very accomplished walker. I mean, sure, I have occasional back pain, and okay, when I walk long distances, I feel a grinding pain in my hip that I never used to feel before. And, yes, when I visited Michael Bulger, a structural integrationist near Washington Park with an expertise in "Rolfing," a kind of deep-tissue massage, and he Rolfed one of my feet, then had me walk around a bit for a before-and-after comparison, I felt, thanks to my un-Rolfed foot, like a pirate walking on a peg leg.

## BARE ESSENTIALS

Several new shoes claim to offer the benefits of going shoeless—though they don't all agree on exactly how bare "barefoot" should be.

SHOD ←-----→ BARE



### MASAI BAREFOOT TECHNOLOGY

The thick sole mimics the soft, unstable ground on which our ancestors walked. But your foot won't roll through each step—the sole does the rolling for you.



### NIKE FREE

After decades of gimmicky shoes, Nike released the Free: light and flexible, and available in various stages, with Free 5.0 pitched as halfway to barefoot.



### VIVO BAREFOOT

Basically a leather slipper with a 3-mm.-thick puncture-resistant sole. It's thin enough to feel pebbles underfoot and flexible enough to fold in half like a wallet.



### VIBRAM FIVE FINGERS

This fabric-and-rubber sock with individualized toes is primarily for outdoor sports like kayaking—though at least one entrant wore them to run in the Boston Marathon.

Still, I'm feeling pretty confident when it's my turn to have my feet assessed. The other students examine. They confer. They seem concerned. Apparently, my ankle bones are stacked like a tower of Jenga blocks that's about to topple.

Then Matthews sits splay-legged in front of me, puts her hand on my ankle, and asks me to move my talus bone. Weirdly, I'm able to do this. She explains that, when we don't use our feet properly, our muscles have to strain to compensate—not just in our feet but in our whole body. She asks me to lift the front of my foot, which I also do. She then replants my foot and asks me to "trust my bones to hold me up."

And I have to tell you, in that brief moment, it felt like I had never stood up properly on my own two feet before in my entire life.

After class, I put my chunky Blundstone boots back on, and I tried to replicate that feeling of "standing on my bones." I couldn't, mostly because in my shoes, my feet couldn't even feel the ground. I spent the rest of the day clomping around the city feeling like a guy wearing concrete blocks, waiting to be thrown in the East River.

Life consists of what a man is thinking of all day," said Ralph Waldo Emerson, and right now I'm thinking of my feet. I'm test-driving a pair of Galahad Clark's Vivo Barefoot shoes, which makes it hard to think about anything else.

Barefoot running has been a subject of interest for serious runners for decades, at least since Ethiopia's Abebe Bikila ran the Olympic marathon in Rome in 1960 in bare feet—and won. But barefoot running is a difficult discipline that needs to be learned properly, and you certainly shouldn't be getting advice about it from me, someone who gets winded running for a cab. The real question for New Yorkers is, What about barefoot walking? Is it possible we could be walking better? Well, if my first few minutes in the Vivo Barefoot is any indication, the answer is, Ouch. Yes. Ouch.

### **Testing shoes designed to simulate being barefoot.**

Barefoot walking is, in its mechanics, very similar to barefoot running. The idea is to eliminate the hard-heel strike and employ something closer to a mid-strike: landing softly on the heel but rolling immediately through the outside of your foot, then across the ball and pushing off with the toes, with a kind of figure-eight movement through the foot. There's a more exaggerated version of this style of walking known as "fox-walking," which is closer to tiptoeing and which has caught on with a small group of naturalists and barefoot hikers. Fox-walking involves landing on the outside of the ball of your foot, then slowly lowering the foot pad to feel for obstructions, then rolling through your toes and moving on. All of which is great, if you're stalking prey with a handmade crossbow, or you're an insane millionaire hunting humans as part of the Most Dangerous Game. As for walking in the city, fox-walking has no real practical application, in part because it's incredibly frustrating to master and in part because you look like a lunatic.

