



Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology

EDITORIAL

Expanding oral-systemic linkages: are we putting the cart before the horse?

One cannot be considered completely healthy unless one has good oral health. This is a long-standing, well-accepted principle among dentists. Increasingly, this concept is also being recognized by other health care professionals, elected officials, and the general public. This solidifies our role as dental professionals in helping our patients maintain overall good health, which should then seal our relevance as critical players in the effort to bring optimal health to all.

However, in recent years a movement is afoot to redefine our relevance and perhaps, in some people's minds, importance within the health care system. This effort carries several names, but the one heard most is the oral-systemic connection or linkage. At its core seems to be an attempt to tie oral conditions to systemic problems in a causal relationship.

The primary oral condition to which most point in the oral-systemic linkage concept is poor oral hygiene and the resultant periodontal disease. The periodontal bacterial colonization and infection are then thought to cause problems in other tissues and organs through direct bacterial spread and/or via various inflammatory mediators. Some of the systemic problems claimed to be linked to periodontal disease include atherosclerosis, diabetes mellitus, rheumatoid arthritis and other autoimmune diseases, pneumonia, obesity, premature births, developmental disorders in children, and even cancer.

Granted there are some provocative anecdotal stories and preliminary investigations that may point to a causal relationship between periodontal disease and some systemic problems. But in most, if not all, cases, more definitive evidence does not exist. This is not particularly troubling in and of itself since many well-proven causal relationships were derived from preliminary observations and studies, and, as long as such communications are contained within the profession, until more evidence is available no harm is done. However, what is disturbing is that the oral-systemic link-

ages concept as being well proven seems to have developed a life of its own and is now reaching the general public and dental continuing education venues. This should cause alarm among dental professionals. We are among the most respected of all professions by the public as well as by other health care professionals. This trust and respect came from those before and among us who conducted the research necessary to scientifically determine, as much as possible, those causal relationships and therapeutic strategies that can be safely and effectively applied to patients with confidence by clinicians. And, in most cases, new ideas were only clinically adopted and promoted after tests of their scientific validity.

Yet, now we are seeing on a more regular basis materials distributed to dentists, physicians, and the lay public stating that many oral-systemic linkages are well enough proven to be accepted as true. Case in point is a recent publication by the lay magazine *Scientific American* titled "Oral and Whole Body Health." This is a polished, well-written, and beautifully illustrated publication distributed to dental professionals and, I assume, to subscribers to *Scientific American*. It carries a number of stories written by authoritative people and, in some cases, by professional writers who interviewed dental and medical authorities. Several of the oral-systemic causal linkages mentioned previously are presented in this publication in various manners. Some give a very balanced discussion, pointing out that certain connections remain controversial or unproven. Others, particularly if read by nonprofessionals, make it appear as if linkages are well established. I doubt the careful reader who is a dentist or physician will miss the fact that most of the linkages discussed require more research before they can be accepted as scientifically valid. But what about those without a basic medical science education? To them it may not be clear that this is a well-intentioned, professionally produced infomercial for keeping your teeth and gingival clean

and healthy, and for seeing your “dentist or periodontist” (sic) regularly. (The writer of the lead article may think those are mutually exclusive [obviously an editorial oversight].)

Certain linkages have substantial evidence behind them. The connection between periodontal disease and diabetes mellitus is probably the strongest. It has long been recognized that diabetic patients, particularly when their disease is poorly controlled, have impairments in their immune system. They are well known to have difficulty managing established infections. Thus, is it not surprising that diabetic patients tend to have difficulty managing any existing periodontal problems. But is the reverse true? Does periodontal disease cause type-2 diabetes or worsen any form of diabetes mellitus? This is where the chicken-and-egg debate may begin. Is the linkage between diabetes and poor periodontal health one where causality goes in both directions? Consider the following:

- (1) Patients with diabetes tend to have more severe periodontal disease than nondiabetic individuals.
- (2) Diabetic patients with periodontal disease tend to have more difficulty controlling their blood glucose.

