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

An interview with Prof. Debbie Guatelli-Steinberg, US

By Kristin Hübner, 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. 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 de-composition. The fact that teeth are likely to fossilise is extremely convenient for physical anthropologists because teeth lock detailed information about diet and dental development 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 disruptions, providing insight into periods of physiological stress (malnutrition, illness) in the individual lives of our ancestors.

Dental Tribune: What can teeth reveal about earlier life and human evolution?

Prof. Guatelli-Steinberg: They also mature and die much earlier than we do (which is sad for dog owners). Chimps erupt their first molars more on the order of four years of age and do not appear to have natural lifespans that are as long as ours. In other words, rates of dental development reflect the developmental rates of species, but we would not really know that unless we compared humans to other primates. This applies to fossil teeth too— we need a broader comparative context to understand the indications they give us.

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 (negative) consequences of this change in diet?

Prof. Guatelli-Steinberg: Well, it is possible to find dental pathologies in ancient hominin fossils, but only in a handful of individuals. So, I would say that, although dental pathologies did occur early in human evolution, we were nowhere nearly as frequent as they are today.

Dental Tribune: What sparked your interest in this field of research initially? I have always had an interest in human evolution and non-human primates, 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. Guatelli-Steinberg: How does one decode the information gleaned from fossilised teeth?

Dental Tribune: One can gain information about growth rates and develop-

Yes. Over most of our evolutionary history (until the rise of agriculture around 10,000 years ago), we humans were foragers, eating food that could be gathered or hunted. Those kinds of foods were 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.

Hominin dietary studies on baboons (which rarely show malocclusions) showed that soft diets led to dental crowding and rotations of teeth. Essentially, without foods that were hard or tough, bone growth in the baboon jaw was not great enough to accommodate the animal’s teeth.

The oral environment had changed to provide an optimal environment for caries-causing strains to flourish.

If one has an understanding of the oral bacterial environment and the impact of teeth on the oral environment, it seems likely that dental health would be linked with diet and the impact of diet on tooth development.

Prof. Guatelli-Steinberg: During the Industrial Revolution, the diversity of oral flora decreased, with caries-causing strains becoming predominant. Essentially, the oral environment had changed to provide an optimal environment for caries-causing strains to flourish.

Would you say that today’s dental problems, such as the high prevalence of dental caries and periodontal disease, are man-made evolutions? Well, it is possible to find dental pathologies in ancient hominin fossils, but only in a handful of individuals. So, I would say that, although dental pathologies did occur early in human evolution, we were nowhere nearly as frequent as they are today.

The oral environment had changed to provide an optimal environment for caries-causing strains to flourish.

Certainly genetics plays a role. Some individuals are more prone to dental disease than others, but what one eats also plays a role. As far as that goes, there is no perfect diet, but diets that are low in sugar and eating tough foods that may stimulate jaw growth during childhood might help to alleviate our dental problems.

Thank you very much for the interview.

Dental Tribune Asia Pacific Edition | 1+2/2017

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

An interview with Prof. Debbie Guatelli-Steinberg, US

By Kristin Hübner, 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. 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 de-composition. The fact that teeth are likely to fossilise is extremely convenient for physical anthropologists because teeth lock detailed information about diet and dental development 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 disruptions, providing insight into periods of physiological stress (malnutrition, illness) in the individual lives of our ancestors.

Dental Tribune: What can teeth reveal about earlier life and human evolution?

Prof. Guatelli-Steinberg: They also mature and die much earlier than we do (which is sad for dog owners). Chimps erupt their first molars more on the order of four years of age and do not appear to have natural lifespans that are as long as ours. In other words, rates of dental development reflect the developmental rates of species, but we would not really know that unless we compared humans to other primates. This applies to fossil teeth too—we need a broader comparative context to understand the indications they give us.

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 (negative) consequences of this change in diet?

Prof. Guatelli-Steinberg: Well, it is possible to find dental pathologies in ancient hominin fossils, but only in a handful of individuals. So, I would say that, although dental pathologies did occur early in human evolution, we were nowhere nearly as frequent as they are today.

The oral environment had changed to provide an optimal environment for caries-causing strains to flourish.

If one has an understanding of the oral bacterial environment and the impact of teeth on the oral environment, it seems likely that dental health would be linked with diet and the impact of diet on tooth development.

Prof. Guatelli-Steinberg: During the Industrial Revolution, the diversity of oral flora decreased, with caries-causing strains becoming predominant. Essentially, the oral environment had changed to provide an optimal environment for caries-causing strains to flourish.

Certainly genetics plays a role. Some individuals are more prone to dental disease than others, but what one eats also plays a role. As far as that goes, there is no perfect diet, but diets that are low in sugar and eating tough foods that may stimulate jaw growth during childhood might help to alleviate our dental problems.

Thank you very much for the interview.

Dental Tribune Asia Pacific Edition | 1+2/2017

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

An interview with Prof. Debbie Guatelli-Steinberg, US

By Kristin Hübner, 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. 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 de-composition. The fact that teeth are likely to fossilise is extremely convenient for physical anthropologists because teeth lock detailed information about diet and dental development 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 disruptions, providing insight into periods of physiological stress (malnutrition, illness) in the individual lives of our ancestors.

Dental Tribune: What can teeth reveal about earlier life and human evolution?

Prof. Guatelli-Steinberg: They also mature and die much earlier than we do (which is sad for dog owners). Chimps erupt their first molars more on the order of four years of age and do not appear to have natural lifespans that are as long as ours. In other words, rates of dental development reflect the developmental rates of species, but we would not really know that unless we compared humans to other primates. This applies to fossil teeth too—we need a broader comparative context to understand the indications they give us.

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 (negative) consequences of this change in diet?

Prof. Guatelli-Steinberg: Well, it is possible to find dental pathologies in ancient hominin fossils, but only in a handful of individuals. So, I would say that, although dental pathologies did occur early in human evolution, we were nowhere nearly as frequent as they are today.

The oral environment had changed to provide an optimal environment for caries-causing strains to flourish.

Certainly genetics plays a role. Some individuals are more prone to dental disease than others, but what one eats also plays a role. As far as that goes, there is no perfect diet, but diets that are low in sugar and eating tough foods that may stimulate jaw growth during childhood might help to alleviate our dental problems.

Thank you very much for the interview.