Similarly, you may have heard of a shoe called MBT, or Masai Barefoot Technology, which was developed in the early nineties by a Swiss engineer after studying the barefoot walk of the Masai people. MBTs have gained a cult following because wearing the shoes forces you to work—and presumably tone—your leg muscles. I can attest that this part is true. After wearing MBTs for a short walk, you feel it in the backs of your legs. What you can't feel—at all—is the ground. In an obvious irony, these "barefoot" shoes look like orthopedic shoes for Frankenstein. You stand on a rocker-shaped sole that's designed to be soft and unstable. This improves your forward step but makes it nearly impossible to move laterally, i.e., slalom through slow-moving tourists in Soho. And a ride in MBTs on the herky-jerky D train feels like someone's throwing an ankle-spraining party and you're the guest of honor.

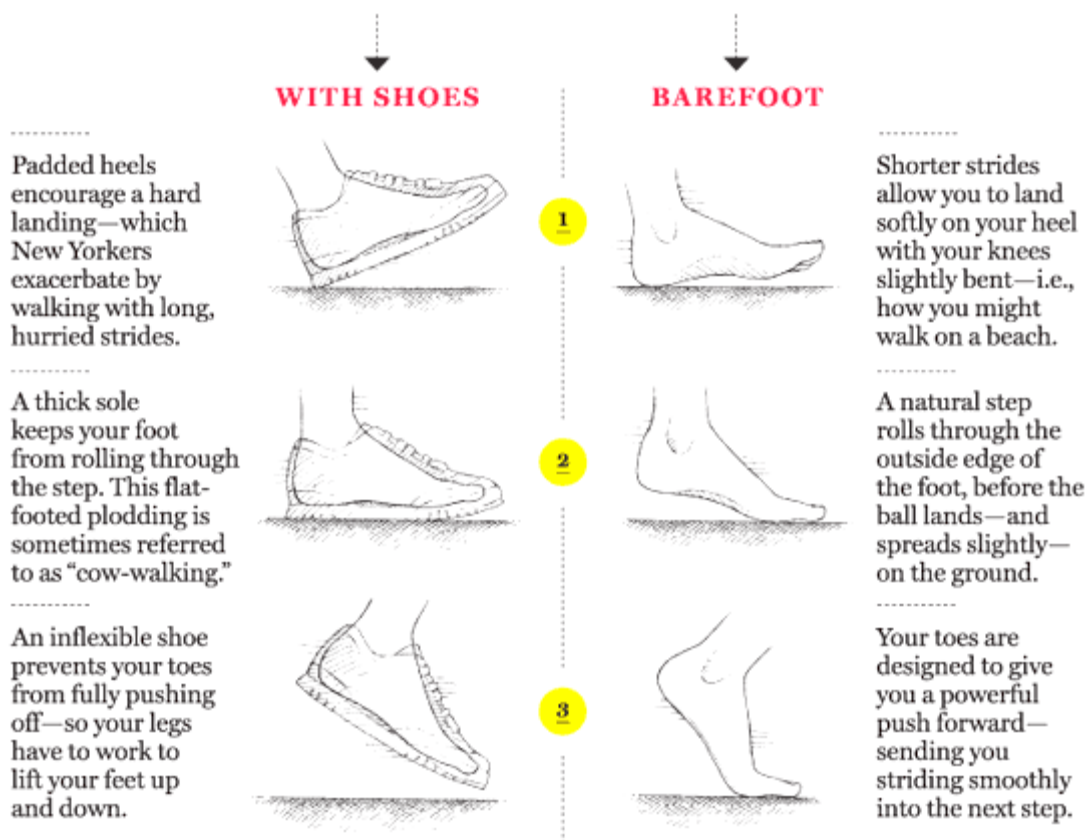
The Vivos are a totally different experience, since they're as close to going barefoot in the city as you can get. Barefoot walking should be easy to master, in theory, and Clark assured me that I won't need any special instruction. The first thing I noticed while wearing the Vivos is that each heel-strike on the pavement was painful. Soon, though, I naturally adjusted my stride to more of a mid-foot strike, so I was rolling flexibly through each step—but then I noticed my feet were getting really tired. My foot muscles weren't used to working this hard.

