Dr. John Sorrentino on Evolutionary Biology and Dentistry

My upcoming Optimal Reset webinar will focus on how evolutionary biology reinforces the epi-paleo template and includes some very basic principles that if you adhere to, will give you the power to make the best dentist poor.

Since World War II, dentistry has been, with a brief period of contraction in the 1980s, on an expansionary march in terms of the number of dental schools and the number of trained dentists produced every year. There are currently 62 dental schools in the United States and an additional 10 in Canada.

With every new school comes a new dean, a slew of new department heads and a small corps of faculty. There is also fancy new equipment, post-graduate students to do research and an army of dental students to help provide the funding. This is where the research comes from. All those papers won't publish themselves! We are currently adding about 5,000 new dentists each year. If you go to the ADA's website, you will be able to see many new stories about how this is addressing such issues as "access to care" or the "greater ability to serve the public."

The downfalls of modern dentistry

I have seen many articles that state that dentistry, at the highest level, has a vested interest in fostering dental disease on the American public and will point to the above statistics to back up their claim. There are even claims that there is a cabal in Chicago (ADA headquarters) that does not want change. My assessment is that this opinion is understandable, but incorrect. Everyone loves it when their group, circle of friends or circle of knowledge gets larger. Dentistry is no different. It is my assertion that organized dentistry has seized the wrong metric for measuring success, and I think I am beginning to understand why.

Going into dentistry, or any medical field for that matter, is a high-cost, long-term and, usually, lifetime commitment. I cannot speak for medical or other professional schools (I imagine that they are quite similar), but on a day to day basis, dental schools are run by the above-mentioned department heads and are plagued with mini turf wars. Each specialty has a department and believes it is a vital component with brand new, cutting-edge information to teach.

This means one of the biggest disputes is TIME. This includes both classroom hours as well as clinical instruction. Yet there is only so much time in a day. One dental school has addressed this problem by adding a fifth clinical year. This, in effect, delays your productive lifetime and drives students even deeper into debt. The bar for admission is constantly being raised, and the associated costs are skyrocketing. This leaves the students with little free time and almost no potential to earn income. In the end, they graduate with huge piles of debt that must be repaid.

The list of departments, again each with a department head, faculty, staff and budget, may include such disciplines as anatomy, restorative dentistry, prosthetic dentistry,

pharmacology, endodontics, periodontics, orthodontics, public health and oral surgery, as well as many others. You begin to see how they want to crowd the others out. What is missing from this equation, you may ask? **My answer is that no dental (or medical school for that matter) has a department of evolutionary biology, nor is it required for admission.** How shocking is that? Dental and medical schools are full of some very smart and dedicated people. They are good at training students what they know, and what they know is *how to treat disease*. Very little thought is given to *preventing disease*. What little thought there is is called "Public Health Dentistry." This consists of a little bit of community outreach and a whole lot of fluoride. More on this subject later, though.

What can evolutionary dentistry teach us?

A good working definition of evolutionary biology is, "A sub-field of biology concerned with the study of the evolutionary processes that produced the diversity of life on earth." Since we are talking about human teeth, for the topic of discussion I am going to narrow that definition to human evolution. It is often misstated that humans evolved from chimps.

We split from a common ancestor that broke away between four-six million years ago. The above graphic shows what is currently believed as the assent of man.

Remember, it is a little known fact that we are human because of our genus, not our species. You are human because you are a Homo, not because you are a sapiens. By definition, H habalis, H.neaderthalensis, H. erectus and the rest are as

human as you or I. It is believed that the genus Homo evolved from a genus known as Australopithecus between three-four million years ago. The above depiction show A.afarensis leading to humans, but trust me, this lineage is changing and argued over all the time among anthropologists based on what they dug up last summer and presented at the latest meeting. Arguments are common, and fistfights are not unknown.

Now why is this so important when it comes to your dental health? No one either teaching or studying in dental school knows or cares about this information. In that lies the problem. We are looking at scales in the millions of years here. **Dental decay did not exist in any population anywhere on the planet until 10,000 years ago.** That is the blink of an eye by comparison. None of the species in either of the two graphs has any appreciable demonstrable decay except one. H. sapiens. If there were a department of evolutionary biology in every dental school, they would study this, go to conferences (hopefully without arguments or fist fights) on it, be tested on it and publish journal articles on the subject. In other words, disseminate the knowledge.

The oldest evidence of dental diseases can be traced to the Middle East, then in Egypt and, shortly after that, China. Then it showed up in the rest of the Old World. **This seems to correlate with human consumption of grain products very nicely.** The introduction of sugar in the middle ages sped up the disease process.

