New hominin discovery suggests multiple human ancestors lived side-by-side

Matthew MacEgan
3 June 2015

On May 27, the magazine *Nature* published an article providing details on the discovery of a new hominin fossil in Ethiopia, *Australopithecus deyiremeda*. This new discovery is significant because it provides evidence that there were at least two contemporary hominin species living in the Afar region approximately 3.5 million years ago. It also confirms that certain dental features traditionally associated with later *Paranthropus* and *Homo* genera appear earlier in the fossil record than previously thought, altering our classification methods moving forward.

The first Australopithecine fossil—a child's skull found in a lime quarry by workers in Taung, South Africa—was discovered in 1924 and named *Australopithecus africanus* (*Australopithecus* translates as "southern ape"). *Australopithecus* lived between approximately 4 million and 2 million years ago throughout Eastern, Central, and Southern Africa. The genus is believed to be a link between the modern human genus *Homo* and our last common hominid ancestor with the great apes.

Their brains were approximately 35 percent the size of modern human brains, and adults stood roughly 1.2 meters tall. Significantly, they had longer arms in proportion to the rest of their bodies and less of an upright bipedal frame than *Homo*, allowing some anthropologists to suggest that Australopithecines lived in a period when humans were transitioning from arboreal (tree) dwelling to more terrestrial lifestyles. Many *Australopithecus* species have been discovered since 1924, including *A. afarensis*, *A. anamensis*, *A. garhi*, and *A. sediba*.

There has been some debate among scientists about whether Australopithecines should be split into two separate genera—*Australopithecus* for the more "gracile" types mentioned above and *Paranthropus* for what have been deemed "robust" Australopithecines. Examples of the robust Australopithecines, a characterization which is generally based on dentition and other skull features, are *A. aethiopicus* (*P. aethiopicus*), *A. boisei* (*P. boisei*), and *A. robustus* (*P. robustus*). Scientists in favor of the separation argue that these morphological differences may have accompanied a different set of behaviors among these robust groups.

Our current *Homo* genus probably developed out of one of the *Australopithecus* or *Paranthropus* species between 2 and 3 million years ago.

The etymology of *A. deyiremeda* comes from the local Afar language where *deyi* means "close" and *remeda* means "relative," which the authors use to suggest that this species is a close relative of all later hominins. The fossil remains include two specimens, an upper and lower jaw, which the authors claim belong to the same individual. They were found within a three-square-mile area south of the Mille River, weathered out of sandstone and siltstone. Radiometric, palaeomagnetic, and depositional rate analyses show that the remains are between 3.5 and 3.3 million years old.

The authors spend much of the paper defending their decision to classify their discovery as a new species by comparing its dentition to other hominin skeletons; however, this is not the first study that has suggested more diversity among Middle Pliocene hominins—other recent discoveries have indicated that there existed multiple "locomotive" adaptations in addition to other elements that suggest taxonomic diversity. Most notably, *Kenyanthropus platyops* from Kenya and *Australopithecus bahrelghazali* from Chad have been argued to be morphologically distinct from contemporaneous *Australopithecus afarensis*. This is

significant because all three of these species and the new *A. deyirameda* lived during the same time period.

The main difference that the *A. deyiremeda* fossil has with *A. afarensis*, which lived not only during the same time period but also in the same geographical location, is in the shape and size of its teeth. The new fossil has teeth that are more thickly enameled and a more robust jaw structure. The incisors in the front are also smaller than those typically found in *A. afarensis*. Additionally, the researchers report evidence of tooth and jaw traits that were thought to have evolved in a much later period.

They conclude that "the taxonomy and phylogenetic relationships among early hominins are becoming more complicated as new taxa are added to the Pliocene fossil record, and the temporal range and systematics of early Homo are reconsidered..."

The authors then address homoplacy—the idea certain organs or parts were acquired as the result of the parallel evolution of two species. They write that the place of *A. deyiremeda* outside of *Paranthropus* and *Homo* "implies that some features associated with one or both of these taxa are homoplastic."

Additionally, the authors state that the discovery of *A. deyiremeda* is "incontrovertible" evidence that multiple hominins existed contemporaneously in eastern Africa during the Middle Pliocene. This is exciting because the location where these remains were found is only 35 kilometers south of Hadar, where *A. afarensis* has already been well documented. This suggests that multiple hominin species overlapped temporally and lived in close geographic proximity.

This debunks the limited view that our human lineage comes down through one direct line from our last common ancestor with the great apes to modern *Homo sapiens*. The earliest humans not only evolved in different ways in different parts of Africa, but they still lived and worked side-by-side. It is important to remember that the evidence we have of prehistoric human life is extremely limited. We are able to infer a lot of information from just a small number of hominin fossils. It is possible that far more interactions and changes were happening than we will ever be able to document scientifically.

The lead author, Dr. Haile-Selassie, has stated, "Some of our colleagues are going to be skeptical about this new species, which is not unusual. However, I think it is time that we look into the earlier phases of our evolution with an open mind and carefully examine the currently available fossil evidence rather than immediately dismissing the fossils that do not fit our long-held hypotheses."

The authors suggest that future researchers should more closely examine (1) how these different taxa are related to each other and to later hominins and (2) what environmental and ecological factors triggered such diversity. They claim that these things "can only be understood with the recovery and analysis of more hominin fossils and their associated fauna."