

## **Did walking on 2 feet begin with a shuffle?**

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Somewhere in the murky past, between four and seven million years ago, a hungry common ancestor of today's primates, including humans, did something novel. While temporarily standing on its rear feet to reach a piece of fruit, this protohominid spotted another juicy morsel in a nearby shrub and began shuffling toward it instead of dropping on all fours, crawling to the shrub and standing again.

A number of reasons have been proposed for the development of bipedal behavior, or walking on two feet, and now researchers from the University of Washington and Johns Hopkins University have developed a mathematical model that suggests shuffling emerged as a precursor to walking as a way of saving metabolic energy.

"Metabolic energy is produced by what an animal eats, enabling it to move. But it is a limited resource, particularly for young-bearing females which have to take care of and feed their offspring. Finding food is vitally important, and an animal needs to save energy and use it efficiently," said Patricia Kramer, a UW research assistant professor of anthropology and co-author of a recent study.

She believes it was an empty belly, along with a need to conserve energy, that prompted that early ancestor to shuffle.

"Hunger. It is always hunger," said Kramer. "There is nothing that will get you to do something you don't want to do other than food. That's why we bribe animals with food to train them."



Because of a huge gap in the fossil record that hides when humans split off from other primates, Kramer and co-author Adam Sylvester, now a postdoctoral fellow at Johns Hopkins University, used the chimpanzee as a way of looking into the past and testing other researchers' ideas about the origins of bipedalism.

Chimpanzees are humans' closest relatives. They basically walk on all fours, partially resting their weight on the knuckles of their hands.

"A chimp's body plan is very much like that of a primitive ape, and our last common ancestor probably had a body like that of a chimp. Modern humans are different with long legs and a big head. So chimps are a good place to start," Kramer said.

Using the model they devised, Kramer and Sylvester calculated it would not be metabolically efficient for a chimp to use bipedalism for distances greater than about 50 feet. But it would be efficient and that most shuffling would occur for distances less than 30 feet. In addition, walking on two feet would be used most frequently for distances less than three feet.

"These are predictions other people can test. You should rarely, if ever, see a chimp walking upright at longer distances. The flipside of this is if a chimp is going a short distance returning to all fours is not going to happen. You can see this in human babies learning to walk. If they are going between a couch and a coffee table they are up on their feet. But if they are going a longer distance, they go down and crawl," she said.

"We think metabolic energy is extremely important and we have only touched the surface of the information we can get with this work. The model allows people to plug in the body characteristics of any primate so a researcher can change the parameters for a specific species."



## The study was published in the *American Journal of Physical Anthropology*.

Source: University of Washington

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