

# Shoes Are Not Paleo

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## INTRODUCTION

At events such as the Ancestral Health Symposium and PaleoFX, attendees come from many walks of life. However, surprisingly, I have yet to meet anyone who shares my professional background. I came to my interests in ancestral health through the field of massage therapy. While this detail might seem inconsequential, I find it crucial to drawing conclusions so radically different from those of most health professions.

No other type of health practitioner spends so much time with their hands directly on human bodies, listening at length to the stories told from client perspectives while feeling the results in their tissues. In addition, few other professions devote so much simultaneous attention to self-awareness and corrective mechanics in the practitioner's body. Furthermore, the skilled bodywork practitioner realizes that their ability to effect change lies not in imposing outside force, but in facilitating and encouraging the body's own innate mechanisms.

This approach as dual observer and gentle facilitator promotes a deep curiosity and appreciation for the human body. This allows for an understanding of the body unobtainable through any other profession. Through practicing massage therapy for the last six years, I have observed patterns, sought to answer questions, tested ideas out on my own body, and developed a comprehensive theory of how daily movements (and the ways we learn them) contribute to either physical robustness or degeneration as we age.

## DISCUSSION

Shoes Are Not Paleo is about recognizing how our brains and feet cooperate to manage our biomechanical energy expenditure, a key strategy that led to our evolutionary success. Barefoot endurance running (the hunting strategy which elevated humans to the top of the food chain) provides impact-based feedback to our sensitive soles, which the brain relies on in order to assess movement efficiency and calibrate muscular engagement. The absence of this feedback likely contributes to modern humans' failure to develop and to maintain the physical robustness of our ancestors (Ryan, 2014).

The key evolutionary pressure to consider in this discussion is that of energy management. As Daniel Lieberman explains in *The Story of the Human Body*, "life is fundamentally a way of using energy to make more life" (p. 94). While most modern human cultures have overcome energy access as the limiting factor to reproductive success, our bodies and brains are still ingrained with the strategies that optimized energy usage in evolutionary times. These strategies come in two varieties: energy acquisition and energy conservation.

## Energy Acquisition

Unlike plants, which rely on photosynthesis, animals acquire energy by consuming food: i.e., other organisms. In the case of humans, according to Lieberman, the innovation which gave early humans such a boost in energy acquisition, allowing us to continue expanding our brains to the point that they consume a massive 20% of our total energy, is known as persistence hunting.

Evidence for meat-eating in humans dates back to 2.6 million years ago, and hunting of large game such as wildebeest and kudu by *Homo erectus* dates to at least 1.9 million years ago. However, this is long before the introduction of stone spears (500,000 years ago) and bows and arrows (100,000 years ago). It also long pre-dates the earliest use of fire (around 1 million years ago) as well as the consistent use of fire for cooking, which began as recently as 400,000 years ago (Lieberman, 2013, p. 73-103).

In other words, before tools or cooking or any other technology, we evolved to hunt by moving more efficiently and discharging heat better while running than any quadruped, mercilessly pursuing our prey until it collapsed from heat stroke or exhaustion (Lieberman, 2011). This ascension to top-level predator status literally fueled human development more than any other innovation. Additionally, this reliance on our physical capabilities meant that, as we will revisit later, we were under selection pressure to maintain health even as we aged.

## Energy Conservation

As we have just discussed, endurance running is in fact a quintessential human activity with immense rewards in energy acquisition. At the same time, it entails a great deal of energy expenditure in pursuit of our prey. Locomotive activities such as this are subject to strong selection pressure to conserve energy through efficiency of movement (Lieberman, 2013, p. 42).

Ideally, conserving energy during locomotion means that all our momentum should be in the direction we are trying to travel. Any excess wobbling of appendages, bouncing up and down, or other interruptions to forward momentum represent wasted energy. This presented a challenge, however, as we attempted to balance progressively larger heads (carrying our expanding brains) over two small feet, alternating quickly between them while using them to propel us forward.

This challenge is met by alignment and core coordination. We minimize disruptions by spending energy on strong core muscles like the gluteal complex (to stabilize the pelvis relative to the femur when only one foot is on the ground), abdominals (to counteract twisting and extension in the lower back), and upper back (to maintain scapular position and allow counter-rotation of arms and hips so momentum of the head is least disturbed). With these components in place, the lower body can exert forcefully without destabilizing the carefully-balanced upright structure.

