

# **Study proves running barefoot helps optimize technique and reduces risk of injury**

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Credit: University of Granada

Scientists from the Universities of Granada and Jaén have demonstrated how barefoot running, when done properly, can considerably decrease the risk of injury as it produces significant changes to foot strike patterns, regardless of the speed of the runner.

Barefoot running appears to contribute to the acquisition of a more efficient biomechanical running pattern, allowing contact between the foot and the ground to begin in the metatarsal area (forefoot strikes). The use of standard modern footwear appears to favour the opposite technique; initiating contact with the ground at the heel area with a rearfoot strike, which produces significant impact peaks that negatively affect the runner's health and athletic performance.

There is currently a great deal of interest in the barefoot running trend, which is supported by a growing number of runners and researchers who are attempting to gain a better understanding of the advantages and disadvantages of this type of locomotion. While not currently accepted as the norm, the practice is on the rise.

Footwear worn by human beings over recent millennia can be categorised as clearly minimalist. Its fundamental feature was the introduction of a protective sole. Over the last three decades, several advances have radically changed the design of functional elements in athletic footwear: cushioned midsoles, movement control technology, technology for optimizing shock absorption, etc. The advantages of these recent technological advances in athletic footwear are disputed in scientific forums.

## **A twelve-week programme**

The benefits of barefoot running are attainable only when one acquires certain techniques. Otherwise, barefoot running can give rise to other risk factors. One should therefore take precautions before starting to practice the activity.

A multidisciplinary UGR research team known as HUMAN LAB participated in the study. The team is located at the University of Granada's Sport and Health Institute (iMUDS), which is equipped with the most up to date and advanced technology for conducting comprehensive analyses of the health and efficiency indicators of the runners.

The study has been published in the *Journal of Sport and Health Science*. The article compiles the results obtained by researchers following the development of a training programme based on 12 weeks of barefoot running designed to test the effects produced on runners.

The study was conducted with 39 volunteer runners who took part in a programme consisting of specific exercises, completed in progressively increasing volumes on grass. The exercises were based exclusively on continual running, separated intervals and sprints.

Following the training period, the researchers found that athletes who run barefoot significantly adjust the way their feet initially make contact with the ground. Thanks to the programme, runners with a rearfoot strike pattern significantly adjusted their strike pattern towards a forefoot strike pattern, both at comfortable running speeds (rearfoot support dropped from 55.6% to just 11.1%) and higher speeds (rearfoot support dropped from 58.3% to 13.8%).

Other significant results pertain to injury risk. The researchers found that internal foot eversion remained constant while foot and ankle rotation, however, varied between a 5.5%-13.8% increase in external

rotation.

## Changes in strike pattern

"The mechanical behaviour in the lower extremities, together with an excessive transversal movement of the ankle, appear to be closely linked to the development of chronic injury," explains Professor Víctor Manuel Soto Hermoso from the Department of Physical and Sports Education at UGR, who is one of the authors of the study.

In light of the results, Soto points out: "Training based on barefoot running, practised correctly, produces significant changes in foot support, regardless of the athlete's speed: forefoot support (metatarsal), tends to minimize impact peaks and, therefore, leads to a lower risk of injury."

Nevertheless, the authors point out that athletes should be careful when beginning the practice of barefoot running. They recommend conducting a multidisciplinary study of the biomechanics of the musculoskeletal system both at the static (podiatric and postural) as well as dynamic (ambulatory and running locomotion) levels. Considerable importance should be given to the evaluation of three-dimensional kinematic changes (technique analysis), kinetics (force analysis) and biostructural changes (analysis of elastic and contractile elements) in addition to an analysis of commonly used footwear.

Soto concludes: "Professionals in the Sport Sciences field, working in cooperation with other health professionals, can design personalised programmes in order to progressively introduce individuals to this fascinating and stimulating form of locomotion, the benefits of which—whether as an occasionally employed resource, a training technique, or as a standard intensive practice—are worth testing."

**More information:** Pedro A. Latorre-Román et al. Effects of 12 weeks of barefoot running on foot strike patterns, inversion–eversion and foot rotation in long-distance runners, *Journal of Sport and Health Science* (2016). [DOI: 10.1016/j.jshs.2016.01.004](https://doi.org/10.1016/j.jshs.2016.01.004)

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