

Is this the answer to an old, old problem?

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We all know why women wear high heels, don't we?

A: To make themselves taller and increase their stature.

B: As a fashion accessory.

C: They like what high heels do for their legs and body—and so do men.

Where brand wars in the 'sneaker' world are essentially about 'coolness' among kids in the inner city, heels are all about power, status and impressing males.

It may surprise some in the shoe industry that, from a medical perspective, raising a woman's foot three or more inches off the ground at the heel and transferring the resulting pitch of the last into an 'ice cream shaped cone' at the metatarsals, is not conducive to foot health. This is especially so in the long term, hence the long lines of ladies at podiatric clinics awaiting treatment for conditions resulting from wearing fashion heels. The ultimate example must surely be the 'Manolo Blahnik Syndrome', whereby women undergo foot surgery in order to fit into his mega-dollar, high heel creations. In the view of the podiatrists women will have to cope with the long-term results, which is plain stupidity.

Looking at the problem

For years women have suffered for their love of high heels. A 'high heel', as opposed to a shoe with a 'reasonable' lift of 5cm (2 inches) or less in the back, is one that raises the

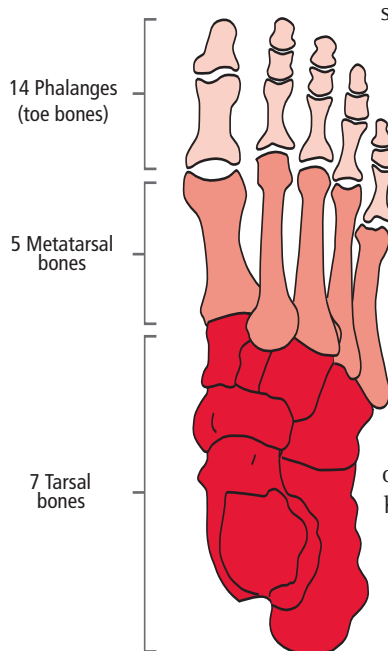


Figure 1: the bones of the foot

seven talus, the calcaneus and talus (or rearfoot and cuboid), navicular and the three cuneiform bones together termed the 'midfoot', above the metatarsals and phalanges (toes—together termed the forefoot). How high the calcaneus is raised above mid and forefoot, and at what angle, depends on the height of the heel and the pitch of the last. Typically, a high heel is raised more than 5cm at the heel, causing the metatarsals to slant towards the phalanges at an angle of between 40 and 55 degrees.

Without exception, high-



heeled shoes are not good for the feet, even though experienced shoe designers choose to ignore the facts. That's not to say heels cannot be endured, perhaps to the point of tolerance. Research conducted by Howard Dananberg DPM, the inventor of the Insolia System, has revealed just how deeply ingrained the 'finished look' of high heels is on a woman's psyche. Some women, with naturally high arched feet, actually insist that 75cm (3 inch) heels are comfortable. However, the determining comfort test is to ask that, if given a choice, would you wear heels to hike or run in? The answer is obviously "no" and this is borne out by the fact that, as women mature, they either voluntarily or are forced to reduce their waking time spent in heels.

A widespread and expensive problem

In previous studies, women's complaints of foot pain regarding high-heeled shoes have been well detailed. These include pain in the digits, balls of the foot, ankle instability, and pain in the muscles of the legs and lower back. Almost 85% of women list one or more of the above problems as a regular occurrence with the use of high-heeled shoes. The statistics in the panel below make interesting reading.

Women account for 90% of foot surgeries in the US at an estimated cost of \$2,000,000,000

82% of women reported having foot pain

72% of women reported one or more foot deformity

86% of women wore shoes 2-1 width sizes too small (av. 1.2 cm less girth)

In the 20% of women reporting no foot pain, there was only an average 0.56 cm discrepancy between the width of the shoe and their foot

20% of women had pain in the ball of the foot and 58% in the toes

75% of women had not had their feet measured in over five years

60% noted that their size has increased

Women with US size 8 (UK 6 & Continental 40) or larger had more pain and deformities than others

50% of women were dissatisfied with their ability to find dress shoes that were both fashionable and comfortable, despite the fact that 60% said they paid between \$50 and \$200

Source: American Orthopedic Foot and Ankle Society.

What causes all these complaints?

The reason for all this can be easily explained. The standard high-heeled shoe construction creates an angle of the heel seat to the ground surface (known as the heel pitch or wedge angle). In essence, this creates a ramp effect, with the foot sliding forward into the toe of the shoe. The generally narrow toe, aside from its fashionable attributes, prevents this forward motion and so creates a continuous pressure on the digits. In other words, the proverbial 'caught between a rock and hard place' saying is brought vividly to life.

Excessive loading of the metatarsal heads, particularly the second and longest metatarsal, is also exacerbated by this same ramp effect *Figure 2a*. Previous studies have shown that women who go from flat athletic type shoes to ones with 5cm heels have nearly a 64% increase in pressure to the forefoot. Subjective descriptions of women confirm this finding.



Is this the answer?