After wearing the Barefoots for a while, though, I found I really liked them, precisely because you can feel the ground—you can tell if you're walking on cobblestones, asphalt, a manhole, or a subway grate. (Striding along that nubby yellow warning strip on the subway platform feels like a foot massage.) Of course, it's not often that you walk around New York, see something on the ground, and think, *I wish I could feel that with my foot*. But this kind of walking is a revelation. Not only does it change your step, but it changes your perceptions. As you stroll, your perception stops being so horizontal—i.e., confined more or less to eye level—and starts feeling vertical or, better yet, 360 degrees. You have a new sense of what's all around you, including underneath.

Still, while I can accept that barefoot-walking is beneficial, it's hard to shake off 30 years of wrapping my feet in foam. So I put this question—if bare feet are natural, why do we need shoes to “protect” the foot?—to a podiatrist at the Hospital for Special Surgery, who explained, “People who rely on the ‘caveman mentality’ are not taking into consideration that the average life span of a caveman was a heck of a lot shorter than the life span of a person today. The caveman didn't live past age 30. Epidemiologically speaking, it's been estimated that, by age 40, about 80 percent of the population has some muscular-skeletal foot or ankle problem. By age 50 to 55, that number can go up to 90 or 95 percent.” Ninety-five percent of us will develop foot or ankle problems? Yeesh. Those are discouraging numbers—but wait. Are we talking about 95 percent of the world population, or of North America? “Those are American figures,” he says. Which makes me think, *North Americans have the most advanced shoes in the world, yet 90 percent of us still develop problems?* We've long assumed this means we need better shoes. Maybe it means we don't need shoes at all.

## MAKING STRIDES

*Walking is like any physical activity: You can learn how to do it better. Here's a three-step guide to reactivate the machines at the end of your legs.*



### How we can stop taking walking for granted.

Let's face it: I'm not going to walk barefoot in New York. Neither are you. We're going to wear shoes. So even if shoes are the enemies of our feet, what have we really learned?

When I met with Amy Matthews, my standing-up-properly guru, I found out that, as a yoga teacher, she goes barefoot when she can, and the rest of the time she wears supportive shoes like Keens or Merrells. “The most important thing is to change up your shoes as much as possible,” she says. “And let your foot do the walking rather than your

shoe do the walking." Even Galahad Clark still makes and sells regular shoes along with Vivos because, as he says, there are a whole host of reasons people buy shoes, most of which have nothing to do with comfort. So weaning people—especially New Yorkers—off shoes is "a bit like trying to wean people off sex. It ain't going to happen," he says. "My girlfriend loves to put on heels at night. Then the next day she puts her Vivos back on, to recover."

What you can do, though, is stop taking walking for granted and start thinking of it like any other physical activity: as something you can learn to do better. Don't think of your feet as fleshy blocks to be bound up or noisy animals that need to be muzzled. (Oh, my barking dogs!) In one of the Rush Medical College knee-adduction experiments, barefoot walking yielded the lowest knee load, but a flat sneaker, like a pair of Pumas, also offered significantly less load than the overly padded walking shoes.

My new Vivo Barefoots aren't perfect—they're more or less useless in rain or snow, and they make me look like I'm off to dance in *The Nutcracker*. But when I don't wear them now, I kind of miss them. Not because they're supposedly making my feet healthier, but because they truly make walking more fun. It's like driving a stick shift after years at the wheel of an automatic—you suddenly feel in control of an intricate machine, rather than coasting on cruise control. Now I better understand what Walt Whitman meant when he wrote (and I hate to quote another Transcendentalist, but they were serious walking enthusiasts): "The press of my foot to the earth springs a hundred affections."

It might be hard to imagine that the press of your foot to the New York pavement could yield anything other than pain or disgust. But if you free your mind, and your feet, you might find yourself strolling through a very different New York, the one Whitman rightly described as a city of "walks and joys."