

Would changing gait pattern decrease your likelihood of running injuries?

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Are runners less injury-prone trekking barefoot than in pricey running shoes? Maybe, according to a new literature review in the March issue of the *Journal of the American Academy of Orthopaedic Surgeons (JAAOS)*. Advances in running shoe technology in the last 40 years have not reduced injuries, but racing "barefoot" in shoes with minimal cushioning could help runners change their strides and landing patterns to prevent repetitive heel pain and stress fractures.

Three of four active runners sustain injuries, mostly in the knee and lower leg. Most [distance runners](#) who use cushioned running shoes run heel-to-toe, or in a rearfoot strike (RFS) pattern. This action is associated with longer strides and excessive load force—up three times the runner's body weight—on the lower leg, knee, and hip. This leads to bone and soft-tissue injuries, tibial stress fractures, and severe heel pain, such as plantar fasciitis.

Minimalist, including barefoot, running has become popular in recent years. Minimalist running shoes have thinner soles and less cushioning and are more flexible than conventional runners' footwear. Advocates believe these shoe changes alter running so the front or middle of the foot strikes the ground first—a forefoot or midfoot strike (FFS and MFS)—which reduces load stress on the knee, lower leg, and heel. Flatter foot placement dissipates load impact on the heel.

"Injury patterns among long-distance runners are unacceptably high, and while some research in minimalist running seems promising regarding

injury prevention, there still are a lot of unknowns, and the debate continues," says lead author and orthopaedic surgeon Jonathan Roth, MD, with Fort Belvoir Community Hospital in Virginia. "Evidence to date shows that changing gait patterns, not shoe selection, is the best intervention to lower the injury prevalence in runners. Minimalist shoes may give better feedback to runners and allow them to focus on changing their gait, but not everyone does, and this could lead to more injury."

Dr. Roth added that increasing acceptance of minimalist running has outpaced medical evidence of its benefits. Orthopaedic literature, however, has demonstrated that with less-cushioned footwear, runners spontaneously transition from the RFS to the FFS gait pattern. Whether FFS running truly can reduce injuries is unknown, but the most compelling data were published in a 2012 study involving a Division I collegiate cross-country team. The results showed:

- The athletes had a 75 percent injury rate per year, categorized as either traumatic or repetitive;
- Strike type was characterized for each athlete and showed that 31 percent ran in the FFS pattern and 69 percent demonstrated RFS; and,
- There was no difference in the traumatic injury rate between FFS and RFS runners; and,
- FFS runners were 1.7 times less likely to sustain repetitive injuries than RFS runners.

Other findings in the *JAAOS* literature review include:

- Barefoot and minimalist running is not injury-proof and poses risk for metatarsal (toe) [stress fractures](#), plantar fasciitis, and puncture wounds;
- Runners can transition to the FFS pattern in any shoe with

- appropriate training; and,
- Barefoot and minimalist running is an emerging phenomenon that requires further exploration of its orthopaedic implications to identify true long-term benefits and risks.

Runners interested in exploring minimalist [running shoes](#) to provide more feel and less of a heel-to-toe offset, and to allow easier landing midfoot to forefoot, "should consider themselves as non-[runners](#) and start over by walking and gradually adding running distance week to week," advises Dr. Roth. "This will help assure proper transitioning to build strength, flexibility, stability, and endurance around the foot and ankle." Transition from a RFS to FFS gait pattern should be a gradual process—over many months. Runners should expect to run minimal mileage when transitioning and always remember the 10 percent rule when increasing in distance. An abrupt switching of gait patterns can lead to an increase in other repetitive stress injuries if not done correctly.

Provided by American Academy of Orthopaedic Surgeons

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