Hunter-gatherer diets weren't always heavy on meat: Morocco study reveals a plant-based diet

June 10 2024, by Zineb Moubtahij

A tooth caries found in Taforalt Cave, Morocco. Credit: Louise Humphrey

About 11,000 years ago, humans made a major shift from hunting and gathering to farming. This change, known as the Neolithic Revolution, dramatically altered our diets.

For decades, scientists have thought that pre-agricultural human groups ate a lot of animal protein. But analysis has always been hampered by a

scarcity of well-preserved human remains from Pleistocene sites. So, in fact, little is known about the dietary practices of that time.

I'm a a Ph.D. candidate studying this subject in Morocco, and was part of a research team that uncovered some new insights into the Stone Age diet.

Using novel research techniques, we found evidence that our Late Stone Age hunter-gatherer ancestors in north Africa had a heavily plant-based diet, thousands of years before the advent of agriculture.

Most studies of pre-agricultural populations have been conducted at European and Asian Paleolithic sites, so our understanding of the diet during this period has been largely based on findings from those regions. Our knowledge has also been limited by the poor preservation of certain materials in arid regions like north Africa.

Our research changes this. It challenges the long-held belief that hunter-gatherers primarily relied on animal protein, and adds to what's known about pre-agricultural diets across different regions.

Chemical traces in bones and teeth

Imagine being able to tell what someone ate thousands of years ago just by examining their bones and teeth.

This is possible thanks to a fascinating technique called isotopic analysis. Isotopes are tiny chemical markers of the food we eat that get stored in our bones and teeth. They can be preserved for thousands of years. By studying them, we can learn directly about the diets of ancient humans.

Since the 1970s, scientists have used stable isotope analysis to learn about the diets and lifestyles of ancient human groups by analyzing

collagen protein in their bones. Collagen is a protein found in connective tissue, skin, tendon, bone, and cartilage. For example, carbon isotope analysis was used to detect the maize consumption of prehistoric people in North America.

Researchers have also used this technique to compare the diets of Neanderthals and early modern humans (Homo sapiens) in Europe.

Together with an international team of scientists, I analyzed the teeth and bones of people buried in Taforalt Cave in the north-east of Morocco. The burials were deliberate. Researchers have referred to the site as a cemetery due to the organized nature of the burials and the long period over which they occurred. The cave is one of the best-studied sites in north-west Africa for the Paleolithic period.

It is likely the oldest cemetery in north Africa. It has some of the oldest ancient human DNA in Africa, which has allowed scientists to characterize human genetic ancestry in this region.

The human burials, associated with the Iberomaurusian culture, were radiocarbon dated to between 15,100 and 13,900 years ago.

Zoologists have identified that the population hunted Barbary sheep and other animal species in their surroundings, such as gazelles, hartebeest, and equids. The macrobotanical remains recovered from the site show that they also had access to a variety of plant species native to the Mediterranean region, including sweet acorns, pine nuts, oats, beans, and pistachios.

We looked at isotopes of carbon, nitrogen, strontium, sulfur and zinc. Different foods leave unique isotopic "fingerprints." For instance, meat, plants and seafood have distinct carbon and nitrogen isotope ratios, which help us determine what kinds of foods people were eating.

We also used cutting-edge techniques involving zinc isotopes developed by one of my Ph.D. supervisors, Klervia Jaouen, which we applied to tooth enamel. This method, combined with analyses of amino acids, allowed us to further differentiate between plant and animal sources in the diet.

This innovative approach gave us a clearer and more detailed picture of what ancient diets looked like, shedding light on how these people adapted to their environment long before anyone started farming crops.

Surprising diet for hunter-gatherers

We analyzed tooth enamel and bones from seven individuals from the cave of Taforalt and various isolated teeth. Our analysis revealed something unexpected: instead of a meat-heavy diet, the isotopic signatures showed a significant reliance on wild plants. We also found minimal evidence of seafood or freshwater food consumption, which was surprising given their proximity to water sources.

Our research indicated that while the Iberomaurusians did consume some meat, their diet relied heavily on wild plants which they might have stored to provide a food supply through the year.

One of the interesting discoveries we made was that a baby started eating solid foods at the early age of around six to 12 months. This baby was apparently given plant-based foods, probably as porridge or soup. This gives us a fascinating glimpse into how hunter gatherers took care of their children in the past.

The findings also help explain why tooth cavities were common among the people of Taforalt. They ate a lot of starchy foods, which can lead to cavities, especially since they didn't have toothbrushes or good dental hygiene back then. The plant bits would get stuck in their teeth and cause

decay, leading to tooth problems.

People who were mainly hunters would have to follow a nomadic lifestyle. At Taforalt, however, archaeologists found grinding stones likely used for plant processing. The use of the cave as a burial site, in addition to heavy plant consumption, suggests that this population might have already been leading a more settled lifestyle, exploiting available food resources from the surrounding area.

Looking forward

These findings challenge the traditional view that a heavy reliance on plant-based diets started only with agriculture. The Iberomaurusians were consuming a lot of wild plants 8,000 years before farming began in Morocco.

This suggests that early humans were more adaptable and resourceful in their dietary habits than previously thought. Understanding this helps us appreciate the complexity and flexibility of human diets in prehistory and how these dietary practices influenced our evolution and health.

Our study also shows how novel isotopic techniques can give us detailed insights into our ancestors' diets, helping us understand the foundations of human nutrition.

Provided by The Conversation