'Hobbit' more likely had Down Syndrome than a new species

August 5 2014, by Maciej Henneberg And Robert Eckhardt

The hominid skull that gave rise to Homo floresiensis - but is it really a new species? Credit: Flickr/NCSSM , CC BY-NC-SA

Many people believe that what was found in Liang Bua Cave on the island of Flores in Indonesia in 2003-2004 was some variety of hobbit-like human or prehuman. Our research published today argues that it was more likely just one of the local island inhabitants suffering from a medical condition.

Those of a more technical bent will recall that the "hobbit" was given the scientific name, Homo floresiensis.

What actually was found was a sample of bones and stone tools. These things did not have specimen labels on them bearing any formal scientific name, and nothing about them could reasonably be reconstructed to look anything like the brave little beings at the centre of J.R.R. Tolkien's masterpiece of fantasy literature, The Hobbit.

Bones are discovered; taxonomic names are invented by researchers. Analogies with characters in works of literary fiction are marketing devices.

What was found in the cave

Inside cave deposits several metres thick were scattered and fragmented human bones and teeth. The only reasonably complete remains of a single individual, labelled LB1 and dated to about 18,000 years ago, consisted of one skull with the mandible, most leg bones, some upper limb bones and fragments of bones of the trunk. (See this 3D image of the skull.)

The skull had an unusually small braincase while the face and teeth were of normal size and form, comparable with those of people living now near the cave. Limb bones had very weak muscle markings and unusual proportions. Thigh bones were very short when compared to the feet. Feet were flat.

No second skull was found among the mostly broken bones of other individuals. These other fragments had a range of sizes, generally on the small side, but comparable with present-day local people and those who live on Palau and the Andaman Islands.

Since the cave lies on an island where stone tools go back to 1 million years, archaeologists interpreted an unusual-looking skeleton as the discovery of a new species. Initial reconstructions of brain size of 380ml and body height of 1.06m did not match modern humans. Nor did they agree with general trends in human evolution (see figure below).

Not as small as first thought

Those reconstructions turned out to be incorrect on further investigation. After cleaning the deposit from inside the brain cavity its volume increased to 430ml. After correcting for unusual proportions of thighs and using other bones the reconstructed stature increased to between 1.2m to 1.4m.

The excitement of the discovery of the new species resulted in a flurry of speculations as to its origins among people interested in human evolution. It was thought initially that the small brain and diminutive stature were a result of island dwarfing - a phenomenon known for some herbivores residing on smaller islands.

The 18,000-year-old bones first thought to belong to a new species, Homo floresiensis. Credit: AAP Image/Supplied

Then complex statistical analyses of skeletal measurements led to the conclusion that the ancestors of the species had to wander to Indonesia from Africa nearly 2 million years ago but leaving no traces along the way.

Immediately after the discovery's announcement in 2004, biological anthropologists, who were familiar with the mechanisms of human evolution and experienced in the study of diseases from skeletal remains of ancient people, realised that the skeleton dating to a time when anatomically modern humans lived in Indonesia displayed signs of a developmental syndrome.

For this reason they opposed the naming of the new species. Since 2005 access to the skeletal remains for re-study was strictly limited. Opponents of the new species theory had to work from notes and measurements taken during 2005 examination of all skeletal remains from the Liang Bua cave and from secondary sources.

Looking for a diagnosis

Regarding the bones themselves, it always is difficult to make a diagnosis of disease from ancient remains because they are incomplete. Medical laboratory tests can't be run and, of course, there is no way to question the patient about symptoms.