Finally, someone has come to the rescue. With perhaps the best biomechanically correct approach to ladies heels to date, Dr. Dananberg, a well-known American podiatrist, has introduced the Insolia System for ladies footwear.

Heels are directly related to body alignment and weight distribution and therefore cannot be alleviated by padding alone. Dr Dananberg's patented system shifts the weight off the metatarsals to the heel of the shoe without altering the height or pitch of the last *Figure 2b*. This is done biomechanically by incorporating a geometric parabola into the shank area of the insole board combined with an asymmetrical heel cup to seat the calcaneus and thus redistributing the body's weight toward the heel as opposed towards the toe.

How it works

The essence of the system is to reverse the talar declination that occurs during foot plantarflexion with talar positional change *Figure 2b*, the wider portion of the talus is placed into the ankle mortise thus creating an intrinsically stable foot. Additionally, with this change in ankle plantarflexion, there is a concurrent weight shift from the ball to the heel. With the increased weight bearing at the heel, less stress is applied to the forefoot.

Other accommodations are made to encourage a more broad

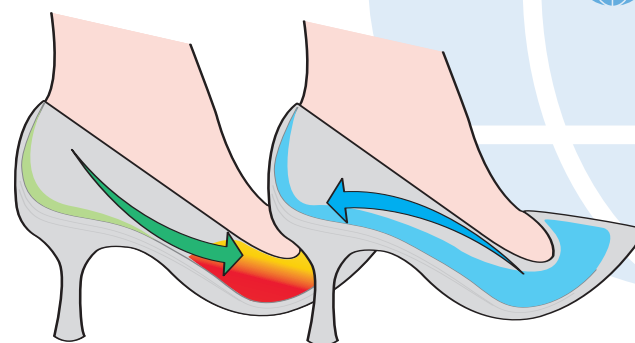
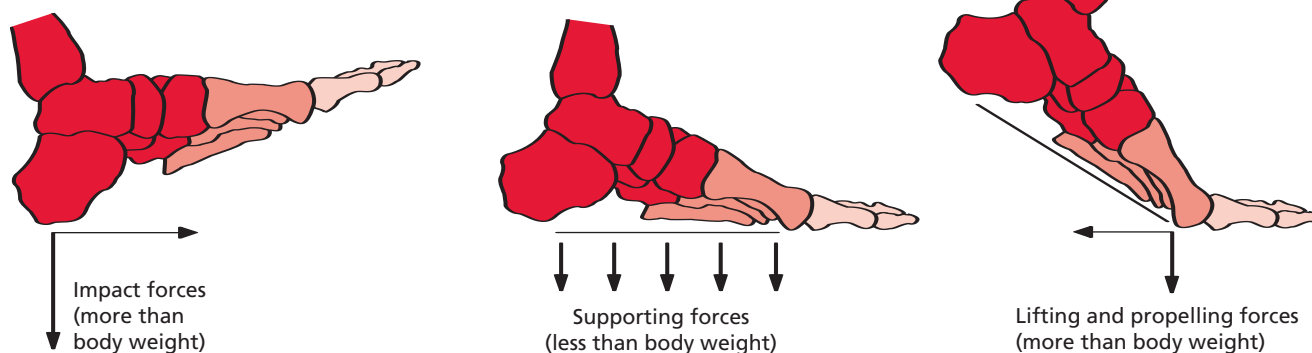


Figure 2a: Load is pushed forwards. Figure 2b: Load is pushed backwards.

weight bearing of the forefoot rather than a concentration on the longer second and third rays. Illusions as to toe shape and other aspects lead to a product that appears high styled yet functions as a comfortable alternative to standard heeled footwear. This is borne out by the fact that it is currently being used in twelve Donna Karan New York high heel models.

Optimal positioning

If we accept the ideal normal barefoot distribution is 50/50 between forefoot and heel, and that exaggerated 7.5cm plus heels change this dynamic to more like 80/20 towards the forefoot, the Insolia System places the foot in the optimal position, relative to the height of the heel.

Depending on heel height, stride length and heel-to-toe-gait rhythm, it brings the wearer within the 64/36 forefoot to heel range, which is much closer to the 50/50 ideal. This is a vast improvement in weight distribution and reduction in pressure on the metatarsals, especially as it is done internally without padding or supports and without changing the all-important aesthetic look or height of the shoe. Test results show that a woman wearing high heels with standard insoles experiences 64% more forefoot pressure over a pair of athletic shoes. With Insolia this is reduced to 22%.

All things to all women

The Insolia component effectively changes the DNA of shoes. At least, there is now an option which offers ladies a compromise by allowing them to wear the high heels they crave but at the same time considers biomechanical design to avoid foot problems, such as bunions, *hallux valgus*, metatarsalgia and various neuromas. With patents issued or pending in more than 40 countries, this revolutionary shoe technology is different from anything else on the market today. With successful sales already in Europe and Asia—over a million shoes with Insolia technology have been sold world wide—US retailers and brands are now adopting the concept across the full spectrum of price points.