The Barefoot Route

Some Runners Prefer to Return to the Basics of Human Locomotion.

BY ZOIE CLIFT

"The human foot is a work of art and a masterpiece of engineering."—Leonardo Da Vinci

Though it could have happened, running barefoot did not disappear with the advent of the running shoe. A subculture of runners still abides by the au naturel technique our ancestors relied on even with the rows upon rows of hi-tech options stocking the shelves of running stores these days. One of the most often-cited barefoot cases was Ethiopian runner Abebe Bikila, who ran a world-record 2:15:17 marathon at the 1960 Olympics in Rome. South African Zola Budd also springs to mind: in the early 1980s, she made headlines by breaking one middle-distance record after another sans shoes.

A solid example of a barefoot runner these days is Ken Saxton, 51, a computer technician from Long Beach, California. Saxton finished 14 marathons barefoot in 2006, and has now completed a total of 56 marathons barefoot,

Dr. Edward H. Kozloff Collection

▶ The soles of legendary runner Abebe Bikila, who ran the 1960 Olympic Marathon in Rome barefoot, winning the gold medal and setting a world record in the process.

Photo by Margaret Everitt

▶ Pat Saxton shows off the soles of his brother, barefoot runner extraordinaire Ken Saxton, who was a guest speaker at the Pacific Shoreline Marathon.

including major races such as Los Angeles and Boston. There is even a society, the Society for Barefoot Living, devoted to the lifestyle. Though barefooting has survived the test of technology, many runners disagree about it, with some being wholehearted backers while others view it as a route to potential injury.

So with this in mind, it seems interesting to trace how we went from running barefoot through nature to running in what to ancient man would probably seem like clodhoppers. From there, we will take a quick tour of what barefoot running can offer endurance runners today.

A NATURAL EVOLUTION

The evolution of mankind has witnessed humans running barefoot safely on dirt trails and roads for thousands of years. Stories exist of Bushmen relentlessly chasing down zebra and of Navajo Indians doing the same with pronghorn. Some anthropologists believe humans evolved as a diurnal endurance predator that was an adept endurance runner. One such person is Daniel Lieberman, a professor of biological anthropology at Harvard University. His studies in human evolution include how the ability to run played a crucial role in this arena. His published work in the British science journal *Nature* highlights his theory of how the human body was shaped by long-distance running. He says early humans probably took up running around 2 million years ago, after our savanna ancestors began standing upright.

Lieberman said there is often a misunderstood aspect of ancient man's ability to run long distances. "We wrongly think of ourselves as nature's wimps," he said. "We are actually among the most spectacular athletes in the mammalian

world, but we are a different kind of athlete compared to most animals. Whereas most animals are designed for speed and power, humans have evolved to be endurance athletes. The human ability and proclivity to run long distances, especially in hot conditions, is unique among primates and exceptional among even the best runners in the animal kingdom." He said traits that aided running included a foot structure that allowed efficient use of the feet to push off, ligaments that acted like springs, and shoulders that rotated independently of the head and neck, aiding in better balance.

Today, barefooting is far from extinct, and Lieberman said he is not surprised by modern man and his capability of running long distances without shoes.

"People don't run barefoot any more simply because they don't have to," he said. "The barefoot running movement is wonderful evidence of how good the human foot is for doing one of the most natural and fundamental of all human activities—endurance running."

BAREFOOT BIOMECHANICS

The fastest runners have a style quite similar to that of a person running without shoes. They absorb shock by landing lightly on their forefeet rather than on their heels, and their landing leg is beneath the torso, with the leg slightly bent to absorb impact.

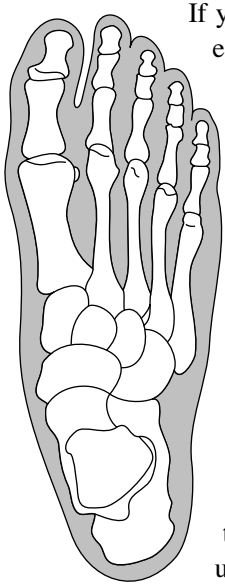
Shoes are useful because they protect from broken glass and in the winter, when conditions such as freezing ice and snow can numb the feet. Also, there will always be routes where obstacles such as stones and nails provide conditions where going barefoot just wouldn't be ideal.

However, shoes treat your feet like planks that move only at the ball of the foot. In other words, they often protect the feet so much that certain muscles get lazy because they are not being used. Michael Warburton, a physical therapist in Queensland, Australia, found that running barefoot decreased the occurrence of ankle sprains and chronic injuries such as plantar fasciitis. According to his study, shoes also increased the risk of sprains because they made a runner unaware of the foot's position.

