

How Oral Health Affects the Rest of You

by Joseph Hooper

"Show me your teeth, and I will tell you who you are," declared preeminent 18th-century naturalist George Cuvier. The guy was onto something.

During the past few years, periodontal researchers and physicians have amassed a trove of evidence showing that not only can the gums and teeth act as a barometer for how well the body is doing, they may directly affect the health of the heart, metabolism, brain, and even penis. What kind of impact are we talking about? Let's just say that, if you were to keel over now from a heart attack, before hitting the floor you may want to ask yourself, "When was the last time I flossed?"

Hyperbole? OK, maybe. But look at the facts: The mouth is the body's most common entry point for infection, yet doctors have almost universally ignored it, says Wenche S. Borgnakke, a University of Michigan periodontal health researcher and a dentist who for decades has urged M.D.'s to take the health of the mouth more seriously. "Almost every medical condition has some kind of manifestation in the mouth," she says. "Yet until two or three years ago, medical schools basically taught that the body began at the tonsils." It's a sentiment echoed by Harvard endocrinologist William Hsu, another of the new breed of oral health investigators: "I call the mouth the 'black hole' of the body, because it's a mystery to most medical folks."

For anyone who needs a refresher, here's why oral health is so crucial: Every time you eat, food particles stick to your teeth. If you don't brush and floss daily, the particles attract bacteria and form a slimy coating on teeth: plaque. With less than a week of inattention, that plaque calcifies into hard tartar, which won't come off without a dentist's scraping tool, and begins to lodge in the supporting gum structure. The gums become inflamed — that's gingivitis, the first stage of periodontal disease, or PD — and little pockets open up between the teeth and the gums. Over time, the pockets get bigger, driven by ever more festering bacteria that eat away at the tooth and its supporting architecture, eventually dooming it. This is periodontitis, the severe form of gum disease.

You may know all of this already, but what you likely haven't heard from a doctor or dentist is that mouth bacteria — living, breathing germs — can cause repercussions downstream. These germs can wriggle through red, swollen gums, and travel to the bloodstream, where they're free to proliferate throughout the body, triggering a harmful inflammatory response far from the mouth. (Inflammation is a major force behind almost every chronic disease.) What's scary? Nearly half of U.S. adults have PD, and even more have the milder form of gum redness and swelling — gingivitis. Says Robert Genco of the University at Buffalo, arguably the nation's leading periodontal researcher, "If somebody has gingivitis for years, it could, in theory, contribute to cardiovascular disease." That's bad news if you're healthy and with no risk factors for the illness, but it's particularly dangerous if you're predisposed to the disease.

The collateral damage from neglecting your teeth and gums stacks up fast: Heart disease, stroke, diabetes, and possibly erectile dysfunction and Alz-heimer's can all be connected to an unhealthy mouth. And the inflammation that we believe is responsible for all this misery wears different masks.

In the case of heart disease, the oral bacteria triggers the release of inflammatory molecules called cytokines, which interfere with the ability of the heart vessels to relax and contract. Not only does that impede healthy blood flow, but the rigid arteries are also more vulnerable to developing plaque that can set a heart attack in motion. (Pretty much the same thing happens in vessels in the brain and can result in a stroke.) Last year, a study published in *Circulation* found that patients with periodontal disease were 30 percent more likely to suffer a first heart attack than patients with a clean bill of health — and that's after accounting for factors like smoking and education.

Here's how we know that it's the bacteria from the mouth causing problems: After coronary bypasses, researchers dissected clogged arteries removed from patients, and they found oral bacteria, Borgnakke says. Probably the best evidence that these bugs are up to no good comes from studies in which people have had the health of their mouths restored with nonsurgical periodontal therapy — the vigorous scraping away of plaque on the teeth and underneath the gumline that we get when we visit the dentist. Their inflammation levels dropped, and, a *New England Journal of Medicine* study found, their heart vessels could more easily relax and contract.

