Ancient Romans 'had perfect teeth' thanks to healthy low-sugar diet

Scientists used CAT scans to examine the remains of 30 men, women and children killed in Pompeii when Mount Vesuvius erupted in AD 79.

By Nick Squires, Rome for Med Expose’

4:22PM BST 30 Sep 2015

They may have lived in an era when dental care was rudimentary at best, but the ancient Romans had better teeth than people today, new research has revealed. Scientists used CAT scans to examine the remains of 30 men, women and children who were killed in Pompeii when the city was engulfed by ash and pumice from Mount Vesuvius in AD 79.
After months of research, their most startling discovery was the excellent condition of the Romans’ teeth, which the researchers ascribed to a low-sugar, fibre-rich Mediterranean diet.

“The inhabitants of Pompeii ate a lot of fruit and vegetables but very little sugar,” said Elisa Vanacore, a dental expert. “They ate better than we did and have really good teeth. Studying their teeth could reveal a lot more about their lives.”
They were strangers to toothbrushes or toothpaste, but their healthy diet meant that few of the Romans suffered from cavities, the CAT scans showed. Three-dimensional imaging revealed that many of the victims of the eruption had severe cranial injuries caused by falling masonry and rubble as homes, taverns and public bath houses toppled around them. The scans reveal the victims’ skeletons in stunning detail, including that of a little boy. “Their diet was balanced and healthy, similar to what we now call the Mediterranean diet,” said Massimo Osanna, the director of the ancient site near Naples. “The research is a big step forward in our understanding of the Roman world. “Exceptional findings are emerging about their age, sex, social status and dietary habits.” Another surprising discovery was that the bones showed deterioration as a result of the high levels of fluoride in the water that supplied Pompeii. The research project has brought together an expert team of Italian radiologists, archaeologists, orthodontists and anthropologists. It is not only humans that they studied – there was also a dog and a wild boar, both trapped in the conflagration that devastated Pompeii and neighbouring Herculaneum when Vesuvius erupted. When waves of blisteringly hot ash fell over Pompeii, many people suffocated and were buried. The ash gradually hardened into pumice, encasing their bodies.
Over time the soft tissue of the bodies rotted away, leaving cavities containing just their skeletons. Archaeologists in the 19th century pioneered the technique of pouring plaster into the cavities. Once the plaster hardened, the archaeologists chipped away at the surrounding pumice to extract detailed casts of the victims, many of them contorted in the moments before death. Experts plan to examine a total of 86 plaster cast bodies. The little boy aged around four was found in a villa dubbed the House of the Golden Bracelet with the ossified remains of his parents. Some of the remains are too unwieldy to fit into the CAT machine, including that of a woman in a sitting position who is holding a toddler on her lap, one of the most poignant casts. Pompeii was encased in hardened ash for centuries before excavations began in 1748. Mt Vesuvius had been spouting smoke and ash for days before it finally erupted and the majority of the population of 20,000 are thought to have fled in safety. But around 2,000 stayed behind and were killed when ash and toxic fumes engulfed the city.

Modern dental hygiene would have been quite unnecessary for ancient Romans living in Pompeii, as research has revealed that they had impressively healthy teeth. Scientists appointed by the Archaeological Superintendence of Pompeii have used CAT scans to examine 30 Pompeii inhabitants who were preserved in hardened ash after Mount Vesuvius erupted in AD 79. The group, headed by radiologist Giovanni Babino, released photos of their work on Sept. 29, and revealed in a press conference that the ancient Romans had perfect teeth and “no immediate discernible need for dentists,” according news agency Agenzia Giornalistica Italia. Though Pompeii citizens never used toothbrushes or toothpaste, they had healthy teeth thanks to their low-sugar diet. Massimo Osanna, superintendent of the World Heritage-listed site, said their diet was
“balanced and healthy, similar to what we now call the Mediterranean diet,” according to The Telegraph.

“The inhabitants of Pompeii ate a lot of fruit and vegetables but very little sugar,” said orthodontist Elisa Vanacore, who oversaw the examination of the teeth. “They ate better than we did and have really good teeth.”

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Why Did the Ancient Egyptians Suffer From Poor Dental Health?

