

Human foot not as unique as originally thought

August 20 2013



Image: Wikimedia Commons.

Research at the University of Liverpool has shown that the mechanisms of the human foot are not as unique as originally thought and have much more in common with the flexible feet of other great apes.

Current understanding of the evolution of human walking is based on research from the 1930s, which proposes that human [feet](#) function very differently to those of other apes, due to the development of arches in the mid-foot region and the supposed [rigidity](#) of that on the outside edge of the foot.

In a study of more than 25,000 human steps made on a pressure-sensitive treadmill at the University's Gait Laboratory, scientists at Liverpool have shown that despite having abandoned life in the trees long ago, our feet have retained a surprising amount of flexibility, the type seen in the feet

of other great apes, such as orang-utans and [chimpanzees](#), that have remained largely tree-dwelling.

Professor Robin Crompton, from the University's Institute of Ageing and Chronic Disease, explains: "It has long been assumed that because we possess lateral and medial arches in our feet - the lateral one supposedly being rigid and supported in bone -, that our feet differ markedly to those of our nearest relatives, whose mid-foot is fully flexible and makes regular ground contact.

"This supposed 'uniqueness', however, has never been quantitatively tested. We found that the range of pressures exerted under the human mid-foot, and thus the internal mechanisms that drive them, were highly variable, so much so that they actually overlapped with those made by the great apes."

It has previously been thought that humans who make contact with the ground with the mid-foot region are primarily those that suffer from diabetes or arthritis, both of which can impact on the structure of the feet. Research showed, however, that two thirds of normal healthy subjects produced some footfalls where the mid-foot touches the ground, with no indication that this is other than an aspect of normal healthy walking.

Dr Karl Bates, from the University's Institute of Ageing and Chronic Disease, said: "Our ancestors probably first developed flexibility in their feet when they were primarily tree-dwelling, and moving on bendy branches, but as time passed and we became more and more ground-dwelling animals, some new features evolved to enable us to move quickly on the ground.

"Our limbs, however, did not adapt to life on the ground anywhere near as much as those of other ground-dwelling animals such as horses, hares

and dogs. Our tests showed that our feet are not as stiff as originally thought and actually form part of a continuum of variation with those of other great apes.

"We hypothesise that despite becoming nearly exclusively ground dwelling we have retained flexibility in the feet to allow us to cope effectively with the differences in hard and soft ground surfaces which we encounter in long distance walking and running. The next part of our study will be testing this theory, which could offer a reason why humans can outrun a horse, for example, over long distances on irregular terrain."

More information: The evolution of compliance in the human lateral mid-foot, [rspb.royalsocietypublishing.org1098/rspb.2013.1818](https://rspb.royalsocietypublishing.org/doi/10.1098/rspb.2013.1818)

Provided by University of Liverpool

Citation: Human foot not as unique as originally thought (2013, August 20) retrieved 26 April 2024 from <https://phys.org/news/2013-08-human-foot-unique-thought.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.