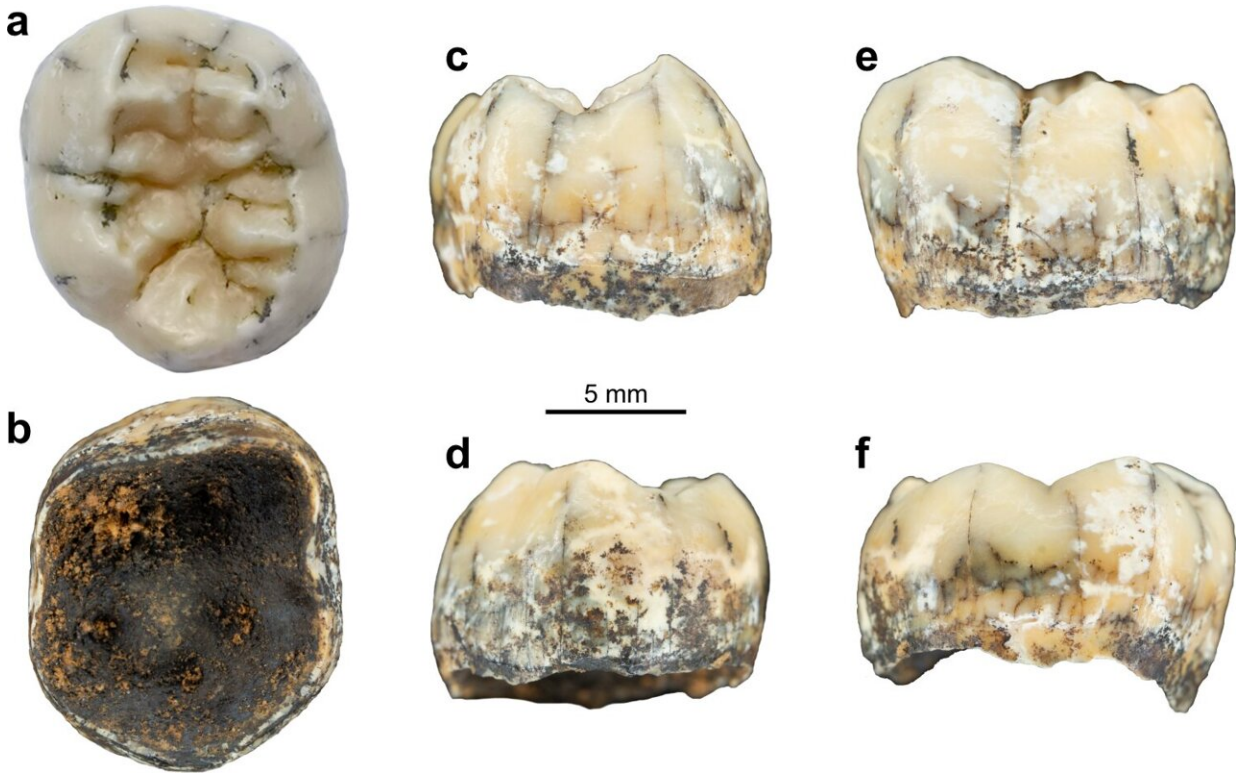
Child's tooth could offer clues to ancient human relative

May 17 2022



Views of the TNH2-1 specimen.. Pictures of TNH2-1 in occlusal (a), inferior (b), mesial (c), distal (d), buccal (e) and lingual (f) views. Credit: *Nature Communications* (2022). DOI: 10.1038/s41467-022-29923-z

A child's tooth at least 130,000 years old found in a Laos cave could help scientists uncover more information about an early human cousin, a

study said on Tuesday.

Researchers believe the discovery proves that Denisovans—a now-extinct branch of humanity—lived in the warm tropics of southeast Asia.

Very little is known about the Denisovans, a cousin of Neanderthals.

Scientists first discovered them while working in a Siberian cave in 2010 and finding a finger bone of a girl belonging to a previously unidentified group of humans.

Using only a finger and a wisdom tooth found in the Denisova Cave, they extracted an entire genome of the group.

Researchers then found a jawbone in 2019 on the Tibetan Plateau, proving that part of the species lived in China as well.

Aside from these rare fossils, the Denisova man left little trace before disappearing—except in the genes of human DNA today.

Through interbreeding with Homo sapiens, Denisovan remnants can be found in current populations in southeast Asia and Oceania.

Aboriginal Australians and people in Papua New Guinea have up to five percent of the ancient species' DNA.

Inside Ngu Hao 2 cave showing the concreted remanent cave sediments adhering to the cave wall. The overlying whitish rock is a flowstone that caps the entire deposit. Credit: Fabrice Demeter (University of Copenhagen/CNRS Paris)

Cobra Cave discovery

Scientists concluded "these populations' modern ancestors were 'mixed' with Denisovans in southeast Asia", said Clement Zanolli, a paleoanthropologist and co-author of the study published Tuesday in *Nature Communications*.

But there was no "physical proof" of their presence in this part of the Asian continent, far from the freezing mountains of Siberia or Tibet, the researcher at the French National Centre for Scientific Research told AFP.

This was the case until the group of scientists began searching in the Cobra Cave in northeast Laos.

Cave specialists discovered the area in a mountain in 2018 next to Tam Pa Ling Cave, where the remains of ancient humans have already been found.

The tooth immediately appeared to have a "typically human" shape, explained Zanolli.

The study said, based on ancient proteins, the tooth belonged to a child, likely female, aged between 3.5 and 8.5 years old.

But the tooth is too old for carbon-dating, and the DNA has been badly preserved because of heat and humidity, said paleoanthropologist and

study co-author Fabrice Demeter.

After analyzing the shape of the tooth, scientists reckon it was most likely a Denisovan who lived between 164,000 to 131,000 years ago.

Neanderthal cousin

They then studied the tooth's interior through different methods including analyzing proteins and a 3D X-ray reconstruction.

The tooth's internal structure was similar to that of the molars found in the Tibetan Denisova specimen. It was clearly distinguishable from modern humans and other ancient species that lived in Indonesia and the Philippines.

"The proteins allowed us to identify the sex—female—and confirm its relation to the Homo species," said Demeter, a researcher at the University of Copenhagen in Denmark, where the tooth is temporarily based.

The tooth's structure had common characteristics with Neanderthals, who were genetically close to Denisovans. The two species are thought to have diverged around 350,000 years ago.

A close up of the tooth from a 'birds-eye' viewpoint. Credit: Fabrice Demeter (University of Copenhagen/CNRS Paris)

A view from inside Denisova cave in the Altai Mountains of Russia. Note the very different vegetation and climate compared to Laos. Credit: Mike Morley, Flinders University.

Dr Mike Morley with cave sediment sample at Flinders University microarchaeology lab. Credit: Flinders University

But Zanolli explained that the researchers concluded it was a Denisova specimen because no Neanderthal traces have been found so far east.

For Demeter, the discovery shows that Denisovans occupied this part of Asia and adapted to a wide range of environments, from cold altitudes to tropical climates, whereas their Neanderthal cousins seemed more "specialized" in cold western regions.

The last Denisovans could have therefore met and interbred with modern humans, who passed on their genetic heritage to southeast Asia's modern populations, in the Pleistocene epoch.

More information: Fabrice Demeter et al, A Middle Pleistocene Denisovan molar from the Annamite Chain of northern Laos, *Nature Communications* (2022). DOI: 10.1038/s41467-022-29923-z