

Type of shoe changes how people run, researchers find

April 5 2013, by Alan Bavley

The style of your running shoes isn't just making a fashion statement. It may be controlling the way you run and setting you up for injuries down the road. That's what researchers at the University of Kansas Hospital found when they put a dozen high school athletes through their paces on a treadmill.

When the teens ran barefoot or in flat-soled racing shoes, they generally landed on the front halves of their feet, the researchers say. But when the young athletes put on standard-issue [running shoes](#) with thick, cushioned heels, they instantly switched to a radically different gait, striking the treadmills with their heels.

Although there is no direct evidence that landing on your heels when you run leads to long-term injury, some experts say that [running](#) this way may over time increase wear and tear to knees and hips.

"It may be more natural to land on your forefoot. It's uncomfortable to land on your heel," said Scott Mullen, a University of Kansas sports medicine specialist who co-authored the study. "But there's something in the makeup of the (cushioned) shoe that promotes that kind of heel strike."

Mullen presented his findings last month in Chicago at the annual meeting of the American Academy of Orthopaedic Surgeons. The study will be published in the *Journal of Pediatric Orthopaedics*.

Mullen, a marathoner and triathlete, put the teens on a treadmill to add some perspective to the growing reaction among runners against thick-heeled shoes. In fact, the relative merits of different [shoe soles](#) have become a regular topic of debate in recent years.

Barefoot running or running in "minimalistic" shoes with as little as a third of an inch between the sole of the foot and the ground has become popular as a more "natural" way to run. The idea was promoted by the 2009 best-selling book "Born to Run," about the Tarahumara Indians of Mexico, who run for hundreds of miles without injury wearing thin-soled sandals.

The injury-prevention message has also been fueled by some research findings, including a Harvard study from 2010 that looked at runners in Kenya. The researchers found that even on hard surfaces, barefoot runners who landed on their forefeet gave their bodies less of a jolt than did runners who wore shoes and landed on their heels.

Shoe companies, which had been adding padding to their products since the first modern running shoes were developed in the 1970s, changed course. They have come out with a variety of shoes that minimize the difference in the thickness of the heel and sole of the shoe.

"We've seen a shift in the consumer wanting this and asking for it," said Jane Tompkins, the manager of Garry Gribble's Running Sports, a store at Ward Parkway Center for serious runners. "It's more mainstream thinking now. Lose the heel and be a midfoot striker."

Mullen wanted to see how the different kinds of shoes affected young athletes who hadn't settled on a running style.

His subjects were six boys and six girls ranging in age from 13 to 18 who were recruited from local track teams. They took turns on a treadmill

that was surrounded by 12 infrared cameras recording motion in three dimensions from markers attached to their feet, ankles and knees.

Each did short runs at different speeds going barefoot, wearing the conventional cushioned-heel running shoes most of them used for training or wearing racing flats with little or no heel elevation.

In the cushioned shoes, the runners landed on their heels about 70 percent of the time. But in track flats, they hit heel-first less than 35 percent of the time, and barefoot just 30 percent of the time.

"Simply by changing their footwear, the runners' foot strike would change," Mullen said. "When they ran in the cushioned heel of an average running shoe - even when running a five-minute mile - the athletes landed on their heel first."

Sam Toby, a senior at Blue Valley Northwest High School, regularly trains in minimalist Vibram FiveFingers shoes with flat soles and individual toes. He has gotten used to striking the ground with the front of his foot.

"I find it tends to be easier on my legs," he said. "You build up muscle in your foot. It's a natural shock absorber."

But when he put on regular running shoes for the study, he found his heels hitting the treadmill first.

"When you run with a two-inch block on your heel, you naturally hit with the heel," said Toby, whose father, Bruce Toby, heads the orthopedics department at KU Hospital and co-authored the study.

Young athletes who are still developing their running styles may want to start out with minimalistic shoes as a way to lessen their risk of injuries

over the long term, Mullen said.

Although no studies have tied particular running styles to greater risk of injuries, heel-strike running does put more stress on hips and knees, he said.

"I certainly think it's a reasonable conclusion that if you decreased the forces when running it would be for the better," he said.

But older, seasoned runners who've been running in comfy, cushioned shoes for some time shouldn't make a quick switch to minimalistic.

"I don't know if there's a point where you can't change, but you need to work on it slowly," Mullen said. "Pay very close attention to what your body is telling you, the aches and pains. We have seen patients with stress fractures because they threw their regular shoes aside too fast. It's worth considering, but it may not be for everyone."

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