

## **Transcript**

**01/08/2013**

### **Ancient Teeth**

#### **Catalyst**

#### **NARRATION**

If you want a new reason to give up sugar, or you're interested in new possible causes of depression, even autism, keep watching. But let's start with teeth. These are the latest expensive, high-tech tools for teaching future dentists. And they're quite remarkable.

#### **Dr Graham Phillips**

This is a virtual reality simulation of a mouth - well, of a tooth at least. This is the dentist's drill. This is the mirror. Now, on the outside world here, they don't look like much. But pop on the 3-D glasses... and, in the virtual world, they look remarkably realistic. And, best of all, I can actually push down on the tooth here, and feel it, because of the pressure feedback to the instrument. It's incredible.

#### **NARRATION**

As a society, we spend a staggering amount looking after our teeth. You might think dentistry is a triumph of human progress. But is it? Judging by skeletons from the past, our hunting and gathering relatives simply didn't need dentists.

#### **Dr Laura Weyrich**

The hunter-gatherer teeth are just much better. They have full mouths of teeth. They're not decayed. They're not... They don't have periodontal disease.

#### **NARRATION**

Scientists at the University of Adelaide have found this by analysing hundreds of skeletons dating back thousands of years. Our teeth went bad when farming began, 10,000 years ago.

#### **Professor Alan Cooper**

When we looked at the actual state of health of the individuals... You're looking at tonnes and tonnes of jaws and teeth. You start getting a pretty good feeling for how these people were living. And some of the early farmers - oh... You know, nasty, nasty, ways to live. Huge holes, ulcers... You know, this is not good stuff.

#### **NARRATION**

The problem was our diet changed with farming. We began eating a lot of carbohydrates, like farmed grains and sugary foods. It's a problem that's only got worse the more we've progressed.

#### **Professor Alan Cooper**

What you've got is almost a permanent disease state now, in the Western mouth, because of the amount of carbohydrate we're eating.

#### **Dr Graham Phillips**

We all know that sugar's bad for our teeth, but the health implications of eating a lot of sweet food are much, much greater than that. To understand them, you have to know about something called the 'human microbiome'. It's the total collection of all the bacteria that live on us and in us.

#### **Professor Alan Cooper**

90% of the cells that you're walking around with right now aren't yours - they're actually bacteria. You're only about 10%. So, it's probably a better way of describing it as you being their human rather than them being your bacteria.

#### **NARRATION**

There are communities of good bacteria on our skin, in our mouths and in our guts. And we're only now realising when these communities break down and change our health suffers.

#### **Dr Laura Weyrich**

Absolutely. I can't stress that enough. People have related these communities to anything from autism to obesity to depression. I mean, so, really, we have to think of these organisms as impacting everything from our mental health to our, you know, regular immune health.

#### **NARRATION**

The concern is - the communities of bacteria living in us today could be far from what we should naturally have.

#### **Dr Laura Weyrich**

These communities change based on what we're putting in our body. And so a lot of the bacteria that we're finding in our bodies now are really associated with this high-sugar diet.

#### **NARRATION**

Bacterial communities are like any web of life. Change the basic food source, and you get different bacteria living in the web. The question is - what are the natural communities we should have? Well, for the first time, researchers have been able to find out by examining old skeletons.

#### **Dr Graham Phillips**

This is the jawbone of a medieval person who lived in England. In fact, got around the streets of York about 800 years ago. Now, remarkably, that brown layer you can just see down the bottom there is tartar that is still preserved. In fact, so well preserved that scientists can extract the DNA from the bacteria in it.

#### **NARRATION**

That allows them to identify the specific bacteria on the teeth. The researchers traced back to the hunters and gatherers of the Stone Age and discovered what we should naturally have in our mouths. The results were stunning. The communities were very different. In the Stone Age, they even had bacteria these guys have in their mouths today.

#### **Dr Laura Weyrich**

So we don't know why those bacteria are in our hunter-gatherer ancestors and not in our modern mouths, but it probably has to do with something of eating a lot more plants.

#### **NARRATION**

But it was the sheer diversity of bacteria in hunter-gatherers' mouths that seemed to be the key to their health.

#### **Professor Alan Cooper**

When the first farmers turned up, we see a major change - a big decrease in the diversity of the bacteria which are present, and a whole bunch of pathogens - bacteria which are causing disease - suddenly spring into being.

#### **NARRATION**

Researchers now believe the right colonies of bacteria are vital for keeping the whole body healthy in all sorts of ways.

#### **Professor Alan Cooper**

We are deliberately inoculated with our bacteria. As you pass through the birth canal, bacteria are present there specifically to get onto and into babies to allow them to digest food. Similarly, breast milk has bacteria in it. It doesn't need to be there, but it's specifically there to give to babies, to inoculate them - to give them the bacteria broth they need to start life and their immune system off.

#### **NARRATION**

And again progress may be hindering this.

#### **Professor Alan Cooper**

It's shown that babies that come from Caesarean sections have quite a different bacterial diversity and a much lower bacterial diversity than children that are naturally born. Really we should be inoculating babies with a full spectrum of bacteria early in life.

#### **NARRATION**

Depression is another one. Rather than pills, it might be treated with doses of bacterium, according to preliminary studies.

#### **Dr Laura Weyrich**

..where they've given these people probiotics. And so, by giving them certain bacterial species, they could have changed the microflora, or at least changed how their immune system is recognising the bacteria in the body. And then they've monitored their depression or anxiety through time. And, when you do that, you do see decreases or increases in their depression or anxiety depending on what bacteria they're given.

#### **Professor Alan Cooper**

The one I find really quite surprising is autism. They're even relating that now to decreased bacterial diversity in children - possibly as a result of overuse of antibiotics.

#### **NARRATION**

Your bacteria might even be controlling your mind.

#### **Professor Alan Cooper**

It's been shown that they'll influence how much sugar you want to eat. You eat a lot of sugar, the bacteria that

metabolise that sugar start demanding more sugar if you're not giving it to them, and you start feeling uncomfortable because there's a bacterial riot going on in your guts. And... well, if you eat sugar, you suddenly feel better.

#### **NARRATION**

Could we develop simple bacterial remedies?

#### **Dr Laura Weyrich**

We hope. We really hope. That's the idea that we can understand these communities enough and understand how we can change these communities and one day develop probiotics. So we could try to put a bacteria in your toothpaste and let you brush your teeth in the morning and have great microflora in your mouth for the rest of the day.

#### **NARRATION**

It seems unlikely dentists will be going out of business anytime soon, but the prospect of more natural mouth bacteria holds great promise.

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