Ancient teeth bacteria track disease evolution

‘Modern mouth basically exists in permanent disease state’

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NA preserved in calcified bac-
teria on the teeth of ancient
human skeletons has shed
light on the health conse-
quences of the evolving diet and behav-
ior from the Stone Age to the modern day.
The ancient genetic record reveals the
negative changes in oral bacteria brought
about by the dietary shifts as humans
became farmers, and later with the in-
troduction of food manufacturing in the
Industrial Revolution.

An international team, led by the Uni-
versity of Aberdeen’s Centre for Ancient
DNA (ACAD) in Australia, where the re-
search was performed, published the
results in Nature Genetics in February.
Other team members include the Depart-
ment of Archaeology at the University of
Aberdeen and the Wellcome Trust Sanger
Institute in Cambridge, United Kingdom.

“This is the first record of how our
evolution over the last 7,500 years has
impacted the bacteria we carry with us,
and the important health consequences,”
said study leader professor Alan Cooper,
ACAD director. “Oral bacteria in modern
man are markedly less diverse than his-
toric populations, and this is thought to
contribute to chronic oral and other dis-
ease in post-industrial lifestyles.”

The researchers extracted DNA from
tartar (calcified dental plaque) from 34
prehistoric northern European human
skeletons and traced changes in the na-
ture of oral bacteria from the last hunter-
gatherers, through the first farmers to
the Bronze Age and Medieval times.

Dental plaque represents the only eas-
ily accessible source of preserved human
bacteria,” said lead author Dr. Christina
Adler, who conducted the research as a
PhD student at the University of Adelaide
and is now at the University of Sydney.

“Genetic analysis of plaque can create a
powerful new record of dietary impacts,
health changes and oral pathogen ge-
nomical evolution, deep into the past,” she
said.

Cooper said, “The composition of oral
bacteria changed markedly with the in-
troduction of farming, and again around
150 years ago. With the introduction of
processed sugar and flour in the Industri-
al Revolution, we can see a dramatically
decreased diversity in our oral bacteria,
allowing domination by caries-causing
strains. The modern mouth basically ex-
ists in a permanent disease state.”

Cooper has been working on the project
for the past 17 years with archaeologist
and co-leader Keith Dobney, a professor
at the University of Aberdeen. Dobney
said, “I had shown tartar deposits com-
monly found on ancient teeth were dense
masses of solid calcified bacteria and

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Big meetings — and a big name in dentistry

By David L. Hoexter, DMD, FACD, FICD, Editor in Chief

I enjoy attending and speaking at dental conferences as often as my schedule allows. The big, international events are especially enjoyable, because of the broadened perspectives gained by being able to interact directly with fellow professionals from across the globe and seeing firsthand some of the latest techniques and technologies in action, perhaps long before they’re common practice here.

If you haven’t made it yet to the International Dental Show held in Cologne, Germany, every other year, I’d strongly encourage you to plan on getting to it at least once. I’ve been able to attend a number of times over the years, and have always felt the effort delivered a strong return on investment. The IDS is the largest dental meeting in the world. More than 120,000 people representing all sectors of the dental field attend. Besides the most innovative, newest products, the standard and the durable are all on display in a touchable, congenial environment. It is always held in Cologne, and this year it’s the week of March 12 through 16. Probably a bit too late now to make a last-minute decision to attend this year — but I’d encourage you to pencil in the next one two years from now. The booths in the exhibit area are the largest, tallest and most imaginative you’ll see anywhere, with several floors of highly creative displays in the individual booths. The broad range of products on display from around the world allows visitors to absorb an overview of global dentistry and its products and services. One has to be there and see it. All in the oral health field are welcome.

Another meeting I’ve had the good fortune of attending many times is the Chicago Dental Society Midwinter Meeting, just held in late February. The Chicago Midwinter is preceded by the Oral Health America Gala, a major fund-raising event that supports Oral Health America’s efforts to improve access to oral health care and education in the United States, especially among our most vulnerable populations.

Many of you may not realize that this year’s Chicago Midwinter and the Oral Health America Gala carried some extra meaning because they mark the retirement of an esteemed colleague, Dr. Tony Volpe, from his position with Colgate-Palmolive Co., a Diamond-level sponsor of the gala. Tony most recently has been serving as vice president of clinical dental research and scientific affairs at the Colgate-Palmolive Technology Center in Piscataway, N.J. He has been a powerful, positive force for our profession for more than 50 years, earning many international honors — as well as the American Dental Association Distinguished Service Award in 2004. I’m hoping Tony remains active in the profession, continuing with his many other interests, roles and responsibilities, and I look forward to spending time with him at many meetings and conferences to come.
food, but couldn’t identify the species of bacteria. Ancient DNA was the obvious answer."

The team was not able to sufficiently control background levels of bacterial contamination until 2007, when ACAD’s ultra-clean laboratories and strict decontamination and authentication protocols became available.

Researchers worked with a team of dentists at the University of Adelaide’s School of Dentistry to establish a picture of microbial diversity in modern-day mouths and the relationship between bacteria in plaque and calculus.

Adler wrote, “One common cause of gum disease, porphyromonas gingivalis, had been suggested to lie behind recent rises in heart disease. However, we were able to show it had not increased in prevalence over the past 7,000 years, suggesting it was not likely to be causative. However, it may contribute to the disease by stimulating a permanent state of inflammation.” The research team is now expanding its studies through time, and around the world, including other species such as Neanderthals.

(Source: The University of Adelaide)