

ARTICLE · CULTURA & SAÚDE

High Heels and a Tight Spot

Anatomy of the foot, pain, and swelling: why heels and circulation are confused

Prof. Dr. Irany Novah Moraes

Professor at USP; author of 'Erro Médico e a Justiça'

Received for publication in August 2004 · Section: Article · Language: English

ABSTRACT

The author uses an analogy with civil engineering to explain the architecture of the human body and, in particular, of the foot, with its three points of support and two arches. He argues that most pain in the feet and legs is orthopedic in origin, chiefly flat foot, rather than circulatory, and is relieved by insoles and weight loss. He explains edema of the lower limbs as a functional response to gravity and to long periods of standing, citing NASA's observations of astronauts and the concept of the 'venous sole' or 'heart in the foot'. He maintains that high heels reduce the pain of flat foot by shifting weight onto the anterior supports, which leads laypeople to wrongly credit them with a circulatory benefit. He concludes that high heels do not affect circulatory problems, dispelling the popular myth.

KEYWORDS: *foot anatomy; high heels; leg pain; flat foot; edema; venous circulation*

Former professor at USP; author of *ERRO MÉDICO E A JUSTIÇA*, RT, 732 p., 2003.

The high heel is a device for enhancing a woman's elegance in a way that accentuates her beauty. It is but one of the requirements of the shoe that contribute to complementary adornment, lending grace to the gait through a subtle lightness.

Nature, in the animal series, when it raised man and set him upright, followed a fascinating architectural design, with arches of support. It used blocks of a special concrete – the bones – and set them with peculiar joints – the joints, which make mobility possible. Reinforced by sturdy beams – the ligaments – and lubricated with the most perfect of permanent protective fluids – the synovium. A complex system of cables and pulleys, the muscular tendons and their sheaths, transmits great energy – muscular force – capable of mobilizing the whole assembly and carrying the body it bears, walking and running long distances.

The construction incorporates a complex hydraulic system – arteries, veins, and lymphatics – equipped with valves and even a lift pump to help carry the blood to the upper floors. Its advanced communication system has well-insulated, perfectly distributed lines – the nerves –

employing sensors able to distinguish pain, position, and heat, reporting temperature conditions, whether hot or cold – the sensory nerve endings – all coupled to the computer – the brain – indeed the most perfect of all, for it possesses intelligence and consumes practically no energy in its operations.

The overall finish is provided by a layered covering – the skin – of varying strength. To complete it, there are also elements of protection and defense – the hair and nails.

The foot has three points of support: one posterior, at the heel, and two anterior, one on each side. The three points joined together form a triangle presenting two arches: the transverse, joining the anterior supports, and the longitudinal, joining the anterior to the posterior along the inner side of the foot. The skin, through friction, as a natural physiological response, increases its thickness; the layer of dead cells grows, and thus hyperkeratosis or callus increases, most markedly at the points of greatest support.

A knowledge of anatomy, as presented, is enough to understand how certain things come about and why certain procedures work, as well as the mistaken interpretation of others. I single out two complaints common to many patients: pain and swelling.

Pain – the arches, like those of civil engineering, are designed to bear a given weight and, as with building materials, their use over time leads to fatigue. Thus the passing of the years is enough to make them sag. Should they be subjected to loads greater than those for which nature designed them, they will eventually give way, and flat foot sets in. The familiar "flat foot" produces alterations in the statics of the foot and, consequently, has its repercussions. The leg pains that many patients wish to attribute to the veins can be explained, again by analogy with civil construction. In those with flat feet, they correspond to the cracks in walls caused by weak foundations. In both cases, although the manifestation is above, the triggering problem is below.

The sagging of the arches alters the gait, producing friction in other areas of the sole. The skin, constantly traumatized, increases its callus. These calluses cause discomfort and aggravate the faulty way of stepping. A vicious cycle sets in: calluses appear that accentuate the defect of the gait, worsening the picture.

This problem, which appears to be complex, is elementary to understand, but a torment for its victims. It can be resolved with the use of an insole and, in the obese, is eased by weight loss, provided the ideal weight is reached. These two very simple prescriptions are seldom followed. The insole, for women, is practically impossible to wear constantly. Few submit to wearing closed shoes to hold them in place. Intermittent use increases the pain. It is as if one placed a prop against a wall, and every day it was removed and, a few hours later, put back. It is understandable that the wall cannot withstand this and collapses. For men, owing to their different attire, this problem does not arise, and the insole is easily accepted and used correctly.

There is a popular belief that leads those with pain in the feet and legs to the idea that it stems from circulatory problems. This is a myth, or rather nonsense!

Pain in the feet arises from multiple causes, but since we step every day, all day, throwing the whole weight of the body onto the two feet, they have every right to "complain," and they do so through pain. Most pain in the feet and legs has nothing to do with circulation; it is an orthopedic problem.

Swelling in the legs – the edema that appears in the feet and legs of a person who spends long hours standing still, most noticeable on hot days, is usually a natural or functional response; it does not signify disease, as can be seen from the fact that after a night's rest in bed it disappears. Added to this is NASA's finding: in perfectly

healthy astronauts who spend months without gravity, edema appears in the face and upper body and never in the lower limbs, requiring active procedures to distribute it through the body. Thus it would seem that the chief culprit for edema in the legs and feet is gravity!

Consider the dynamics of the venous blood of the lower limbs.

The skin of the sole of the foot is so rich in veins that anatomists went so far as to describe what they called the "venous sole" which, because each step squeezes a good amount of blood into the circulation, SILVA SANTOS of Rio de Janeiro called "a heart in the foot" in *Brasil-méd*, 48:2, 1934. Indeed, to show the ejection force of this venous heart, I made a program for TV Cultura in the "Série Receita de Saúde" in which I demonstrated how much blood the venous sole pumps into the return circulation, confirming what RUTLEDGE demonstrated back in 1942 when he published that the venous pressure of a person lying down is 100 millimeters of water, and 1,000 when standing, whereas on walking the pressure falls almost by half, which does not happen so efficiently in someone who has varicose veins or, at least, some small degree of venous stasis. When venous return is insufficient, even incipiently, that is enough to cause a certain leakage of extracellular fluid and produce edema. This will be greater the longer the person stands, and more intense if they remain motionless. Certain professionals suffer from this.

Let us now turn to the high heel – wearing a high heel, a woman throws the weight of the body onto the two anterior pillars of the feet. In this way she reduces the alteration that walking produces, avoiding, in the case of flat foot, its rotation to rest on the longitudinal arch. This substantially diminishes the pain! It is this that the less well-informed, mixing up "garlic with bulbs," misinterpret, thinking it has something to do with circulation. From all that has been said, it should be quite clear: pain in the foot rarely stems from circulatory problems, and still less often from venous or lymphatic alterations, and it does not benefit from high heels. It is indeed an orthopedic problem! Flat foot causes the pain, which can be relieved by an insole and partially by wearing high heels. The latter does not alter, improve, or worsen any circulatory problem.

Anyone who believes the high heel improves circulation, a true miracle, will walk about in high heels and, soon enough, in a tight spot as well.

Added Jan 2014: Read a recent article at: <http://vascular.pro/content/o-salto-alto-e-circula%C3%A7%C3%A3o>