Shoes: A treatment for osteoarthritis in the knees?

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Flip-flops and sneakers with flexible soles are easier on the knees than clogs or even special walking shoes, a study by Rush University Medical Center has found. And that's important, because loading on the knee joints is a key factor in the development of osteoarthritis.

The study has been published online in the journal Arthritis *Care & Research*.

"Traditionally, footwear has been engineered to provide maximum support and comfort for the foot, with little attention paid to the biomechanical effects on the rest of the leg," said Dr. Najia Shakoor, a rheumatologist at Rush and the primary author of the study. "But the shoes we wear have a substantial impact on the load on the knee joints, particularly when we walk."

"Our study demonstrated that flat, flexible footwear significantly reduces the load on the knee joints compared with supportive, stable shoes with less flexible soles."

Osteoarthritis is the most common form of arthritis and a significant source of disability and impaired quality of life. A higher-than-normal load on the knees during walking is a hallmark of the disease, associated with both the severity of osteoarthritis and its progression.

Shakoor and her colleagues analyzed the gait of 31 patients with symptoms of osteoarthritis in the Rush Motion Analysis Lab while they

walked barefoot and with four popular shoe types: Dansko clogs, which are often worn by healthcare professionals who have to be on their feet much of the day; Brooks Addiction stability shoes, which are prescribed for foot comfort and stability; Puma H-Street shoes, a flat athletic shoe with flexible soles; and flip-flops.

The loads on the knee joints differed significantly depending on the footwear. For the clogs and stability shoes, the loads on the knee joints were up to 15 percent greater than with the flat walking shoes, flip-flops or barefoot walking. Knee loading was roughly the same whether the subject wore flips-flops or walked barefoot.

"Currently, knee braces and wedged orthotic shoe inserts are used to relieve the load on the knee joints of patients with osteoarthritis, but everyday footwear is also a factor to consider. The results in our study demonstrate that the reduction in load achieved with different footwear, from 11 to 15 percent, is certainly comparable to reduction in load with braces and shoe inserts ," Shakoor said.

According to Shakoor, several aspects of footwear affect the joint loading.

"Heel height is one factor, and may explain why the stability shoes and clogs in our study, both of which had higher heels, produced greater knee loads," Shakoor said.

"Stiffness is also a factor. We've shown in earlier studies that barefoot walking is associated with lower knee loads than walking with conventional footwear. It may be that the flexible movement of the bare foot is mechanically advantageous. The natural flex of the foot when it contacts the ground probably attenuates the impact on the joint, compared to the artificial 'stomping' movement created by a stiff-soled shoe."

In the present study, Shakoor said, flip-flops and the walking shoe were flat, flexible and lightweight and seemed to mimic the mechanics when walking with bare feet.

"Clogs and stability shoes, conventionally believed to provide appropriate cushioning and support, actually increased the loading on the knee joints, as opposed to shoes with less 'support,' flatter heels and more flexibility," Shakoor said.

Shakoor cautioned, however, that knee loading is not the only consideration in any clinical recommendations based on her study.

"For the elderly and infirm individuals, flip-flops could contribute to falls because of their loose-fitting design. Factors like these need to be taken into account," Shakoor said.

Provided by Rush University Medical Center