



What is natural about footwear?

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In numerous shoe surveys conducted over the years, comfort has always topped the list of desirable features for consumers. Comfort in itself is a complex set of tactile, thermally and biomechanically correct features that can be built into a shoe to offer the wearer support, shock absorbency and thermal comfort, all packaged in an unrestricted natural shape. However, an even more difficult word to explain in shoe making terms is the word 'natural'.

'Natural', as well as being adopted as a footwear brand name, together with Naked Foot, VIVObarefoot and Earth Footwear, conjures up images of strolling tirelessly through endless fields of lush green grass or walking on soft golden sandy beaches. 'Natural' is one of those nebulous terms that need defining, especially when assigned to footwear where the product is actually 'unnatural' or even foreign to the bare foot to begin with. Like all animals, humans do not require shoes at birth, but there is an immediate need, in terms of warmth and protection, within one to two years.

The natural state

In our natural barefoot state, the ideal distribution of weight for the human body, when standing, is 50% on the ball of the forefoot (metatarsals) and 50% on the heel bone (calcaneus), the largest bone in the foot. When we put on a shoe with a heel, the body's weight distribution changes. Depending on the height of the heel—from an athletic shoe with a 15° distal pitch on the metatarsals to a 55° pitch on a lady's 75mm high heel—the weight distribution will change from approximately 40-60% distal to 20-80% forward on the forefoot.

Would this be regarded as 'natural'? Well, obviously not in the instance of the lady's high-heeled shoe. But, when one considers that all propulsion starts with the midfoot and propels the body forward on to the ball of the foot and finally to toe

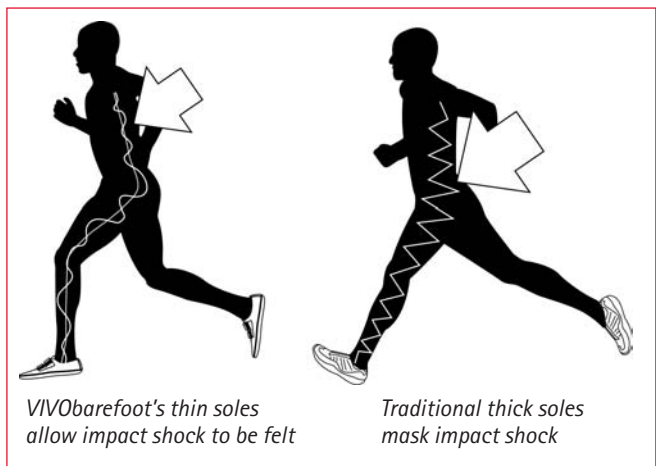
off, it is in fact an advantage to shift the weight forward into the 'ready' position in many athletic activities. Ask any tennis player whether they would prefer to receive serve back on their heels or on the balls of the feet.

Shoe balance

Shoes in all of their construction forms, styling and functions can be categorised simply into three Sagittal planes:

- Neutral that basically keeps the foot on a level plane
- Plantarflexed that shifts weight forward on to the ball of the foot as with any heel or wedge added to a sole
- Dorsiflexed in the case of the negative or minus heel concept that transfers more weight on to the heel of the shoe

The new VIVObarefoot brand from the UK is based on the neutral plane concept which, together with an ultra-thin and highly flexible puncture-resistant Kevlar sole, claims to ➤



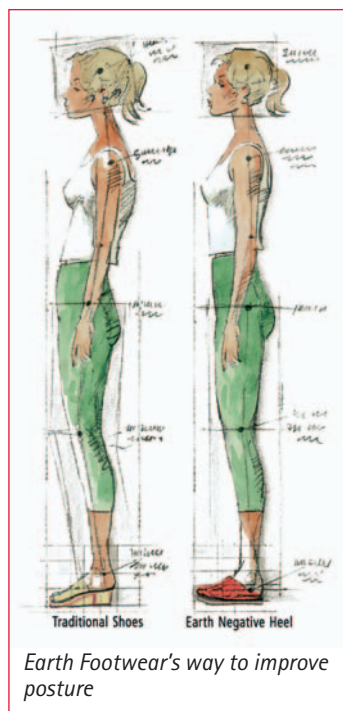
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stimulate natural sensory perception, strengthen the foot muscles and realign posture.

New or renewed shoe concepts have been introduced in footwear over the years. Many are conceived and/or marketed as being 'natural'. One such, the Earth shoe, has been reintroduced in the USA by Earth Footwear Inc. with e-tailer lovethoseshoes.com distributing the brand across Europe, Africa and parts of Asia. Earth shoes were initially launched in the US over thirty years ago but then disappeared from the fashion scene.

Basically the brainchild of a Danish yoga master Anne Kalso, the Earth shoe is made with an anatomical plantar surface with a 'minus' or negative heel. Thus, the rearfoot is positioned slightly lower than the rest of the neutral plane sole surface. This concept is often referred to both bio-mechanically and anatomically as natural with the explanation that the negative heel concept simulates walking barefoot in soft sand, allowing the heel to sink lower than the mid and forefoot.