Diabetes is the other major area of oral-systemic research. A raft of studies show that if you've got gum disease, you're more likely to have or develop diabetes; the worse the gums, likely the worse the diabetes. Here, the inflammatory molecules triggered by mouth bacteria can interfere with the body's ability to clear sugar from the blood. This means glucose levels go up — exactly what you don't want if you're diabetic or prediabetic, which accounts for nearly 50 percent of adult Americans. Diabetes and periodontal disease create a toxic two-way street. Each drives up the inflammation and bump in blood sugar that makes the other worse. Here again, simply scraping the bacteria off teeth can stop the downward spiral, as studies in dental journals have already shown.

Farther down the body, we find deflating figures for erectile dysfunction: You have up to a three times greater chance of developing ED if you've got PD, according to new research (which is admittedly preliminary). While the vessels in the penis rarely accumulate plaque, they're even more vulnerable to a restriction in blood flow. "The vessels in the penis are only about one-quarter the size of your coronaries," Baylor College of Medicine urologist Larry Lipshultz says. "So theoretically you're going to see vascular effects in the penis before you will in the heart." While a 2013 Turkish study did find that men with self-reported ED saw an improvement in their symptoms after receiving periodontal therapy, the study methodology was rudimentary, and American academic urology hasn't yet embraced the ED-PD connection. "Oral health is not something we ask about," Lipshultz admits, "but I do think it may be worth adding to our patient questionnaire."

Finally, there's the potential impact oral bacteria have in the brain. In a small study last year, a British team tracked Alzheimer's patients over six months and found that the group with gum disease suffered cognitive decline at six times the rate of the group without. And yes, people whose brains are rapidly deteriorating are more likely to forget to brush their teeth — so, in this case, too, the mouth-brain connection works both ways.

At this point, it may seem obvious that oral health influences overall health. So why did we ever divorce the mouth from the body? Blame it on the Middle Ages. Back then, it was the barber-surgeons who trimmed hair and extracted teeth, and the learned physicians who pronounced judgments (mostly wrong) about the rest of the body. But while surgeons have vaulted into the medical elite, dentistry remains apart as a distinctly lower-caste form of health care and an afterthought in our health insurance system. Dental insurance is typically an expensive add-on to employer-based health plans, and out of reach for many Americans: One-third of us go without dental coverage. According to one recent study, more than 2 percent of emergency room visits are dental-related, and the patients are typically treated with antibiotics and sent home. What they really need is a dentist.

But health care professionals are finally beginning to reattach the mouth to the body. To wit: At the University of Michigan, preventive cardiologist Melvyn Rubenfire asks each of his patients whether they keep up with dental evaluations, and his patients getting valve or congenital heart operations have an exam and necessary periodontal therapy before surgery to minimize the chance of infection-related complications. Meanwhile, Hsu continues to push for new guidelines from the American Diabetes Association, urging that, if you've been diagnosed with diabetes, you should go to the dentist to treat any gum infection or inflammation. "When I see an unexplained rise in blood glucose in a patient," he says, "I'll ask, 'When is the last time you had a dental cleaning?'" Hsu and Genco even teamed up for a study in which they asked dentists to test the blood sugar of patients with periodontal disease to catch diabetes early among patients.

For individuals, an ounce of dental prevention can be worth a pound of medical cure. Take this 2014 study in the American Journal of Preventive Medicine: Researchers looked at the dental and medical insurance records of several hundred thousand people who had, among other conditions, heart disease, stroke, and diabetes. If they'd had at least one routine teeth scraping, their medical costs, and their likelihood of being hospitalized, dropped.

At a more philosophical level, Borgnakke argues, we need to start thinking of the mouth as an ecosystem of bacteria that can drive health and sickness, similar to how we now view the gut. "When the balance in the community of bacteria gets skewed, nasty bugs take over," Borgnakke says. That can happen when you neglect good brushing and regular flossing — or your diet. In the mouth, saliva breaks down sweets and even starches into sugar, which coats your teeth and feeds toxic mouth germs. If the bacteria seep into the gums and then the bloodstream, Borgnakke dubs them "the Traveling Oral Microbiome." Exactly where they land, fester, and drive up the risk of disease — be it the heart, brain, or penis — is a question of individual vulnerability, or the location of your particular Achilles' heel.

Pass that floss.