

Barefoot Walking Inspires Healthier Shoe Choices

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Based in part on the work of Dr. Ray McClanahan, DPM

Have you ever finished a second hour session only to watch your client bind up their feet in a heavy, restrictive shoe? Do clients ask you what shoes will support their Structural Integration experience, and you aren't sure how to answer? This article will explain the principles of healthy footwear and how to discuss these ideas with your clients. Remember "thin, flat, flexible, and wide toe-box."

Our feet need a healthy balance of stability and mobility: stability for standing and mobility for movement. Most footwear errs on the side of stability, largely immobilizing the foot. Let's find out how your footwear measures up: Take off your shoe, turn it sole-side up, grab it sole-side up, grab it at the heel with one hand, and in the middle with the other hand, and twist. You are checking for "torsional rigidity," a trend in shoes that locks down the mobility of the tarsal bones. Do your shoes have the **flexibility** to allow for natural foot motion?

Shoes that are stiff or overly cushioned interfere with proprioceptive sensing of the ground. When barefoot or in lightweight shoes, the gait naturally adjusts to avoid discomfort from heavy landing. Research shows that conventional sneakers and stiff-soled clogs cause harder foot-strikes, increasing joint shock, and the risk for knee osteoarthritis [Shakoor 2006]. When you can **feel the ground through your shoes**, you will be able to land more softly.

There is another reason why it's important to have shoes with good "ground feel." Sensory feedback from your feet is essential for the correct firing of motor nerves. The nervous system demands quite a bit of sensory data to guide its motor commands: the neural bandwidth for sensory data is about 5 times more than for motor data. Your brain wants to sense your environment before deciding how to move, so it can make adjustments accordingly. One example of this is the tibialis posterior muscle, which does the job of lifting the arch of the foot, but will tend to be lazy if there is a lack of sensory information.

When the tibialis posterior is doing a poor job of raising the arch, it is often further weakened by wearing shoes with too much arch support. The arch is meant to be supported by the foot's bone structure, ligaments, and muscles (*tibialis posterior* and *flexors hallucis* and *digitorum longus*). When the arch of the foot is not coddled by artificial arch support, it will be stronger and more capable. A stiff arch support interferes with the natural pronation stage of walking, when the medial arch of the foot spreads and flattens. The peroneal muscles will still attempt to pronate the foot against this obstacle, which can cause peroneal tendinitis and even IT band strain. Your foot will be allowed to regulate its own arch support when you choose shoes with **minimal arch support**.

The next step in following foot biomechanics is to seek a shoe with a completely **neutral heel**. Most athletic shoes, sports sandals, and even "flat" dress shoes have a half-inch heel. Even a small heel contributes to tight calves and hamstrings and increased heel

strike. A “negative heel” is also not neutral, and I have not heard a scientifically-based argument for why it would be an improvement over nature’s design for the heel.

Exercising in a standard athletic shoe causes the calf to be strengthened in a limited range of motion. Outside the gym, muscles heal in a shortened position, especially if your daily footwear has a raised heel. When the calf is short, the Achilles tendon is vulnerable to tears instead of being strong and resilient. Shortened calves limit ankle freedom, and also impact the rest of the body. Since there is one continuous line of fascia from the bottom of the feet, up the back of the body, to the forehead, it makes sense that short calves could contribute to many problems. Tight hamstrings and lower back trouble are obvious consequences, and perhaps this pull from the calves could even cause neck tension and headaches.

Athletic shoes can set runners up for plantar fascia pain. In one case, an athlete had run many marathons and even a 100-mile race, and wore athletic shoes daily with no problem. However, spending just one day barefoot at a water park triggered severe, lasting plantar fascia pain. The tissue had been overstretched by normal motion after being held short for so long. The typical podiatric recommendation is to avoid being barefoot, but that answer doesn’t address the root of the problem. A better healing plan would be to calm and free the tibial/plantar nerve and artery (between the gastroc heads and along the inner ankle), to lengthen the calf muscles and fascia, and to transition to neutral footwear to support full calf length.