Some consider shoes protective devices from dangerous or painful objects rather than corrective devices because their capacity for shock absorption and control of overpronation is limited. In other words, shoes do a good job of protecting from the elements, but over time they desensitize the tiny sensors in your feet that tell them how to react to the terrain. Eventually feet grow lazy and weak, triggering a chain reaction up the entire leg that can lead to shin splints, runner's knee, and iliotibial band strains. Cushioned running-shoe heels add to the problem by shortening calf muscles and the Achilles tendon. Barefoot running stretches the calves and gets foot muscles moving again, promoting good biomechanics.

"Many runners believe shoes have magical properties that they probably lack," said Amby Burfoot, an executive editor at *Runner's World* magazine. "Mainly we run in shoes for comfort and safety, reasons that are compelling enough to me." Burfoot, who once ran a hard, fast three miles barefoot on a road course when he was young and now opts for routes on grass or golf courses, has his own take on barefooting. "It's all the same sport," he added. "I think we exercise personal preference, like some who prefer 5Ks and some who prefer marathons."

THE FIRST STEPS



If you open up the pages of *Gray's Anatomy*, you can see that each foot has 26 bones and more than 20 muscles and associated tendons. The skin on the sole of the foot is more resistant to abrasion than skin on any other part of the body.

Saxton said a misunderstood aspect of barefooting is that you must have really tough soles. "It is true that the soles will get tougher but like soft leather, more like the palm of our hands, not the hard crusty calluses some people expect," he said. "Most who ask to look at my feet are surprised because they are softer than their own feet. Hard calluses don't last long on hard asphalt; I guess that's why automobile tires are made of rubber, not stone."

Saxton, who said he learned to run because of four siblings chasing him, had some tips for going barefoot, including applying sound running technique such as keeping a vertical torso, bent knees, relaxed ankles, and landing with your foot under your body. "If you land with your foot in front of your body, you are hitting the brakes and bashing your knees," he pointed out. "If you want to run forward, the body should be moving in front of the foot."

According to exercise physiologist and Olympic marathoner Pete Pfitzinger, the key to starting out is to go slowly. He advises walking barefoot for a few weeks to toughen up the skin on the bottom of the foot as well as the muscles in the ankles and feet. Once you are ready to run, start with a mere five minutes, increasing slowly and running barefoot every couple of days. From there, build to up to 20 minutes over a month. After a few weeks of this, the feet and ankles will be stronger, thus reducing the risk of injury. Possible places to train include sandy beaches and golf courses.

The barefoot running technique has been described as falling forward. It has also been described as gently kissing the ground with the balls of your feet. If you need one more concept to meditate on while running barefoot, imagine that

Barefeet on the Web

During my research into barefoot running, I came across quite a few Internet spots that might be of interest. A Passion for Running, which can be found at *www.completerunning.com/running-blog-mark/*, is a solid site for runners across the board. Saxton's Web page at *www.runningbarefoot.org* is a comprehensive take on the sport from the Barefoot Guru. Also, *http://barefootted.com/*, with its tag line of "One foot at a time, One sole at a time, One hell of a good time," is another example of the many blogs available on barefoot running.

a log is lying across the path in front of you; you don't want to kick the front of the log with your toes. You want to step over the log with each step, keeping your knee bent and placing the ball of your foot immediately behind the log as your chest moves over the top of it.

BENEFITS AND PRECAUTIONS TO CONSIDER

Once you decide to take off the shoes, the next step is looking at the benefits and precautions of barefoot running. These days, in light of the evolution of the running shoe, the practice of running barefoot is considered unsafe by some. "What do you use for arch support?" some might ask. "My arch," is probably usually the first answer that pops out of the mouth of die-hard barefooters.

Lieberman views the proposed link between barefooting and increased injuries with a perspective gleaned from his years of research in the field.

"The human foot is a marvelously adapted machine, and clearly more capable of effective barefoot running than most people appreciate," he said. He added that several factors lead to the foundation for most barefoot injuries. First, people who wear shoes have not developed the calluses necessary to protect the foot, particularly in modern environments replete with pavement. More important is a decrease in the use of the arch of the foot, which acts as a spring. "When you walk, you land on your heel, but during running you land toward the middle of your foot on your plantar arch," he said. "The arch acts as a spring, stretching and then recoiling, not only helping to cushion the impact of the collision with the ground, but also to help push the body into the air. Laboratory studies show that the plantar arch alone returns at least 17 percent of the energy of impact. Running shoes have largely replaced our arches, but they are neither as effective nor as durable. Barefoot runners can clearly do as well as shoed runners, but it takes time to develop the strength in the foot to use our natural arch fully."

According to Dr. Benno Nigg, founder of the Human Performance Laboratory at the University of Calgary, barefooting puts fewer demands on the energy sup-

ply of the human body, costing around 3 to 5 percent less oxygen than running with a normal running shoe. Another benefit is that it incorporates more training for the small muscles in the foot and lower leg when running on grass, which is typically associated with fewer injuries.

Some argue that running shoes can correct an Achilles curve as well as a runner's tendency to overpronate, of which the Achilles curve is a symptom. The belief is that this tendency can't be corrected when you are running or walking barefoot, and in fact it will worsen it.

