

Running Shoes: Hazardous to Your Joints?

Study Shows Running Shoes Exert More Stress on Knees and Hips Than Running Barefoot

By [Kathleen Doheny](#)

WebMD Health News

Reviewed by [Louise Chang, MD](#)

Jan. 7, 2010 -- Compared to [running](#) barefoot, running in conventional running shoes increases stress on the knee joints up to 38%, according to a new study.

"There is an increase in joint torque that may be detrimental," says D. Casey Kerrigan, MD, the lead author of the study, published in *PM&R: The Journal of Injury, Function and Rehabilitation*.

Joint torque is a measure of how much a force causes the joint to rotate.

But Kerrigan is not advocating that runners take up barefoot running -- just that her findings may be a reason to redesign running shoes. Kerrigan, formerly chairwoman and professor of physical medicine and rehabilitation at the University of Virginia, Charlottesville, now heads JKM Technologies and is designing a running shoe.

At least one podiatric specialist calls the study finding "much ado about nothing."

Running Shoes Study: Details

Kerrigan's team evaluated 68 runners -- 37 women, average age 31, and 31 men, average age 36 -- who ran at least 15 miles a week. None had any history of musculoskeletal injury.

Participants ran barefoot on a treadmill and then in a running shoe: the Brooks Adrenaline.

Kerrigan's team observed how each condition, barefoot and shod, affected the joints of the hip, knee, and ankle.

Compared to running barefoot, the researchers found running in running shoes increased stress on the lower extremities. They found a 54% increase in the hip internal rotation torque and a 36% to 38% increase in knee torque. Is that increase mild, moderate, worrisome? "We don't know," Kerrigan tells WebMD. "We just know it's an increase."

She attributes the increased stress to the characteristic design of the majority of running shoes, including an elevated heel and increased material in the midsole arch.

Providing this cushioning in the heel, she suspects, counteracts the body's natural response to compensate for the torque associated with impact.

The increases found in her current study are higher than when she compared barefoot walking to walking in high heels. The high-heel shoes increased knee joint torque by 20% to 26%, she says.

Running Shoes Study: Analysis

Some torque on the knee is normal, of course. "What we are saying is, there is an increase over what would be experienced just walking around," Kerrigan says.

Her concern is that the excess stress may contribute to knee [osteoarthritis](#), although the study did not look at a link between running shoes and injury or running shoes and the development of [arthritis](#).

She isn't suggesting barefoot running -- a trend that's picked up steam in the past year or so -- is necessarily better than running in athletic shoes, she says.

Running Shoes Study: Other Opinions

"It's much ado about nothing," says Bruce Williams, DPM, past president of the American Academy of Podiatric Sports Medicine and a spokesman for the American Podiatric Medical Association, of the study results.

"She showed there was an increase in joint forces, but that's it," says Williams, a podiatrist in Valparaiso, Ind., and a runner. There was no link shown between running shoes and running injuries, nor with development of arthritis -- both beyond the scope of the study.

The bulk of research studies have found that runners don't have a higher incidence of knee osteoarthritis than the general population, Williams tells WebMD.

In one study, for instance, German researchers evaluated 20 former elite marathon runners and compared them to the general population, looking for arthritis. They found that knee osteoarthritis was rare in the former marathoners, publishing the result in the journal *Orthopade*.

Ideally, Kerrigan's team should have looked at many different shoe types, says Joseph Hamill, PhD, professor of kinesiology and director of the Biomechanics Laboratory at the University of Massachusetts, Amherst, who has researched the biomechanics of running shoes. "For example, a racing flat has very little in the way of cushioning and is almost like running barefoot," Hamill says.

Running Shoes Study: Industry Input

In an email response, Tiffany Herman, a spokeswoman for Brooks Sports, which makes running shoes, says: "We value the results of this study and are in active research and development on many unique performance running footwear solutions at Brooks."

"This includes styles that enhance the natural motion of the foot and body while offering protection from weather conditions, road debris, and individual biomechanical variances."

Running Shoes: What to Buy?

So what's a runner to wear -- or not wear? "Nobody should take the message that being barefoot is better than wearing any type of shoe whatsoever," says Williams of the new study.

Kerrigan, too, says her research isn't a vote for the barefoot running trend -- nor for giving up running.

"If you are happy with your running shoes, you don't necessarily have to change them," Williams says. But if you have an injury, he suggests consulting a sports podiatrist and getting advice about the best shoe features for you.

"I would suggest runners try a number of different types of shoes until they find one that they like," Hamill says. "Also, buy two or three pairs of shoes and rotate them each day."