If these are both well-documented truths, does it then support the concept that periodontal disease causes or worsens diabetes mellitus? Or is this a situation in which statements (1) and (2) are true but do not allow one to conclude a causal relationship of worsened diabetes because of periodontal disease? This is where other possibilities of the true relationship exist and may better explain the linkage. Perhaps those with poor periodontal health cannot eat a set of foods that better cleanse the dentition as part of mastication or eat foods less likely to adhere to teeth, or have diets skewed to foods causing obesity, that then affects their diabetes. Maybe people with periodontal disease frequently take poorer care of themselves overall, jeopardizing the control of their diabetes and periodontium. There is no attempt here to imply that severe periodontal infections cannot affect the status of a patient’s diabetic control. Rather it is to suggest that it is premature to go too far along the path of alerting all members of society that we understand the linkages well enough to state that the causal relationship is firmly enough established to change public policy and to which to divert resources in lieu of other conditions with more scientific proof.

The other espoused oral-systemic linkages are much more questionable. Some dentists already seem to accept that poor oral hygiene and periodontal disease can cause premature births and low-birth weight babies. The *Scientific American* publication goes so far as to imply a link between dental health and miscarriages via

an anecdotal story and a graphic picture showing oral bacteria flowing into a fetus’ amniotic fluid. This must be horrifying for a pregnant person or prospective father to see. If I was a layperson reading this article and my wife was pregnant I’d be tempted to volunteer to follow her own personal oral hygiene sessions with my own inspection and touch-up brushing and flossing to help protect our developing child. Yet the recent landmark article in the *New England Journal of Medicine*¹ reports the results of a carefully done multicenter study. The study found no relationship between a mother’s periodontal health during pregnancy and the weight or delivery time of her infant. Of course, there is always a chance a relationship does exist because of some flaw in the execution of the study or number of subjects involved. But it certainly has to give pause to anyone telling the public and other health professionals that the link between periodontal health and low-birth weight infants is scientifically supported.

The day of dentists being considered physician wannabees has pretty much passed in North America. So, the need to try to strengthen our relevance as key players in keeping people in excellent overall health is not compelling to say the least. Dentistry does need to continue to find ways to regularly remind people of how good oral and dental health is essential to maintaining general health. And if there are linkages between oral disease and systemic problems it is critical that investigators do the research necessary to define them. But until those studies are complete and peer reviewed, dentistry should restrain from prematurely disseminating the information to those outside of our profession who cannot distinguish between proven science and, as certain vitamin supplement companies like to say, “emerging” science. Our credibility and reputation are at stake, as is the health of our patients.

In the final interview in the *Scientific American* publication, Daniel Meyer, the associate executive director of the division of science at the American Dental Association is quoted as cautioning, “Whether or not treating oral health conditions will affect systemic health depends on the disease—and we’ll know more about that as future research unfolds. Until we have [intervention] studies, where we can measure results in consideration of other variables that may influence health, I think we have to be guarded in treatment recommendations. But treating oral conditions such as periodontal disease has its own undisputed benefits and may have broader systemic health outcomes.” This balanced view is a salient take home message.

Dentistry must resist efforts to put the clinical practice cart before the research horse. Clearly there are some instances when clinical practice gets out in front of supportive research and the horse needs to nudge it

from behind in a more appropriate direction. But in the case of oral-systemic linkages, the cart may be developing a momentum of its own and threatens to run over the horse to the detriment of the dental profession and our patients.

Finally, while on the subject of oral-systemic linkages, it is time for some investigators to scientifically debunk a supposedly well-established linkage. This is the theory that there is a causal relationship between dental care and bacterial endocarditis. This association crept into clinical care without any strong scientific evidence and now requires dentists to give certain patients potentially harmful antibiotics to manage bacteremias.² The harm includes altering patient flora, triggering allergic reactions, and exposing dentists to

unwarranted litigation should the patient inadvertently not receive the antibiotic regimen. Here's a hypothetical linkage begging to be undone.

James R. Hupp, DMD, MD, JD, MBA
Editor in Chief

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