

How Meat Eating CHanged Us – More On "Dental Chaos"/"Evolution Of Cooking"

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Meat–eating has impacted the evolution of the human body, scientists reported today at the American Association for the Advancement of Science's annual meeting in Washington, D.C.

Our fondness for a juicy steak triggered a number of adaptations over countless generations. For instance, our jaws have gotten smaller, and we have an improved ability to process cholesterol and fat.

Our taste for meat has also led us into some trouble—our teeth are too big for our downsized jaws and most of us need dental work.

"It's really amazing what we know now that we didn't know 15 or 20 years ago," said Mark Teaford, a professor at Baltimore's Johns Hopkins University. Teaford helped organize a panel discussion on human diet from a number of perspectives:

- How did the ability to eat meat shape the evolution of humans?
- What can we learn about early humans from tooth shape?

Carnivorous humans go back a long way. Stone tools for butchering meat, and animal bones with corresponding cut marks on them, first appear in the fossil record about 2.5 million years ago.

How Did Meat–Eating Start?

Some early humans may have started eating meat as a way to survive within their own ecological niche.

Competition from other species may be a key element of natural selection that has molded anatomy and behavior, according to Craig B. Stanford, an ecologist at the University of Southern California (USC).

Stanford has spent years visiting the Bwindi Impenetrable Forest National

Park in Uganda, Africa, studying the relationship between mountain gorillas and chimpanzees.

"It's the only forest where mountain gorillas and chimps both live," he said. "We're trying to understand the ecological relationship—do they compete for food, for nesting sites?"

The key difference between chimps and gorillas ecologically is that chimps eat meat and gorillas don't. A total herbivore is able to coexist with an omnivore because they have significantly different diets.

"From there we can extrapolate back to what two species of early humans may have done vis-à-vis each other two or three million years ago," Stanford said.

Better Fat Processors

When humans switched to meat-eating, they triggered a genetic change that enabled better processing of fats, said Stanford, who has worked extensively with gerontologist Caleb Finch of USC.

"We have an obsession today with fat and cholesterol because we can go to the market and stuff ourselves with it," Stanford said. "But as a species we are relatively immune to the harmful effects of fat and cholesterol. Compared to the great apes, we can handle a diet that's high in fat and cholesterol, and the great apes cannot.

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Diet and Teeth

Tool-use no doubt helped early humans in butchering their dinners. But there is evidence that the advance to cooking and using knives and forks is leading to crooked teeth and facial dwarfing in humans.

Today it's relatively rare for someone to have perfectly straight teeth (without having been to the orthodontist). Our wisdom teeth don't have room to fit in the jaw and sometimes don't form at all, and the propensity to develop gum disease is on the increase.

"Virtually any mammalian jaw in the wild that you look at will be a perfect occlusion—a very nice Hollywood-style dentition," said Peter Lucas, the author of *Dental Functional Morphology* and a visiting professor at George Washington University in Washington, D.C. "But when it comes to humans, the ideal occlusion [the way teeth fit together] is virtually never seen. It's really the only body part that regularly needs attention and surgery."

Lucas argues that the mechanical process of chewing, combined with the physical properties of foods in the diet, will drive tooth, jaw, and body size, particularly in human evolution.

Essentially, by cooking our food, thereby making it softer, we no longer need teeth big enough to chow down on really tough particles. By using knives and forks to cut food into smaller pieces, we no longer need a large enough jaw to cram in big hunks of food.

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