As athletes transition to reduced heels and then neutral heels, careful stretching will help to prevent injury. Stretching should occur after calf exercise that fully warms the muscle tissue. Stretch the calf by dropping the heel off the edge of a curb. Start slowly, feeling for the first place of resistance, pausing for 10-20 seconds to let that resistance soften. Sink deeper and look for the next resistance. Once in the full stretch, hold the position for 60 seconds or more. This measured approach to stretching will prevent injury and support the calf in adjusting to shoes with a neutral sole.

A neutral sole will also be **flat through the toes**. In the past decade, athletic shoes have commonly featured a 15 degree upward slant, called toespring. Toespring was added to facilitate the rolling action of the foot, but our legs naturally perform this motion without changing shoe shape. If the shoe is flexible, toespring can be reversed by bending the shoe in the other direction for a half hour. Toespring may contribute to deformed toes because it holds the toes in a lifted position. Toespring also limits the ability of the flexors and extensors of the toes to work properly. Stretching the top of the foot and toes after exercise can help restore this alignment.

Your toes will enjoy having a **foot-shaped toe box**, which means the toe box needs to be wide at the end of the toes. The shoe should not taper from the ball of the foot to the toes. Narrow toe boxes cause bunions, neuromas, and distorted toes. Athletic shoes are often wide at the ball of the toes but narrow at the tips of the toes. If you remove the insole and stand on it, check whether your toes go over the edges of the insole. If your toes tend to be squished together, spread them to make sure the shoe can accommodate your true toe width. Toes will expand to fill the space if allowed enough room. If you have a wide-toed shoe but you need even more space, you can wear the shoe without the insole liner.

Avoid sandal straps that cross the toes and pull the toes inward.

Narrow toe boxes are a sneaky contributor to overpronation. If the big toe is pushed toward the other toes, the foot is more likely to overpronate. Try it by holding your big toe in toward your other toes, and then out away from your toes, and attempt to collapse into your medial arch. In the natural position, the big toe helps limit pronation.

It's logical that too-tight shoes can deform toes, but shoes that are too loose can cause toes to habitually curl or lift upwards in an attempt to keep the shoe from falling off. Footwear needs to **stay on your feet** without having to use your toes. Common culprits can include flip-flops, clogs, Crocs, and Birkenstocks. Over the years, gripping or lifting your toes will contribute to hammertoes, claw toes, and squished-together toes. Choose a version with a heel strap, or with a design that stays on easily as you walk. Examples would be a slip-on sandal with a strap behind the ankle, or Mary Jane style dress shoes with a strap above the ankle.

Indigenous peoples who have been barefoot since childhood show us how to walk and run correctly. Allow your foot to stay on the ground longer, rolling through to the tips of the toes, then swing your leg forward only to the point where it is just a little in front of your body. Contrast this to reaching the foot far in front of the body, striking the heel, and pulling the rest of the body forward. This new stride will be shorter but with a faster cadence. Each step will feel lighter, minimizing both impact and effort. Keep the feet fairly close to your midline, over your center of gravity. This prevents side-to-side rocking, for reduced impact and improved balance.

You've found shoes that are wide at the end of the toes, but when you take out the insole and stand on it, your big toe or little toe still extends past the edge. Your toebox needs a little more room. Ideally, choose a larger size. You can also re-lace the shoe, skipping the first pair of eyelets, to allow more room at the toes. You can try to stretch the leather in specific places, soaking it in rubbing alcohol and using a tool such as the blunt end of a pen or a device called a bunion shoe stretcher.

If the toebox is spacious but your toes are still inactive, you can wake them up by wearing toe socks, which have a separate pocket for each toe, like a glove. This stimulation will increase sensory information coming from your toes and help you learn to use them. Injini brand offers wicking fibers appropriate for sports, but their toes are sometimes too long for the average woman; for women I prefer Feelmax anklets, available at www.sockdreams.com. Toe shoes, such as Vibram Five Fingers, can also help activate your toes, but they aren't a good solution for everyone. I suggest the leather type because they are more comfortable and more adaptable in fit than the synthetic options.