At the same time, the body is still reluctant to spend this energy without proof of cause. As with any muscular strength training, it awaits the proper stimulus before responding. The key insight I

propose is that the proper stimulus, without which we no longer automatically develop healthy alignment and coordination, is the ability of the feet to accurately sense impact forces while running.

### **Impact Significance**

The defining feature of running, as compared to walking, is that it involves “flight:” a period during our stride in which both feet are off the ground. When not supported by our lower body, we are subject to the acceleration of gravity and to the potential for impact force created by free fall. We have tremendous ability to reduce this impact if we keep our feet under our center of mass and minimize the duration in which we are in an uncontrolled fall.

If the feet land forward from our center of mass, which is characteristic of heel striking, there is an impact transient created as the foot decelerates rapidly while the center of mass is still traveling forward. This can be eliminated in a controlled forefoot strike, as the knee bends and the foot already begins traveling backward to meet the center of mass before touching down (Lieberman, 2009).

The ability of our strike pattern to eliminate the impact transient is dependent on two other factors. Keeping our feet under our center of mass means that we can maximize our active resistance to gravity through muscular engagement during greater portions of our stride. Further, this allows us to increase our cadence, or steps per minute, because the foot has to travel less distance per step. Faster steps reduce the amount of flight time, i.e. falling, in between steps.

Combined, all of these factors result in fluid movement with negligible disruption in forward momentum. Since we can control all of them through muscular engagement, the perfect feedback system is one based on these impact forces. It is our feet which inform the brain and body when tighter coordination of our muscles and fascia is worth the extra energy cost.

### **Foot Sensitivity and Modern Injuries**

Feet, like hands, are extremely sensitive organs. This is especially true with regard to loading forces, which are discerned by mechanoreceptors on the plantar surface. In 1988, Steven Robbins published a paper on this topic, “Sensory Attenuation Induced by Modern Athletic Footwear.” It has been cited as support for minimalist footwear that purports to restore sensation and thereby stimulate muscle activity to improve running form.

Unfortunately, Robbins’ most important point seems to have been overlooked: that deformations in the plantar surface (i.e. bumps) are required to stimulate those mechanoreceptors. The vast majority of even “minimalist” shoes still maintain sole thickness sufficient to defray this effect.

Because we not only run less than our ancestors did but also shield ourselves from the real and varied ground surface when we do, our brains believe we’re always moving efficiently and never bother spending energy on core muscles, coordination, or postural alignment. Thus, our joints suffer, we age poorly, and we get injured doing basic activities like walking and running.

## **Health and Longevity**

We should not look at these injuries as the inevitabilities of aging. Because of humans' extended period of childhood dependence and our social evolution in tight-knit tribal communities, pressure to maintain health does not end at giving birth, but in fact spans generations.

In hunter-gatherer times, the number of offspring you could raise was highly dependent on how much food you could provide for them (Lieberman, 2013, p. 112). Being healthy and able to contribute resources to support one's grandchildren and great-grandchildren bolsters our genetic pool (Hawkes, 1998). The alternative, becoming frail with age and draining the community resources, would be selected against due to the calorie costs (absorbed among the community as a whole) associated with feeding dependent offspring (Lieberman, 2013, p. 108).

With this in mind, it is worth considering that the defining activity of human evolution (barefoot endurance running) is incredibly supportive of long-term health through its positive effect on core musculature and alignment. Predictably, musculoskeletal dysfunctions have become overwhelmingly common in modern cultures where this activity is conspicuously absent.

## **Recommendations**

This topic deserves urgent attention as the musculoskeletal dysfunctions which we commonly associate with old age are occurring earlier and more frequently. Back pain rates are increasing rapidly even in young populations (Freburger, 2009), and arthritis affects as much as 7% of the population by age 44 (Centers for Disease Control and Prevention, 2013). This onset matches or precedes many of the other mismatch diseases like heart disease, type 2 diabetes, and cancer which have often garnered more of our attention (Mozaffarian, 2015; Wild, 2004; Cancer Research UK, 2013).

I have personally committed to going barefoot as much as possible, weather-permitting, including running, and have seen improvements in my feet, gait, and posture. Similar anecdotal reports abound from other individuals who have chosen to live barefoot lifestyles. However, without documentation of the process, it is impossible to make any specific claims.

We should consider millions of years of human success, as well as existing cultures which still go primarily unshod, as support for its efficacy. We must recognize that we have cut ourselves off from our body's innate intelligence system, reconsider whether foot "protection" should be the default, and commit to research and measures that address these problems at their root.

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