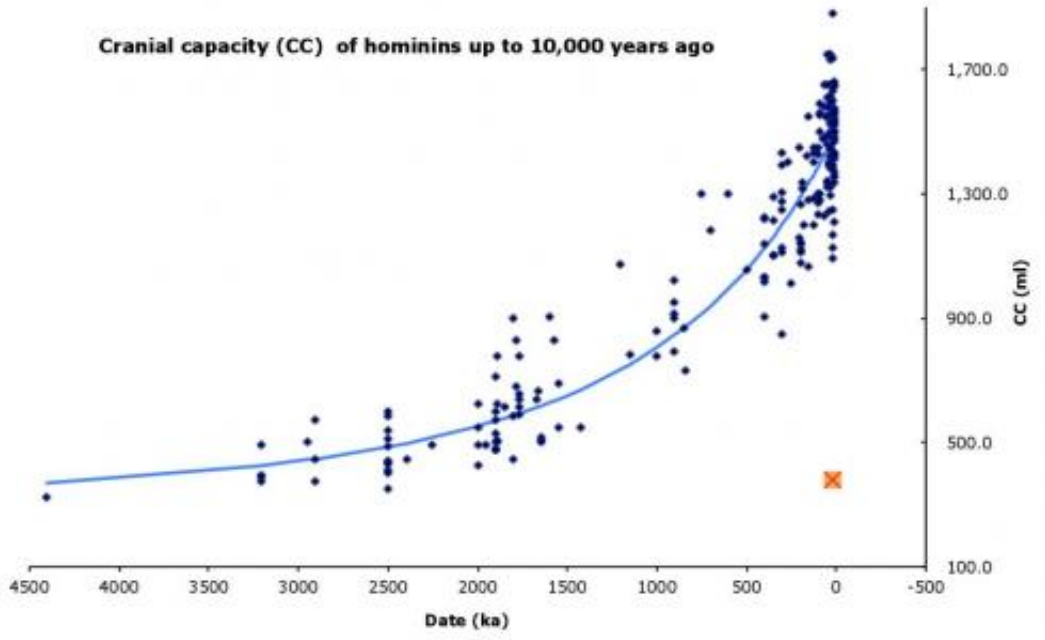
A number of scientists initially proposed various diagnoses. It took us a decade to arrive at a diagnosis of Down Syndrome.

Although there are disagreements about the precise numbers for brain size and stature estimated from skeletal parts, and the explanations for these, from the beginning everyone has agreed that LB1 brain and body size are unusually small.

Our group's additional early insight from late 2004 was that the skull of LB1 was asymmetrical in several ways, particularly in its face. Although we published measurements of the left-right facial disparities, curiously these data were denied or dismissed for several years – but they are matters of observation, not interpretation. Anyone can see them.

Members of our group sometimes are referred to as "Hobbit deniers". We think that this controversy has been perpetuated by "data deniers".

Starting from small brain and body size combined with asymmetry, it was possible to find several hundred medical syndromes that were at least a partial match. We went through these – as, incidentally, did several other groups of able researchers in Australia and elsewhere.



Brain size of LB1 (orange square) against brain sizes of all hominids that lived up to the end of the Ice Age.

More than a few syndromes seemed promising to others as well as to us. Each time, as we looked closer, some detail would not fit. We even went so far as to begin a clinical study of Laron syndrome.

Finally, after comparing the distribution of signs in various diseases, and using statistical data on body proportions of patients, we have arrived at the diagnosis of Down Syndrome. This was the only pathological condition that had all signs in agreement with what is present in LB1.

No help from DNA

DNA extracted from LB1 bones is too fragmentary to allow direct diagnosis, but significantly the only fragments recovered so far are of modern human type. No sequences of a different species could be found.

Down Syndrome results from duplication of some genetic material and produces small brain and short stature. It affects childhood development, causing "atavisms", with some bodily characteristics resembling earlier stages of evolution. No wonder archaeologists were confused.

Skeletal remains of Down Syndrome people are known from archaeological sites. Such people, though disadvantaged, can be valuable members of families and communities and in the past survived to age 30-35 years.

The researchers who made the extraordinary claims of the new species's discovery, and the science writers who spread them, overlooked an important rule central to scientific method: extraordinary claims require extraordinary evidence.

But simpler explanations must be considered first (the rule of parsimony). This is a key issue for rational thought and scepticism everywhere.

Source: The Conversation