



NEW ANALYSIS SHOWS “HOBBITS” COULDN’T HUSTLE

THE FEET OF *HOMO FLORESIENSIS* WERE PRIMITIVE BUT NOT PATHOLOGICAL

A detailed analysis of the feet of *Homo floresiensis*—the miniature hominins who lived on a remote island in eastern Indonesia until 18,000 years ago—may help settle a question hotly debated among paleontologists: how similar was this population to modern humans? A new research paper, featured on the cover of the current issue of *Nature*, may answer this question. While the so-called “hobbits” walked on two legs, several features of their feet were so primitive that their gait was not efficient.

“The hobbits were bipedal, but they walked in a different way from modern humans,” explains William Harcourt-Smith, a Research Scientist in the Division of Paleontology at the American Museum of Natural History and an author on the paper. “Their feet have a combination of human-like and more primitive early hominin traits, some of which are more akin to those in Lucy.” Lucy is an early bipedal but small-brained hominin, or australopithecine, that lived in Africa 3.2 million years ago.

The “hobbits,” excavated from Liang Bua Cave on the island of Flores, were first described in 2004. Known specimens range in age from 90,000 to 18,000 years old, making them contemporaneous with modern humans. This, in combination with the unusually small stature and brain size of *H. floresiensis*, led to considerable debate among researchers and in the press. Some consider the population a separate species, while others have assessed the fossils as pathological modern humans. But a number of recent analyses of the skull, face, and wrist have found many unusually primitive features among the “hobbits” that are more similar to chimpanzees and *Australopithecus*, suggesting that the Flores inhabitants represent a remnant population of early hominins.

The anatomy of the foot described in the new paper might finally answer the pathological modern vs. primitive population question. Although the foot is characteristic of a biped—being stiff and having no opposable big toe—many other traits fall outside of the range for modern humans. The *H. floresiensis* foot is very long in proportion to the lower limb and considerably more than half the length of the thighbone; modern human feet are relatively shorter at about half

of the femur's length. The stubby big toe of the hobbits is another primitive, chimp-like trait. But the pivotal clue comes from the navicular bone, an important tarsal bone that helps form the arch in a modern human foot. The "hobbit" navicular bone is more akin to that found in great apes, which means that these hominins lacked an arch and were not efficient long-term runners.

"Arches are the hallmark of a modern human foot," explains Harcourt-Smith. "This is another strong piece of the evidence that the "hobbit" was not like us."

Researchers also assessed the pathology hypothesis by comparing "hobbit" feet to those of typical modern humans and pathological modern specimens such as pituitary dwarfs. While the pathological specimens fell well within the range of modern humans, the "hobbits" did not. This suggests that *H. floresiensis* was an unusual, isolated population of early hominins.

"The fossil record continues to surprise us," says William Jungers, Chairman of the Department of Anatomical Sciences at Stony Brook University Medical Center, and an author on the study. "*H. floresiensis* is either an island-dwarfed descendant of *H. erectus* that not only underwent body-size reduction but also extensive evolutionary reversals, or, as our analysis suggests, it represents a new species full of primitive retentions from an ancestor that dispersed out of Africa much earlier than anyone would have predicted. Either way, the implications for human evolution are profound."

In addition to Jungers and Harcourt-Smith, authors of the research paper include Roshna Wunderlich, James Madison University; Matthew Tocheri, National Museum of Natural History (Smithsonian Institution); Susan Larson, Stony Brook Medical Center; Thomas Sutikna and Rhokus Awe Due, National Research and Development Centre for Archaeology in Jakarta, Indonesia; and Mike Morwood, University of Wollongong in Australia. Research was funded by grants from the Australian Research Council, the National Geographic Society, the Wenner-Gren Foundation for Anthropological Research, the Wellcome Trust, and the Leakey Foundation.

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