In the New World, there is an even more fascinating story to tell. As I understand it, the Pre-Columbian Americas were a mixture of agriculturalists such as the Hopi, Mayans, Aztecs and the tribes of coastal New England, in addition to hunter-gatherer societies such as the Inuit and plains Indians, including the Sioux, among others. Of the agriculturalists, their staple was corn (a grain). I asked one prominent researcher where he saw decay. Was it everywhere? He replied that it was not. **Dental decay could only be demonstrated in**

those who were agriculturalists!

Here's a short timeline:

- Humans – 2.5 million years
- Sapiens – roughly 200,000 years
- Decay – 10,000 years
- Toothbrush – 2,000 years
- Modern dentistry – 150 years

Is cleaning your teeth important to prevent decay? After doing the math, I can argue that it is not.

Now it becomes clear that dentistry evolved as a cure to a modern, common problem and has no long-term background as to why it is this way. I consider this a major failing of my profession. If we had a department that understood the sweep of history, as modern anthropology currently does, I believe we could make inroads into eliminating tooth decay for all time.

So what does modern dentistry offer in the way of prevention? Plaque control by flossing and brushing with fluoridated toothpaste. Then by moderating consumption of sugar containing foods. Sweets are not part of the epi-paleo diet.

As I stated above, the toothbrush was developed about 2,000 years ago. For most of humanity, we did not have it and never had decay.

The history of fluoride

Fluoride deserves its own section. **Fluoride became popular in the 1950s shortly after the Newburgh-Kingston study demonstrated that adding it to water lowers the decay rate.** Building on this "success," by the 1960s, Proctor and Gamble became the first, but by no means the last, company to add fluoride to their toothpaste.

Fluoride works by incorporating into the tooth enamel and chemically replacing an –OH group with a –F group. This has the effect of changing the hydroxyapatite crystal of tooth enamel into a fluorapatite crystal. Since fluoride has the same charge but is smaller that the hydroxyl group, the fluorapatite crystal is a smaller, tighter crystal, and thus more resistant to the acid attack that causes decay. This is what your dentist learns in school and is the reason that dentistry wants to use fluoride.

This double whammy of topical and systemic fluoride did give us a modest reduction in decay and a slight lack of need for dentists. By the 1980s, this success was demonstrated by the closing of a few dental schools and declining enrollment in most of the others. **No thought was given to the fact the fluoride has no physiologic or catalytic use in the human body.** Nor was any thought given to the fact that human skulls did not demonstrate cavities or any dental disease until about 10,000 years ago, despite the fact that no one was using fluorides.

Tooth decay and diet

It seems that the paradigm of human evolution demonstrates that neither cleaning nor using topical agents are necessary for strong, healthy teeth. Dentistry has done a good job of making everyone aware that sugar consumption can lead to decay. They have dropped the ball in regards to getting the word out that starches are sugars and that these should be avoided as well.

I have written previously that starches are not obligate nutrients, but optional nutrients. They should be consumed in small amounts with regard to the growing season and ambient light levels, if at all. When evolutionary biology invades dental schools, hopefully that will be the new message. It is one of my goals.

Most dentists are smart and well educated in the art and science of restoring teeth to proper esthetics and function. They have a general interest in bettering the human condition and relieving pain and suffering. **They receive no education whatsoever in the history of human evolution or the fact that decay is a relatively new phenomenon.**

The human life span is about 80 years on average. We tend to think of 100 years as a long time and that it is normal to eat what our parents or grandparents ate. **The fact that most people have not been eating a species-appropriate diet for 10,000 is just not considered.** What was happening on the planet 10,000 or 1,000,000 years ago is not something that most people think about very often.

Preventing tooth decay with the epi-paleo diet

If you are asking what you can do before organized dentistry gets its act together, my message is simple:

1. Eliminate all processed sugars.
2. Limit natural sugars.
3. Be aware that starches are sugars. The enzymes in your saliva convert it to sugar.
4. Eat a whole-food, nutrient-dense diet high in fat-soluble vitamins. There is some evidence that your teeth can be remineralized, but this capacity is not limitless.
5. Eat a seasonal diet appropriate for your latitude and light level.
6. The fruits that we eat are a far cry from what our ancestors ate; they have been selected for sweetness. Dried fruits are not much healthier than candy bars.
7. Brush and floss your teeth, it is not going to hurt you.

So by now you have probably figured out that I believe the

correct metric we should be looking at is how many dental schools are closing because of lack of need. Closures will evince the lack of need for dental services. While I do not believe this is going to happen anytime soon, the roadmap to get there is clear. This will minimize your need for all but the most routine of dental care.

Tooth decay is arguably the most common disease of mankind, but the plan to eliminate it is as easy as looking back at what, why, and when our ancestors ate before the rise of agriculture.

What do you think about the link between tooth decay and diet? Leave a comment.

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