



## Surveillance Spotlight: Current Concepts in Oral-Systemic Health

### New “Syndemic” Paradigm for Interprofessional Management of Chronic Inflammatory Disease

By Anthony M. Iacopino, DMD, PhD

The emerging body of knowledge in oral–systemic science and the changing nature of health care will have a dramatic impact on the practise of dentistry. Dental professionals will be required to play a larger role in collaborative health care management teams as community practice continues its transition to an interprofessional model of care.

Current estimates indicate that 75% of the North American population has some form of periodontal disease, with approximately 15% demonstrating severe disease.<sup>1</sup> Untreated oral infection has systemic effects, as the microorganisms and their associated endotoxins generate a localized host-mediated tissue destructive immune response that spills over into the circulation in the form of bacteremia and endotoxemia.<sup>2</sup> This creates a systemic exposure that significantly increases the level of inflammation in the body. Years of elevated systemic inflammation have destructive effects on target tissues and organ systems throughout the body. Recent data indicate that gingivitis may be as damaging as periodontitis in elevating the systemic inflammatory burden, but that these changes are reversible with periodontal treatment.<sup>2</sup> Thus, the emerging base of evidence supports interrelationships between periodontal disease and inflammatory-driven conditions such as diabetes, adverse pregnancy outcomes, rheumatoid arthritis, respiratory disease and atherosclerosis-induced diseases.

In this regard, a recent groundbreaking and insightful article<sup>3</sup> has called for a new way of thinking about health care and the role of dental professionals. This new paradigm is based on a “syndemic approach” to clinical care, where syndemic refers to a set of 2 or more linked health problems that interact synergistically to cause excess burden of disease in the population. Within this context, these linked disease states must be viewed through the lens of the risk factors that bind them together. The recent epidemic of obesity, diabetes, cardiovascular disease, metabolic syndrome (overweight, hypertension, hyperlipidemia and hyperglycemia) and periodontal disease represents an interrelated cluster of chronic inflammatory diseases and conditions linked through etiologic factors related to overall systemic inflammatory burden.<sup>2</sup>

Cardiovascular disease and diabetes represent 2 of the most common chronic inflammatory diseases that could be significantly influenced by more aggressive oral care.<sup>4,5</sup> For example, the role of infection and inflammation in the initiation and progression of atherosclerosis is widely accepted.<sup>4</sup> Systemic inflammatory markers are elevated for years before the first myocardial infarction and are highly predictive of recurrent infarctions. Up to 50% of individuals with cardiovascular disease do not have any traditional risk factors. Atherosclerotic changes (fatty streak lesions) can be observed in children, and obesity, which is another major contributor to systemic inflammation, is rising rapidly in both adults and children. Within the context of the factors that contribute to elevated systemic inflammatory burden, periodontal disease represents a preventable, treatable and modifiable risk factor for cardiovascular disease.

Regarding diabetes, the inflammatory process may play a greater role in the long-term progression of type 1 diabetes than in its onset, and increases in inflammatory markers are detected in healthy individuals who later develop type 2 diabetes, suggesting that inflammation precedes impaired glucose tolerance and insulin resistance.<sup>5</sup> Periodontitis has been linked to elevations of diabetic markers (serum glucose and glycated hemoglobin) and treatment of periodontitis has been shown to reduce these markers. Periodontitis has also been linked to pre-diabetes and insulin resistance. Again, with the rapid rise in obesity, periodontal disease represents a preventable, treatable, modifiable risk factor for elevated systemic inflammation.

These scenarios mandate inclusion of oral health and oral care in public health approaches to overall risk reduction (systemic inflammation) and these preventive approaches must target aggressive health promotion and risk reduction strategies throughout the lifespan (multidirectional screening and referral for undetected diabetes, cardiovascular disease and periodontal disease). It is imperative that the dental profession be prepared to advocate strongly for coordinated interprofessional delivery of preventive oral health, especially in children and older adults. Although children are not typically considered to be at risk for systemic diseases linked to poor oral health, changing risk factors for systemic inflammation make prevention in this population critical. Older adults are particularly susceptible to the exacerbation of chronic inflammatory diseases and conditions if periodontal health is not maintained. Children and older adults are also at greatest risk for lack of access to dental care, especially those in rural or urban poor areas and seniors who are homebound or reside in personal care homes.

In the future, comprehensive care models will most likely involve dental and medical professionals working together with other health professionals and paraprofessionals to assess and manage periodontitis and systemic disease.<sup>3</sup> These educational, research and case management teams should consist of the dentist, dental hygienist, physician, nurse, nutritionist and pharmacist, at minimum. The teams should also emphasize comprehensive patient education and management, multidirectional screening and referral, collaborative reinforcement of health and wellness messages, public education forums and screenings for systemic conditions and periodontal disease, and communication and awareness forums for professionals, government and media. Thus, it is the responsibility of all health professionals to reduce oral infection. Effective health policy must focus on reduction of risk factors for systemic inflammation. Even modest changes in risk can produce significant changes in disease burden.

The dental team can actively participate in redefining the approach to patient care where interprofessional interactions emphasize linked health problems that interact synergistically to cause excess burden of disease. All dental professionals should be aware of the periodontal–systemic connection and should stress the importance of regular periodontal maintenance to their patients, as well as other health professionals. As the population ages, it is likely that preventive oral health will pay huge dividends in reducing potential systemic complications, especially those associated with chronic inflammatory diseases and conditions. ➤

## References

1. Moritz A, Mealy B. Periodontal disease, insulin resistance, and diabetes mellitus: a review and clinical implications. *Grand Rounds Oral-Sys Med* 2006;2:13-20.
2. Iacopino AM. What is the role of inflammation in the relationship between periodontal disease and general health? *J Can Dent Assoc* 2008;74(8):695-6.
3. Hein C, Small D. Combating diabetes, obesity, periodontal disease and interrelated inflammatory conditions with a syndemic approach. *Grand Rounds Oral-Sys Med* 2006;2:36-47.
4. Seymour GJ, Ford PJ, Cullinan MP, Leishman S, Yamazaki K. Relationship between periodontal infections and systemic disease. *Clin Microbiol Infect* 2007;13(Suppl 4):3-10.
5. King GL. The role of inflammatory cytokines in diabetes and its complications. *J Periodontol.* 2008;79(8 Suppl):1527-34.

---

**Dr. Iacopino** is dean and professor of restorative dentistry, and director of the International Centre for Oral–Systemic Health, at the faculty of dentistry, University of Manitoba, Winnipeg, Manitoba. Email: [iacopino@cc.umanitoba.ca](mailto:iacopino@cc.umanitoba.ca).

*The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association.*