“Essentially, we are not adapted to the diets we eat today”

An interview with Prof. Debbie Guatelli-Steinberg, US

By Kristin Hübnner, DTI

In her book What Teeth Reveal About Human Evolution (Cambridge University Press, 2016), anthropologist Prof. Debbie Guatelli-Steinberg describes what fossilised teeth reveal about history and the living conditions of our ancestors. One finding is that the high proportion of soft and sugary food people consume in the Western world these days is to blame for the steady rise of dental problems such as dental decay and malocclusion. Dental Tribune had the opportunity to speak to the Ohio State University professor about the causes of this development and the impact her research may have on modern life.

Dental Tribune: Prof. Guatelli-Steinberg, you are studying fossilised teeth in order to shed light on the living conditions of our ancestors. What can teeth reveal about earlier life and human evolution?

Prof. Debbie Guatelli-Steinberg: Teeth make up most of the mammalian fossil record, and this is true for human evolution as well. The reason teeth are heavily mineralised, so they resist destruction and decomposition. The fact that teeth are likely to fossilise is extremely convenient for physical anthropologists because teeth lock detailed information about diet and growth into their physical and chemical structure. The book is meant to synthesise insights into human evolution that researchers have gleaned from teeth—those insights include the recognition that human diets began to diversify only in hominin evolution, making it possible for our lineage to ride out fluctuations in food availability.

From daily growth lines in teeth, researchers have been able to calculate the length of time teeth took to develop and erupt into the oral cavity. And, since growth is linked to the development of the organism as a whole, it has been possible to use the pace of dental growth and development to gauge the evolution of the protracted childhoods that are a unique feature of humans among other primates. It is even possible, and much of my own research is about this, to use growth lines in teeth to assess the timing and duration of enamel growth disruption, providing insight into periods of physiological stress (malnutrition, illness) in the individual lives of our ancestors.

Dental Tribune: How does one decode the information teeth provide about our ancestors?

Prof. Debbie Guatelli-Steinberg: In your new book, you say that our teeth were adapted for a very different diet than the one we eat in Western societies today. Could you explain that briefly? What are the consequences of this change in diet?

Yes. Over most of our evolutionary history (until the rise of agricultural societies about 10,000 years ago), we humans were foragers, eating food that could be gathered or hunted. Those kinds of foods are the foods that our teeth are adapted to eat. With the rise of agriculture, and particularly with the more recent introduction of processed and sugary foods into the diet, there was an enormous increase in dental malocclusion and pathology. Essentially, we are not adapted to the diets we eat today, and these dietary changes are quite recent in our evolutionary history.

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Dental Tribune: What sparked your interest in this field of research initially?

I have always had an interest in human evolution and non-human primate, and when I began my doctoral program at the University of Oregon, I met Prof. John Lukacs, who used teeth to answer questions related to these topics. This seemed like a really fascinating thing to me—that one could find out so much from fossil teeth.

Prof. Debbie Guatelli-Steinberg: How does one decode the information garnered from fossilised teeth?

One can gain information about growth rates and development in teeth or about the morphology of teeth, but that information requires a broader context for interpretation. For example, human first molars erupt at around six years of age, but that fact does not tell one much unless one compares it with other mammals, especially non-human primates. Dogs grow up fast and their first permanent teeth erupt around six months of age. Therefore, it is much easier to determine that dogs are adapted for eating processed foods than it is to determine that Homo sapiens is adapted for eating processed foods.

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