

Footprints suggest that different human ancestors lived together

The discovery suggests that different types of human ancestors, with different anatomies and ways of walking, inhabited the same place at the same time.



By Katrina Miller

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A million and a half years ago, among giant storks and antelope ancestors, two extinct relatives of humans walked along the same muddy lake shore in what is now northern Kenya, new research suggests.

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An excavation team has discovered four sets of footprints preserved in mud in the Turkana Basin, a site that has led to major advances in understanding human evolution. The discovery, announced Thursday in a paper in the journal *Science*, is direct evidence that different types of human ancestors, with distinct anatomies and gaits, inhabited the same place at the same time, the paper's authors say.

It also raises questions about the extent of interactions between species.

“It’s possible they were passing by each other,” said Kevin Hatala, an evolutionary anthropologist at Chatham University in Pittsburgh who led the study. “They could have looked up into the distance and seen another member of a closely related species living in the same landscape.”

Based on skeletal remains from the region, Hatala's team attributed the footprints to *Paranthropus boisei* and *Homo erectus*, two types of hominins, the group consisting of our human lineage and closely related species. *Paranthropus boisei* had smaller brains along

with broad, flat faces and huge teeth and chewing muscles; *Homo erectus* more closely resembled modern human proportions and are thought to be our direct ancestors.

Scientists have long known that different types of hominins coexisted on Earth. *Homo sapiens*, which emerged about 300,000 years ago, shared the planet with Neanderthals and Denisovans for thousands of years. Remains of their DNA are still in us today.

But evidence of species overlap and how behaviour differed from one species to another comes mostly from bones. These fossils are often patchily preserved or found in sediments that have accumulated over millennia. This can lead to a large margin of error in dating.

Footprints, on the other hand, are fossilized much more directly, often within hours or days of their creation. They provide a clear snapshot of both a moment in time and a pattern of locomotion.



A footprint that is hypothesized to have been created by an individual of *Homo erectus*. Kevin G. Hatala



Research team members along the perimeter of the excavated footprint surface. Louise N. Leakey

In 2021, Hatala was part of a team that determined that footprints found in Tanzania were made by two different species of hominins 3.6 million years ago. Now, she has found something similar in Kenya.

The researchers discovered three individual footprints that appeared to come from the same type of hominin, and a long, continuous trail of footprints that came from another.

It has not yet been determined whether the footprints belong to different species. Because the fossil record is sparse, “you can’t do a Cinderella thing and try to fit the skeleton of the foot into the footprint,” Hatala said.

Instead, the scientists relied on the results of previous experiments using X-ray technology to understand how foot movement affects the footprints left in the mud. Compared to the continuous trail of footprints, the three isolated footprints had higher arches, indicating that they emerged from a gait more similar to that of modern humans.

They also found that the feet in the footprint trail had a big toe whose position changed from one step to the next. The toe was not as mobile as that of apes, but was more varied than that of modern humans.

“That, to me, is fascinating,” said William Harcourt-Smith, a paleoanthropologist at Lehman College and the American Museum of Natural History in New York, who wrote a perspective piece accompanying the study in *Science*. “Here we have diversity in the way these creatures moved across the landscape, in each other’s backyards.”

Because they are more human-like, the team believes that *Homo erectus* individuals created the three isolated footprints, and that the continuous trail of footprints, which bear similarities to those left by earlier human relatives, came from *Paranthropus boisei*.

Although Hatala and his colleagues have made that claim, Harcourt-Smith said, “it’s difficult to know which species created each print.”

“I think that more data is needed for that,” he said.

A new analysis of footprints from a nearby site showed a similar overlap between the two hominins more than 100,000 years later. This suggests that the two species may have coexisted for a long time and were not in direct competition for resources.

“One didn’t drive the other out of its territory or anything like that,” Hatala said. “Otherwise we wouldn’t see multiple cases of their overlap, or at least that would be much less likely.”

The specialist is intrigued to think about how they might have regarded each other: what would it be like to live in the same habitat as another human-like species, which shares some resemblance, but with such a different appearance?

The current era, when *Homo sapiens* dominates the landscape, “is actually very strange,” Hatala said. “There’s only been this brief, recent period where we’ve only had one human species on the planet.”

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