

Global Oral/Systemic Health Forum: A Journey of Discovery

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Is oral infection and inflammation a risk for systemic conditions? *It has taken more than 300 years to arrive at the point we are today. The articles in this special issue, which are based on presentations at the International Consensus Forum on Oral and Systemic Health in Montreal, review the current evidence on the contribution of oral bacteria to systemic health. As a first step, it is helpful to review the past to see how the question of the oral/systemic connection evolved over three centuries. This article presents a brief overview of that journey.*



Antony von Leeuwenhoek

THE EARLIEST IDEA

The journey began in 1674 when Antony von Leeuwenhoek discovered microbes. He was an early user of the microscope and analyzed small scrapings from teeth. He described small “animalcules,” which later were named microbes and we call bacteria. Two hundred years later in 1876, Robert Koch proposed the “germ theory of disease,” suggesting that bacteria may cause disease.¹ At the same time, Edward Jenner, Joseph Lister, and Louis Pasteur also implicated germs as a possible source of disease. In 1879, Willoughby D. Miller, a recent graduate of the University of Pennsylvania Dental School, heard of Koch’s theory that germs might cause disease and determined that

he too wanted to study bacteria. On completing his dental training, he traveled to Berlin where he began work within Koch’s institute, looking at the relationship of bacteria to disease. Miller became convinced that the mouth was a focus of infection and that bacteria in the mouth could explain most of humankind’s illnesses. Simultaneously, William Hunter, a physician in London, was investigating what caused illness in his patients. Why did his patients develop high fevers and why were they dying? He heard Miller speak on “Oral Infection as a Cause of Systemic Disease.”² After hearing Miller, Hunter realized that he had the answer: his patients developed illness because of the sepsis (bacteria)

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ERA OF FOCAL INFECTION

The years 1910 and 1911 are pivotal. In 1910, Hunter was invited to Montreal for the dedication of the Strathcona Medical Building where he gave his classic address, "The Role of Sepsis and Antisepsis in Medicine," which was published in *Lancet*.⁴ By 1911, the term *oral sepsis* was replaced with the term *focal infection* and the "era of focal infection" was launched. Dental practitioners began advertising to their patients that they were "100-percenters," which meant that the dentist would remove 100% of the patient's teeth to prevent systemic disease. Medicine also embraced the concept of "focal infection" and tooth extraction was widely used in medicine as well as dentistry for the treatment of disease. In 1922, Mayo suggested that the tonsils might also be a source of infection.⁵ The tonsils plus the teeth could explain most of the infective diseases that troubled a person throughout life.

By 1938 there was a change in this way of thinking. For example, rheumatologists at that time treated arthritis with tooth extraction. In 1938, Cecil and Angevine reported a study involving 200 arthritis patients. As treatment, all of the patients' teeth were removed. The authors reported that none of the patients improved, and three patients became worse.⁶ At the same time, an editorial in *Dental Cosmos* suggested that the concept of the mouth causing all or most human illness was irrational.¹ And in 1952, an editorial in the *Journal of the American Medical Association* noted that removal of foci of infection (such as teeth) did not necessarily treat or prevent disease, and that dentistry and medicine needed to take a careful new look at the concept of oral sepsis as the cause of most systemic illnesses.⁷

THE CURRENT ERA

From 1952 to 1989, there was little interest in the concept of oral health/systemic health. Then in 1989, a landmark publication ushered in the current era. Mattila and colleagues reported in

the *British Medical Journal* that when patients presented to the emergency room with a heart attack, they were more likely to have a high index of oral disease, which included gingivitis, periodontitis, and endodontic problems.⁸ This publication turned the attention of dentistry to a new era of looking at the relationship of oral infection to systemic conditions. At the Centers for Disease Control, DeStefano used the National Health and Nutrition Examination Survey to look at the relationship. He reported that people with periodontitis had a 24% increased risk of coronary heart disease.⁹

CONCLUSION

It has now been more than 330 years since bacteria were discovered and 130 years since bacteria were implicated in disease causation. The presentations at the International Consensus Forum and the articles based on those presentations review the data linking oral infection to cardiovascular disease and diabetes. We have come a very long way since 1674. We have also already discovered much since Mattila's landmark publication in 1989. It has been a remarkable three-century journey of discovery. And yet, perhaps the work has just begun.

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