

Anthropologist finds large differences in gait of early human ancestors

November 12 2012, by Bob Yirka



A sculptor's rendering of the hominid *Australopithecus afarensis* is displayed as part of an exhibition that includes the 3.2 million year old fossilized remains of "Lucy", the most complete example of the species, at the Houston Museum of Natural Science, 28 August 2007 in Houston, Texas.

(Phys.org)—Patricia Ann Kramer, professor of anthropology at the University of Washington, has found that the walking gait between two of our early ancestors was likely so different that it's doubtful they would have done so together, despite being two members of the same species living during roughly the same time period. In her paper published in the *American Journal of Physical Anthropology*, Kramer outlines how she compared the natural walking speeds of modern humans to those of two members of the *Australopithecus afarensis* species and found that such large differences existed between two members of our early ancestors that walking together would have been troublesome.

In her study, Kramer compared the bones of Lucy, the famous skeletal remains found in Ethiopia, with those of Kadanuumuu (Big Man in Afar) another member of the *A. afarensis* species unearthed in 2010, though clearly much larger. Because of their difference in height – Lucy would have been about 3.5 feet tall, Big Man approximately 5 – Kramer wondered if they would have been able to walk around together.

To find out, she enlisted the aid of 36 children and 16 adults who all agreed to have their leg bones measured and then to be tested walking on a treadmill. Scientists know that people have a natural walking gait that is also the optimal speed for [conserving energy](#). For long legged people, a faster gait is optimal, whereas for those with shorter legs, slower is better. In the case of Lucy and Big Man, the difference in the length of [leg bones](#) would have been equivalent to the difference in leg bone length between modern children and adults. She used the data from her [volunteers'](#) efforts to create a [mathematical formula](#) that allowed her to estimate the natural gait of Lucy and Big Man and found them to be 3.4 feet per second, versus 4.4 feet per second. Such a difference would have meant [Lucy](#) would have had to walk a lot faster than normal to keep up with Big Man, or Big Man would have had to walk a lot slower for the two of them to walk around together; an idea that seems counterintuitive because it would mean one or the other would have had to walk at a pace that consumed more energy.

Kramer notes that her study includes just two specimens of *A. afarensis* which are of the opposite gender, and who would have lived some distance from one another. Thus, she suggests it's possible that regional differences were at play, or that males of the time were simply much larger than females, which likely would have meant they spent most of their time apart, similar to modern chimpanzees.

More information: Could Kadanuumuu (KSD-VP-1/1) and Lucy (AL 288-1) have walked together comfortably? *American Journal of Physical*

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Abstract

The estimated lower limb length (0.761–0.793 m) of the partial skeleton of *Australopithecus afarensis* from Woranso-Mille (KSD-VP-1/1) is outside the previously known range for *Australopithecus* and within the range of modern humans. The lower limb length of KSD-VP-1/1 is particularly intriguing when juxtaposed against the lower limb length estimate of the other partial skeleton of *A. afarensis*, AL 288-1 (0.525 m). A sample of 36 children (age, >7 years, trochanteric height = 0.56–0.765 m) and 16 adults (trochanteric height = 0.77–1.00 m) walked at their self-selected slow, preferred, and fast walking velocities, while their oxygen consumption was monitored. Lower limb length and velocity were correlated with slow (P

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