Q&A: Healthy gums, healthy heart; what's the connection?

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Healthy gums are imperative to a healthy mouth, but what about your cardiovascular health? In honor of Heart Month, Dr. Frank Nichols, professor of periodontics at the UConn School of Dental Medicine, unravels the underlying connection between gum health and heart health.

What is the link between periodontal (gum) disease and cardiovascular health?

Periodontal disease (specifically periodontitis) is associated with accumulation of microbial organisms in the crevice around the teeth that have the potential to increase gingival inflammation, or redness of the gums, and bleeding with brushing or flossing.

Of the many different types of organisms recovered in periodontal disease sites only a few are considered to be critical for periodontitis to occur. These organisms are capable of entering into the gums and with this entry, increased inflammation and destruction of the supporting tissues for the teeth can occur. These organisms include Porphyromonas gingivalis which produces many virulence factors that can promote local tissue destruction around the teeth. In addition, P. gingivalis can enter the blood stream and either activate white blood cells called monocytes and once activated they can adhere to or invade the walls of arteries. Regardless, the artery walls become inflamed and will accumulate cholesterol and other lipids in the inflammatory cells.

Another mechanism for promoting artery wall inflammation is the deposition of bacterial virulence factors directly into the artery walls that can also result in promotion of chronic inflammation. These alterations in artery walls results in formation of altherosclerotic plaques that can ultimately result in blockage of arteries resulting in heart attack, stroke or other possible serious cardiovascular problems.

What have you uncovered in your research?

In our research, we have characterized novel lipid classes produced by P. gingivalis and many other microbial species within the same bacterial phylum (Bacteroidota). These lipids are plentiful on diseased teeth from

periodontitis sites, but they are also recovered throughout the body including blood, artery walls with atherosclerotic plaques, brain samples and the gastrointestinal tract. The gastrointestinal tract may be a major source of these bacterial lipids recovered throughout the body. Contamination of blood with these lipids can lead to systemic immune cell activation and part of this activation process can include alterations in arterial walls leading to the development of atherosclerotic plaques. Other major systemic effects can occur.

What started as an investigation of microbial virulence factors in periodontal disease has expanded to include other important systemic diseases including cardiovascular diseases.

Dr. Robert Clark, Professor of Immunology, and Dr. Chris Blesso, Associate Professor in the Department of Nutritional Sciences and their research teams are evaluating the effects of these lipids on autoimmune disease processes and liver cholesterol metabolism, respectively.

Does age play a role? What about patients with a history of heart issues?

Regarding periodontal disease, the novel lipids of interest accumulate on teeth as bacterial plaque organisms die and mineralize into calculus. Calculus that forms in the gingival sulcus contains very high levels of P. gingivalis lipids which may contribute to the accumulation of specific lipids in diseased gum tissues. The accumulation of subgingival calculus is relatively slow but if it is not removed with periodic cleanings, the calculus accumulates over time such that it becomes more difficult to remove and retains higher amounts of bacterial lipids. Both of these processes can become more evident with increasing age. This is why periodic tooth cleanings are essential to prevent progression of periodontitis.

What are the common signs of periodontal disease? When should you consult a dentist?

Common signs of periodontal disease are enlarged/reddened gums and bleeding of the gums when cleaning the teeth. If these signs are apparent, consultation with your dentist is important. If the disease is not treated, long term progression can lead to loosening of the teeth or tooth loss.

What are the top ways to keep gums healthy?

Maintenance of periodontal health requires both daily brushing and flossing and periodic examinations and cleanings from your dentist/hygienist. In other words, both you and your dentist are responsible for maintenance of periodontal health.

Provided by University of Connecticut

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