Nigg, however, had a different take. "If we assume that most people have an alignment that is bad, one would think that shoes should be used to align the locomotor system appropriately," said Nigg. "The facts are most people have an alignment that is fine; shoes and orthotics do not align the locomotor system in a major way. Alignments are typically small and not systematic. Thus even if one would like to align, shoes do not align systematically and properly."

Nigg said that the initial danger of going barefoot is that people are not used to it, so some of the muscles that are not used with shoes, which are quite a few, will be overloaded. Also, the plantar surface of the foot has not built a protective skin, so blisters may also initially be a problem. He mentioned that precautions should include strength training of the small muscles, slow adaptation to strengthen the plantar surface of the foot, and running on grass or similar surfaces initially.

"Barefoot running is typically considered more 'natural.' However, one should include not only the bare feet but also the more natural surfaces. We are not trained for barefoot running, thus any changes should be slow."

A NATURAL ALLIANCE

Barefoot running may seem like a threat to shoe corporations, but some companies are taking advantage of the idea.

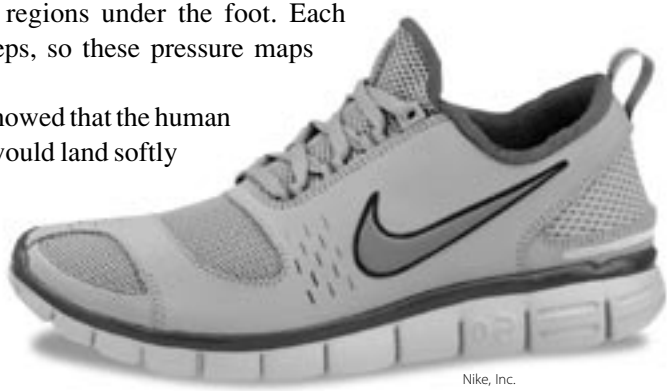
Lieberman said that Nike developed a running shoe that provides protection for the sole of the foot while also allowing runners to use their natural arch. This shoe was the lightweight Nike Free 5.0, which was specifically designed to emulate the motion of running barefoot and with a sole flexible enough to bend in half. The shoe is supposed to strengthen little-used muscles in the foot, forcing a runner to land on the forefoot rather than the heel, and thus helping with balance.

The Nike Free is more of a training tool or a conditioning tool than a piece of running footwear. The concept is that by using it three to four times a week for six months as part of an athlete's warm-up, the health of the foot will be improved and the ability of the athlete to develop speed and proper locomotion will be enhanced.

As part of product development, the company studied the biomechanics of running barefoot. Jeff Pisciotta, a biomechanics researcher at Nike's Sports Research Lab, based in Beaverton, Oregon, explained one study that included 10 men and 10 women runners.

Pisciotta said reflective markers were placed on the runners' joint centers, ankle, knee, hip, and metatarsal-phalangeal joint, in order to accurately calculate joint angles. Each runner was allowed time to acclimate to barefoot running on grass. They were then videotaped while doing five running trials each to develop data for a statistical analysis of the average of 50 runs for the men as well as for the women. The researchers also used pressure measurement to extract peak pressures, the distribution of pressure, as well as the timing of the pressures in specific anatomical regions under the foot. Each subject took 150 steps, so these pressure maps could be calculated.

Pisciotta's film showed that the human foot, unobstructed, would land softly



Nike, Inc.

▶ The Nike Free was designed to emulate the motion of running barefoot.

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Photo by Melissa Callison

▶ Barefooters at Lake Tahoe Marathon—(left to right) Michael Legault, Todd Byers, and Ken Saxton.

and repeatedly, using all of the muscles, ligaments, and bones in the foot. Pisciotta compared the motion to a very soft airplane landing.

Although runners' foot shapes were different, the foot compensated, and the gait would result in the same thing—a nice soft landing of the foot, heel to toe, with the process repeating itself, step after step.

THE NEXT STEPS FROM HERE

Coaches such as Brooks Johnson and Vin Lananna have said that barefoot running was part of an overall program to train the body to run long distances fast. In their opinion, to work properly, the foot needed to grasp and release on a variety of surfaces; it needed to run on dirt, grass, road, concrete, and gravel. Many recreational runners are also starting to try barefoot running in an effort to prevent injuries and improve technique.

"Hopefully we will see athletes get faster . . . new records being set," Pisciotta said. "And that barefoot running will be recognized by more coaches, trainers, and athletes as a useful tool that should be incorporated into a holistic training regimen."

If nothing else, barefoot running is another training tool. As Saxton put it: "What's really great about running is that ultimately, racing, especially a marathon or ultramarathon, is about getting from the start line to the finish line, and that isn't about shoes, or bare feet, or running the entire distance without taking a walk or nap breaks, or running backwards, or whatever. It's very personal, and it's about having options, as long as you're ambulating under your own power, without wheels. Just remember, it's a footrace, not a shoe race."