

Researchers offer alternate theory for found skull's asymmetry

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(PhysOrg.com) -- A new turn in the debate over explanations for the odd features of LB1 -- the specimen number of the only skull found in Liang Bua Cave on the Indonesian island of Flores and sometimes called "the hobbit" -- is further evidence of a continued streak of misleading science regarding the development of a new species, according to researchers.

Robert Eckhardt, professor of [developmental genetics](#) and evolutionary morphology at Penn State, and Maciej Henneberg, Wood Jones professor of anthropological and comparative anatomy at the University of Adelaide, dispute that the skull represents a new species in the Aug. 31 issue of [American Journal of Physical Anthropology](#).

"We have a case in which the majority of workers in paleoanthropology support the idea that a single asymmetrical skull is the representative of a new species rather than an individual abnormal human," said Eckhardt. "Instead, LB1 provides a fantastic example of how biomedical research methods can be used to study the evidence for human developmental patterns whenever and wherever they occur."

What Eckhardt called an "unscientific" dialogue has eclipsed core facts in the debate -- the existing data on LB1's development, he said. The facts concern left-right [asymmetry](#) of LB1's face and braincase. In 2006, Eckhardt and colleagues showed that the face and braincase of LB1 were abnormally asymmetrical.

"Virtually everyone is asymmetrical to a minor degree," he noted.

Normal becomes abnormal when that asymmetry exceeds about 1 percent. LB1 surpasses this cutoff for developmental abnormality -- all eight measurements on either side of the facial midline exceed 6 percent asymmetry, most by a large margin. The unusually large differences between the two sides of the skull provided evidence of disordered development, reinforcing their idea that the tiny [brain](#) of LB1 signaled not a new species, but a malformed human ancestor.

Over the past three years, a series of papers written by other researchers argued a contrasting opinion -- that the LB1 skull was symmetrical, not malformed.

In 2009 published research by Yousuke Kaifu of the University of Tokyo and his collaborators showed that the skull of LB1 was asymmetrical, as Eckhardt and his colleagues had maintained all along. But Kaifu and his collaborators then proposed the explanation that LB1 suffered from an environmentally caused disease known as posterior deformational plagiocephaly (PDP) -- a skull condition caused by too much pressure put on one part of an infant's head.

In their journal article last month, Eckhardt and Henneberg respond that this diagnosis is impossible.

The first reason, they point out, is that widespread PDP is a relatively modern problem. The 1990s witnessed a large increase in the incidence of PDP because parents began putting infants to sleep on their backs to reduce the risk of sudden infant death syndrome (SIDS). The constant pressure on the back of the skull can cause a permanent deformation, which is PDP.

If LB1 represents a novel species with ancient roots, its ancestors predate PDP, say Eckhardt and Henneberg.

According to Eckhardt, Kaifu noted that PDP became evident only after

the development of secondary altriciality, which forced modern humans to deliver a helpless newborn with soft and malleable cranial bones. The primate ancestors of humans probably were less dependent on their mothers than modern human infants. As the size of the neonate skull increased through time, human babies left the womb earlier in development to keep brain function intact.

This shift to more altricial comes much later than the hypothesized evolutionary branch point that led to "Homo floresiensis." LB1's discoverers invented this term to name LB1's species, which they believe to be different than direct [human ancestors](#). Eckhardt and Henneberg disagree with this proposal. There is debate among paleoanthropologists over when hominids evolved to become extremely altricial, but these estimates generally range from about 500,000 to 200,000 years ago.

"The original claim by its discoverers, Peter Brown and Michael Morwood, was that the hypothetical new species originated from Homo erectus during total isolation on Flores more than 800,000 years ago," said Eckhardt. Brown and Morwood later modified their explanation, instead deriving their new species from some earlier African species around 2 million years ago, with brain and body size supposedly having been reduced before the ancestors of LB1 ever reached Flores.

"No one outside of our research group seems to have recognized this contradiction," said Eckhardt. "With a chimp-sized brain, there is no basis for invoking plagiocephaly to explain the asymmetry seen in LB1."

Eckhardt said that, aside from having a tiny brain, LB1 resembles the normal people who still live on Flores in many features (such as jaws and teeth). But that tiny brain of LB1 is inside an asymmetrical [skull](#), which is powerful independent evidence for abnormal development. He believes that many researchers in the field of paleoanthropology tend to favor differences as evidence of a new species rather than looking at

characteristics as reflecting child development.

Provided by Pennsylvania State University

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