A study published in the Journal of Comparative Human Biology has shed light on the dental health of ancient Egyptians. A total of 3,000 mummies were studied, and the results have led to interesting findings. The findings showed that, "Worn teeth, periodontal diseases, abscesses and cavities tormented the ancient Egyptians ..." The teeth in 18 percent of the mummies showed signs of a vast array of dental health disorders. Many of the mummies also showed signs of bone disorders and fractures. What this study fails to tell us is why this occurred.

What could lead to the Egyptians having weak bones and poor dental health? If we look into the foods they ate, we can find the answer. While processed foods were not available to the Egyptians, they did eat other things that contribute to weak bones and poor dental health. A staple in the diet of many ancient Egyptians was bread and honey. Many of the Pharaohs would consume foods that were sweetened with honey on a regular basis. They also consumed overly refined flour, and their diet may have consisted of large amounts of sweets and highly refined baked goods. Breads can be high in toxic substances, such as lectins or phytic acid, which promote tooth decay. While honey can be used in moderation, it is not effective at preventing tooth decay. Sweeteners, including honey, can actually promote tooth decay if a person is already suffering from tooth decay.
and cavities. While a percentage of the mummies did show signs of tooth decay and cavities, others did not. This shows that some of the Egyptians were following a diet that was better for their dental health. The reason why some Egyptians had good dental health and others did not is the result of the other foods that were available to them. Fish and vegetables were available to many of the Egyptians, and these foods are high in the right minerals, nutrients and fat-soluble vitamins that are needed to build strong bones and healthy teeth.

References:


Ancient teeth bacteria record disease evolution

*Date:* February 17, 2013  
*Source:* University of Adelaide

*Summary:* DNA preserved in calcified bacteria on the teeth of ancient human skeletons has shed light on the health consequences of the evolving diet and behavior from the Stone Age to the modern day.

Teeth of late Iron Age/Roman woman showing large dental calculus deposit, from Cambridge area, UK.

*Credit:* Photo by Alan Cooper, University of Adelaide

DNA preserved in calcified bacteria on the teeth of ancient human skeletons has shed light on the health consequences of the evolving diet and behaviour from the Stone Age to the modern day.
The ancient genetic record reveals the negative changes in oral bacteria brought about by the dietary shifts as humans became farmers, and later with the introduction of food manufacturing in the Industrial Revolution.

An international team, led by the University of Adelaide's Centre for Ancient DNA (ACAD) where the research was performed, has published the results in Nature Genetics February 17. Other team members include the Department of Archaeology at the University of Aberdeen and the Wellcome Trust Sanger Institute in Cambridge (UK).

"This is the first record of how our evolution over the last 7500 years has impacted the bacteria we carry with us, and the important health consequences," says study leader Professor Alan Cooper, ACAD Director.

"Oral bacteria in modern man are markedly less diverse than historic populations and this is thought to contribute to chronic oral and other disease in post-industrial lifestyles."

The researchers extracted DNA from tartar (calcified dental plaque) from 34 prehistoric northern European human skeletons, and traced changes in the nature of oral bacteria from the last hunter-gatherers, through the first farmers to the Bronze Age and Medieval times.

"Dental plaque represents the only easily accessible source of preserved human bacteria," says lead author Dr Christina Adler, who conducted the research while a PhD student at the University of Adelaide, now at the University of Sydney.

"Genetic analysis of plaque can create a powerful new record of dietary impacts, health changes and oral pathogen genomic evolution, deep into the past."

Professor Cooper says: "The composition of oral bacteria changed markedly with the introduction of farming, and again around 150 years ago. With the introduction of processed sugar and flour in the Industrial Revolution, we can see a dramatically decreased diversity in our oral bacteria, allowing domination by caries-causing strains. The modern mouth basically exists in a permanent disease state."

Professor Cooper has been working on the project with archaeologist and co-Leader Professor Keith Dobney, now at the University of Aberdeen, for the past 17 years. Professor Dobney says: "I had shown tartar deposits commonly found on ancient teeth were dense masses of solid calcified bacteria and food, but couldn't identify the species of bacteria. Ancient DNA was the obvious answer."

However, the team was not able to sufficiently control background levels of bacterial contamination until 2007 when ACAD's ultra-clean laboratories and strict decontamination and authentication protocols became available. The research team is now expanding its studies through time, and around the world, including other species such as Neandertals.

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**Story Source:**
The above post is reprinted from materials provided by University of Adelaide. Note: Materials may be edited for content and length.

