

Editorial

The Negative Effects of Wearing High-heels: What We should All Know?

Fluid human movement comes from a good gait pattern and good gait comes from a finely tuned interaction between muscles in the legs, knees, hips and spine. Any alteration in this fine balance could have important functional consequences and medical problems. It is unfortunate that fashion trends ensure that millions of women worldwide wear high-heels most of the time, often without being aware that they may be risking the onset of numerous problems related to their back, and hastening degeneration and arthritis of their knees. These high-heels, especially the stiletto variety, make women walk in an abnormal position, leading to unnecessary strains in the whole skeleton. High-heels push the center of body mass forward, increasing lumbar lordosis, taking the hips and spine out of alignment. It may make the legs look longer, but as the heel-height goes up, so does the pressure on the forefoot. Patients with problems related to the knee and lumbar spine are definitely made worse; in normal adults, the potential for getting these problems is significantly enhanced.



A few years ago researchers from Harvard Medical School pointed out that osteoarthritis of the knee was twice as common in women as in men. They noted that an important part of female population was wearing high-heeled shoes, which was probably one of the causes of knee or back pain in later life. Fit women were asked to walk along a special platform in barefeet and then in shoes with heels of 6 cm. Sensors under the platform and cameras recorded the movement of these women's ankle and knee joints; specialized devices allowed the strains on the joints to be measured. The test results showed that when walking in high-heels, there was greater strain between the kneecap and the thighbone, and in the inner side of the knee joint, as compared with walking barefoot. The finding of increased strain on the inner side of the knee joint was of particular interest, because osteoarthritis most commonly starts on the medial rather than the lateral side of the knee.

Cronin and co-workers, in the March 2012 issue of the *Journal of Applied Physiology*, studied the effects of habitual high-heel use on the neuromechanical behavior of calf muscles during walking. They studied 9 habitual high-heel wearers who routinely wore 5 cm heels at least 40 hours/week for 2 years and 10 ladies who wore lesser heels in everyday practice. Ground reaction forces, ankle and knee joint kinematics, and lower limb muscle activity were evaluated. In high-heel wearers, there was substantial increase in muscle strains and muscle activation even while during the stance phase; this means that the muscles were working when they should have been resting, often leading to muscle fatigue and the inevitable negative effects in the legs of this ladies.

Other effects documented are in the spine, which due to its complex structure, consisting of many vertebrae piled one on top of the other, need mobility and inbuilt curvatures to get a mobile and stable structural assembly. These lordotic and kyphotic curves are essential for good posture, and if these become abnormal, either due to weak muscles or aging, then other factors like walking on high-heels or improper leg alignment hasten the process of wear and tear. This starts as mild backache, with increased lumbar lordosis and protuberance of the buttocks; this is further aggravated by walking on high-heels, and a vicious cycle is set up, leading to worsening of the situation.

Another problem related to stiletto heels is the fact that the heel has to balance on a small point during gait, compared with the flat surface that is the normal heel. This means that ankle muscles (peronei and tibialis posterior) have to work all the time to prevent minor twists and sprains with each step of the gait cycle, leading to strains, fatigue and potential long-term damage. The toes are also cramped together leading to forefoot deformities. If high-heels are imperative, thicker heels/platforms are better, as foot load is more evenly spread. Soft insoles help reduce impact on knees; shoes are better than sandals, as snug fit and tight upper prevents the foot from sliding forward, avoiding pressure concentration on heads of metatarsals.

Teenagers wearing high-heels have more risk of long-term problems, as their bodies are still developing, and they could get hip trouble and back pain in adulthood due to stress placed on their spines as youngsters.

So, are high-heels really a good idea? Modern understanding of gait mechanics seems not to think so. Wearing stilettos on the weekend or at parties is probably ok, but regular use is best avoided. Even when the ladies wear these shoes on special occasions, they should try and sit more than stand, as this reduces strains in the legs. For everyday use, 'sensible shoes' are the best, as they definitely make more sense!

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