You don't need to throw away any of your shoes, just put some of them out of easy reach in the top of your closet. If you follow these guidelines for several months, then put on your old shoes, you will feel the difference and may be ready to discard them.

Also, new shoe purchases need not be expensive. Just keep these principles in mind as you shop, and you will find many minimalist shoes for \$80-120. Excellent brands include Lems, Vivo Barefoot, Altra, and Soft Star Moccasins. Pie Footwear in Portland, Oregon is a store that features minimal shoes.

The next time you are out shopping for shoes, look first for shoes that have a very wide toe box and a neutral heel. Pick up each of these shoes, turn them over, and twist

specifically at the tarsal bone area to check for flexibility. If they pass the twist test, pull out the insole (if possible), put in on the ground and stand on it with your toes. Then, try on final candidates for fit and comfort. This way, you are spared trying on shoes that may seem initially comfortable but work against your biomechanics.

Please contact me at 503-230-0087, or see my website www.portlandrolfer.com/feet for more information including classes on this topic and links to scientific studies on feet and shoes.

Scientific studies

“Walking Barefoot Decreases Loading on Lower Extremity Joints in Knee Osteoarthritis,” by Najia Shakoor and Joel Block, published in *Arthritis & Rheumatism*, Sept 2006.

“Foot Strike Patterns and Collision Forces in Habitually Barefoot Versus Shod Runners,” by Daniel Lieberman et al., published in *Nature*, November 2009.

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Using Rolfing to ease the transition to minimal shoes:

- Free the calves, including gentle work to free the tibial nerve deep between the heads of the gastroc and at the inner ankle. This will help the calf be able to operate at its full length, instead of the shortened position when wearing athletic shoes with a raised heel. The result should be improved talar glide, easier hip extension, and less effort in walking.
- Sculpt the metatarsals into their natural transverse arch shape. Some Rolfers do this using both hands, the fingers creating the shape by pushing into the bottom of the foot. I find it easier to put the knee up, foot flat on the table, with a racquetball under the transverse arch. Then both of my hands are free to work.
- Awaken the toes with detailed work to help each toe find its own role. Simply having the sensory input from your work will help the toes operate independently. Derotation of each phalange bone and fascial opening of tight sections of the toes is helpful.
- Look closely at shoes and socks. Perform "fascial release" on the toe seam of tight socks, and teach clients to do it. Simply pinch and stretch. Encourage them to cut, stretch, and otherwise modify their shoes to fit their feet and optimize their foot function. If a client has foot pain, examine shoes for a seam or a fabric pill that might be rubbing.
- Give this article to your clients so they can make educated decisions when purchasing shoes. A short client-friendly 2-page version is available on my website, www.portlandrolfer.com.

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Making Reasonable Exceptions

Some people may wish to use non-minimalistic shoes for specific activities. Examples include:

Tall heels for tango, salsa, or flamenco – but look for a wide toe box

Hiking boots for extreme mountaineering only, especially with crampons or snowshoes

Work boots for standing on ladders, using a shovel, or other dangerous tasks

Ski boots, which resemble an ankle cast – seek the widest toebox possible

Climbing shoes are very restrictive of the toes. Beginner climbers should buy less restrictive shoes, as the tight toe box provides less advantage at beginning levels. More competitive climbers who are using aggressive shoes should remove them between climbs.

For people who love these activities, it is important than the rest of your shoe wardrobe is minimalist. Bring a lightweight shoe to change into immediately after the activity, or go barefoot if possible. Spread your toes and stretch your calves to restore full motion to your legs and feet.

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Teaching the Public

You can use this article as a guide for teaching classes on healthy footwear in your local area. I teach a 90-minute class on healthy footwear that called a "Shoe Clinic." This clinic is a hands-on lesson in evaluating shoes and even modifying them to optimize foot health. Participants bring an assortment of their shoes. The shoes are a great visual aid, as we go through the various points in this article. People leave the clinic motivated and clear on how to improve their foot health through their daily shoe choices. My target audience for this class is young people with healthy feet who want to stay active their entire lives.