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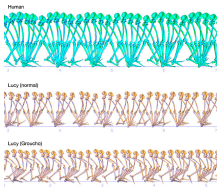

A sequence of steps that may have been taken by our famous hominid relative, "Lucy," known formally as Australopithecus afarensis. Without an Achilles tendon, our ancestors would have been decent walkers but slow and inefficient runners
Bill Sellers/University of Manchester

What's the Secret of Human Running?

The Achilles tendon

Our vulnerability is really located in the Achilles tendon. Even if standing upright, if they lacked an Achilles tendon like in chimps and gorillas, early humans would have been slower than a snail race. "Reverse-engineered" computer models point that in this case, our ancestors would have had difficulties in running. Lacking the spring impulse in their step would have halved the human top speed at a double energy waste. Even so, the upright walk would have been much more effective than the knuckle walking of the chimps and gorillas. "Our research supports the belief that the earliest humans used efficient bipedal walking rather than chimp-like 'Groucho' walking," said lead researcher Bill Sellers, a computational primatologist at the University of Manchester in England. Efficient sprinting was unknown for the first humans, but walking could have been the norm. "The modern human's well-developed Achilles tendon, which transforms the legs into spring-loaded running tools, allowed us to switch from a herbivorous lifestyle to one focused on hunting. What we need to discover now is when in our evolution did we develop an Achilles tendon, as knowing this will help unravel the mystery of our origins," said Sellers. Sellers' models pointed out that our ancestors could walk as efficiently as us around 3.5 million years ago. Even if their gait was slightly slower than ours, that was due to their smaller size (1.2 m or 4 ft tall) and relatively shorter legs. "How we evolved from our common ancestor with chimpanzees six million years ago is a fundamental question. Walking upright seems to be the very first thing that distinguishes our ancestors from other apes, so finding out about this should help us map the evolutionary pathway to modern humans." said Sellers. Sellers had recently reconstituted the running speeds of five carnivorous dinosaurs and employed the same software for modeling anatomical data offered by the hominid fossil skeleton "Lucy", but also by the hominid footprints preserved in volcanic ash at Laetoli (Tanzania). "The skeletons and footprints from some of the earliest members of the human lineage-the early hominids-provide the best clues we have to how we progressed down the pathway to modern human walking and running," said Sellers. "Reverse-engineering" of the fossil skeletons allowed Sellers to achieve information about muscles and tendons for a realistic computer model. "This model is a virtual robot where we can activate muscles and get it to move its legs in a physically realistic fashion. The tricky bit is getting it to actually walk or run without falling over." he said. Sellers' team showed (based on the computer model) that the Achilles tendon works like a big spring that stores energy during running; the removal of the tendon from the model plummeted the top running speed."We have only just started to look at [humanoid] running. Our techniques should let us get to the bottom of this question because it will let us measure the running abilities of our fossil ancestors directly." said Sellers.