Whether the concept is correctly termed as being natural or not, it does seem to improve the posture of the body, allowing the wearer to stand and walk more upright through better alignment of the spine.



little change in shock absorption or motion control in shod versus unclad feet, even though this might seem hard to believe. The third aspect of the article ties into the Benno Nigg study supporting the theory that wearing shoes—at least for running—deceives the body's proprioceptive abilities, reducing its reaction time as well as weakening the lower extremity support muscles, tendons and bones.

Imitating natural walking

Anne Kalso conducted studies over a twelve-year period to create and hone a shoe that would simulate how the foot would mimic the natural action of walking barefoot in the sand. In order to test her theory and design she often embarked on 800km treks.

In 1969 an American couple visiting Denmark discovered the negative heel technology and took it back to the States. The shoes were launched at a Manhattan retail store to coincide with the world's first Earth Summit and were aptly named Earth Shoes. They attracted a huge following amongst the hippy community which later grew to include mainstream markets across the country. Manolo Blahnik, the NY fashion shoe designer famous for his extreme ladies shoes, has been quoted as saying: "It was the first shoe, along with the Jesus



Stability in walking

Stability during locomotion is important for all age groups, and two strategies can be employed to improve stability. One is to strengthen the lower extremity muscles and the other is to construct shoes and inserts that provide proper support for the feet. However, a study by noted professor of biomechanics Dr. Benno Nigg has shown that shoes which provide stability cause the muscles contributing to static and dynamic stability to become weaker as they are not fully used.

A recent article in Runner's World magazine explored several interesting comparisons on running barefoot versus running in shoes. One explains the weight disadvantage of adding any type of shoe to the furthest extremity of the body. It has been proven that 100 grams of extra weight added to the feet can decrease running economy by 1% (this was the thinking behind Nike's Mayfly shoe).

Another interesting result from these experiments has shown

sandal, to make a social statement."

The MBT Swiss Masai brand has taken the negative heel concept and reversed it by elevating the heel with a softer density pad at the rear of the heel to thus reverse the negative heel effect on landing. This unique multi-layered sole design claims to transform flat, hard artificial surfaces into natural (that word again) uneven surfaces and simulate the walking action of our barefoot ancestors. The company claims this improves body posture by 'challenging' the sole, and the muscles used to form posture, to be more active. This reactive, more supportive muscle action also increases shock absorption for joint and cushioning cartilage. Walking more upright not only looks better but automatically makes us healthier and stronger. It is good training for the body and is more 'natural'.

Natural materials

Leather was one of the first materials used to make shoes,

probably as a moccasin some 12,000 years ago and remarkably, is still the primary upper component in use today. Leather is derived from the skin of many different animals which, when tanned and treated for use in footwear, is about as close as one can get to basic nature. The natural grain surface of leather gives it its particular look and character. If it is blemished or not aesthetically attractive, it is often improved by embossing with a natural-looking grain pattern.

Another way to look at the word 'natural' in footwear terminology is to consider how, recyclable, biodegradable and ecologically-friendly the components that make up the finished shoe are. In the UK, lovethoseshoes.com is marketing its natural-type footwear as Vegan shoes, certified by both Vegan and Vegetarian Societies as containing no animal by-products or derivatives. The shoes are made using a refined polyurethane material that replicates real leather and are apparently popular with both vegetarian and non-vegetarian customers.

Bio-electromagnetism

Ask a panel of shoe experts whether they felt that making a shoe breathable was a more natural benefit and they would undoubtedly answer "of course". Ask them if including a shock-absorbing layer in the sole added comfort to shoes used on modern surfaces and the answer would also be "yes". Ask them if it would be more natural to make a shoe lighter or heavier for

use in lifestyle or athletic footwear and the answer would again be positive.

Ask them if the feet are in a more natural state when on a plantarflexed, neutral, or dorsiflexed angle and there would probably be some debate, but they would most likely settle on a neutral plane as being the most natural answer. Now, finally ask the panel if it would be more natural for the body (through the feet) to be insulated from the ground's electromagnetism or be conductive, there would probably be total silence.

The body is an electro-chemical machine. We know a great deal about the chemicals—in the form of food and supplements—that we put into our bodies. Also, in the footwear industry we have, over the past thirty years, learned much from studying the results of biomechanical testing and adapting these into shoe function. What we have yet to learn is how to rectify the inadvertent deprivation of electromagnetic contact with earth through footwear.

Up until the mid-nineteenth century, the predominant soling material used in footwear was leather. This is a natural substance that is electrically conductive to the earth in the same way as walking barefoot. By producing almost all modern footwear with soles made from insulating materials such as rubber, PU, EVA, and TPR, we have inadvertently insulated ourselves from the Earth's natural electromagnetic field with unknown effects. Is that 'natural'? 



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