Journal Reference:

1. Christina J Adler, Keith Dobney, Laura S Weyrich, John Kaidonis, Alan W Walker, Wolfgang Haak, Corey J A Bradshaw, Grant Townsend, Arkadiusz Sołtysiak, Kurt W Alt, Julian Parkhill, Alan Cooper. Sequencing ancient calcified dental plaque shows changes in oral microbiota with dietary shifts of the Neolithic and Industrial revolutions. *Nature Genetics*, 2013; DOI: [10.1038/ng.2536](http://dx.doi.org/10.1038/ng.2536)

The Effects of Sugar

1. Tooth Decay: Caused by acids produced by bacteria in the mouth. The sugar we eat are what bacteria lives on.
2. Insulin Resistance: A condition in which the body’s cells become resistant to the effects of insulin.
3. High Blood Pressure: When the force of blood flow is high, the tissue that makes up the artery walls get stretched beyond its healthy limit.
5. Diabetes: Glucose levels are high and the hormone, insulin is not functioning.
A researcher collects a sample from an ancient human tooth in search of the bacteria that cause cavities and tooth decay.

Credit: Courtesy Marc Simón, Universitat Autònoma de Barcelona

Ouch! The bacterium that causes toothaches has become more diverse over the course of human history, a new study finds.

*Streptococcus mutans* is a nasty little bacterium that lurks in the mouth, frequently causing tooth decay and cavities. Now, a new analysis of the bacteria’s DNA extracted from human teeth dating back to the Bronze Age reveals the bug has been mutating randomly over the years, becoming more diverse as the human population grows, perhaps because it has more mouths to fill.

The study of *S. mutans* is important, because understanding its development should provide clues as to what factors trigger its evolution, said study researcher Marc Simón, a professor at the Universitat Autònoma de Barcelona in Spain.

"Hopefully, it will allow us to predict how it will react under certain circumstances, and predicting its behavior might help us to fight it off in the future," Simón wrote in an email to Live Science. [5 Reasons You Should Really Floss]
Tooth decay

*S. mutans* is a natural tenant of the mouth. It metabolizes sugars from food and excretes lactic acid. This lactic acid eats away at the mineralized enamel surface of the teeth, causing dental caries (Latin for "rot"), also known as cavities.

Dental cavities predate modern humans. They've been found in the mouth of the ancient human cousin *Paranthropus robustus*, a gorillalike primate that lived in Africa about 2 million years ago. But the fossil record shows an uptick in tooth decay coinciding with the shift from hunting to agriculture, particularly in Europe and North America. Increased consumption of carbohydrate-heavy fruits and cereals probably gave *S. mutans* more sugar to feast on.

In 2007, Simón and his research group managed to extract the first fragment of *S. mutans* DNA from the tooth of an ancient skeleton. In their new study, published today (July 22) in the journal Proceedings of the Royal Society B, the researchers examined *S. mutans* DNA from 10 human skeletons. The skeletons came from both Europe and America. The oldest was from Bronze Age Europe, an era that began in 3200 B.C. and stretched until 600 B.C. The youngest dated to the 1900s. The American skeletons were chosen from both before and after Americans encountered Europeans, in case that event caused any changes in tooth decay bacteria.

Unrestrained evolution

The researchers analyzed only one fragment of the genome, a portion known to confer virulence, or the ability to cause disease, on the bacteria. Tracing the genetic mutations in the fragment over time, the researchers found that the bacteria evolved neutrally, Simón said.

Neutral evolution means that changes occur due to random genetic mutations that don’t confer any special advantages on an organism. The goal, Simón explained, was to see if factors such as the European invasion of North America put any pressure on *S. mutans*, causing it to evolve in one way or another. The discovery of neutral evolution suggests there were no particular pressures.

"It has to be taken into account that the amplified segment is very small," Simón said. "But it seems that this gene would not be among the ones that have been positively selected in order to improve *S. mutans* adaptation to the human host."
However, the toothache-causing bug did become more diverse over time. The bacteria seemed to have been able to diversify as their "testing ground" — humanity — became more numerous. Thus, instead of being limited to just a few variants, the bacterium could stretch its legs, try on some new mutations, and still survive.

Simón and his colleagues next plan to test more S. mutans’ DNA samples, expanding their view beyond a single gene fragment and further into the genome. They hope to delve deeper into the moment of European and North American contact in search of any changes to the bacterium.

"Another goal will be to go further back in time, to the Neolithic period, to see if dietary changes provoked some kind of selection in this gene," Simón said.