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White Papers

New Research and Commentary on the Oral-Systemic Relationship*

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Usefulness of Self-Reported Periodontal Disease to Identify Individuals With Elevated Inflammatory Markers at Risk of Cardiovascular Disease

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Abstract

Periodontal disease has been associated with cardiovascular disease (CVD), and inflammation may represent a common pathophysiology. Oral health screening in the context of CVD risk assessment represents a potential opportunity to identify individuals at risk for CVD. The purposes of this study were to determine if self-reported oral health status is independently associated with inflammatory markers and if oral health assessment as part of CVD risk screening can identify at-risk individuals without traditional CVD risk factors. A baseline analysis was conducted among participants in the National Heart, Lung, and Blood Institute's Family Intervention Trial for Heart Health (FIT Heart; n = 421, mean age 48 ± 13.5 years, 36% nonwhite) without CVD or diabetes who underwent standardized assessment of oral health, lifestyle, CVD risk factors, and the inflammatory markers high-sensitivity C-reactive protein and lipoprotein-associated phospholipase A_2. Statistical associations between oral health, risk factors, and inflammatory markers were assessed, and logistic regression was used to adjust for effects of lifestyle and potential confounders. Periodontal disease was independently associated with being in the top quartile of lipoprotein-associated phospholipase A_2 compared with the lower 3 quartiles (odds ratio 1.9, 95% confidence interval 1.1 to 3.2) after adjustment for lifestyle and risk factors. Histories of periodontal disease were reported by 24% of nonoverweight, nonhypertensive, nonhypercholesterolemic participants, and of these participants, 37% had elevated high-sensitivity C-reactive protein (> 3 mg/L) or lipoprotein-associated phospholipase A_2 (> 215 ng/ml) levels. In conclusion, self-reported periodontal disease is independently associated with inflammation and common in individuals without traditional CVD risk factors.

(*Am J Cardiol* 102:1509–1513, 2008. Reprinted with permission.)

What does this study teach us?

Previous clinical studies have attempted to demonstrate an association between periodontal disease and cardiovascular disease (CVD). It is well known that periodontal diseases are the result of inflammatory

*Most published research to date shows that there is a possible association between periodontitis and systemic health. A causal relationship between the two has not yet been clearly established.

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processes in the oral cavity, and recent data have implicated inflammation as an important etiological factor in the development of many types of cardiovascular disease.

The purpose of this cross-sectional study was twofold: first, to explore whether self-reported periodontal disease status was independently associated with two markers of inflammation that are known to correlate with cardiovascular disease risk; and second, to assess whether oral screening via self-reported periodontal status can be used to identify at-risk individuals who do not have traditional risk factors for CVD.

The data suggest that in the absence of traditional CVD risk factors, patients at risk for CVD might be identified through oral health screening.

Non-CVD and diabetic subjects from the National Heart, Lung, and Blood Institute's Family Intervention Trial for Heart Disease were asked to complete a standardized oral health questionnaire, a health questionnaire, blood pressure assessment, waist circumference measurement, body mass index, and laboratory tests to determine low-density lipoprotein, high sensitivity C-reactive protein (hsCRP), and lipoprotein-associated phospholipase A_2 (Lp-PLA_2); the latter two markers of inflammation are thought to be predictive of future cardiovascular events.

Associations were assessed between self-reported periodontal disease status and lifestyle factors, such as physical activity, diet and smoking, as well as periodontal disease status and traditional risk factors for CVD, including waist circumference, body mass index, and blood pressure. The relationship between periodontal disease status and the two inflammatory markers was assessed, controlling for age, gender, race, ethnicity, smoking, and other potential confounding variables. Periodontal disease status was self-reported, and included a history of diagnosis of and/or treatment for periodontal disease, wearing of removable partial or complete dentures, and date of last teeth cleaning.

The authors found a significant association between self-reported periodontal disease and elevated levels of phospholipase A_2 after controlling for age, gender, race, smoking, LDL cholesterol, and consumption of saturated dietary fat. Due to study limitations, it was not possible for the authors to conclude that oral health is a risk factor for CVD outcomes. However, the data suggest that in the absence of traditional CVD risk factors, patients at risk for CVD might be identified through oral health screening.

What are the clinical implications of this study?

Periodontal disease has been positively correlated with the presence of CVD, with chronic inflammation as the proposed commonality to both diseases. Chronic inflammation contributes to an increased risk of adverse coronary events by promoting atherosclerotic plaques in coronary vessels to rupture. In this study group of 421 subjects, though the authors were unable to demonstrate a statistically significant association between oral health status and hsCRP, a history of periodontal disease was associated with higher levels of Lp-PLA_2 than those without periodontal disease.

Among the subjects without traditional CVD risk factors, self-reports revealed that diagnosed periodontal disease was present 23-

29% of the time. Approximately 24% of non-hypertensive individuals without elevated LDL cholesterol levels or overweight/obesity reported a history of diagnosed periodontal disease. Among those subjects with reported periodontal disease without hypertension, elevated LDL cholesterol, or obesity, more than one third (37%) had either elevated hsCRP or Lp-PLA_2.

Periodontal disease has been positively correlated with the presence of CVD, with chronic inflammation as the proposed commonality to both diseases.

It is important to recognize that the predictive nature of neither hsCRP nor Lp-PLA_2 has been verified for all cardiovascular diseases, though high levels of hsCRP may predict recurrent coronary events in patients with unstable angina and acute myocardial infarction (heart attack).

There is much interest in the development of new and additional diagnostic methods that might be used for identifying individuals with periodontal disease instead of the customary disease measures, such as probing depth and radiographs. The hope is that new diagnostic methods could be used outside of the traditional dental office, such as large epidemiological surveys of subjects or within other health care settings such as physicians' offices. To this end, the Centers for Disease Control and Prevention and the American Academy of Periodontology presented a symposium in 2006 entitled "Development of Self-Reported Measures for Population-Based Surveillance of Periodontitis." Might the self-reporting of periodontal disease by a subject be useful in identifying the presence of periodontal disease? The overall consensus from the symposium was supportive of the methodology.[1] Nonetheless, it has been suggested that the disparate findings of inflammatory markers in patients with periodontal disease in the present study may infer that the use of an oral health status questionnaire may not be sufficiently sensitive to determine a risk for cardiovascular disease.

How should the results of this study impact treatment of my patients?

As with other studies that have examined associations between periodontal disease and CVD, caution must be taken not to extrapolate these results to suggest a causal link between these two diseases. Nonetheless, these findings are the first to indicate an association between Lp-PLA_2 and oral health, inferring a possible independent association between oral health and inflammation, which suggests that inflammation may be a factor in the relationship between oral health and CVD.

Preventive oral care, including oral hygiene to reduce bacteria, can minimize oral inflammation that potentially contributes to CVD.

Given the existing knowledge of the relationship between chronic periodontal inflammation and CVD, screenings using self-reported periodontal disease status may be useful for identifying at-risk individuals who could benefit from CVD prevention strategies. Educating individuals about the association between periodontal inflammation and cardiovascular disease is one such strategy. And preventive oral care, including oral hygiene to reduce bacteria, can minimize oral inflammation that potentially contributes to CVD.

References

1. Eke PI, Genco RJ: CDC periodontal disease surveillance project: Background, objectives and progress report. *J Periodontol* 78 (Suppl):1366-1371, 2007.

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1. Panagakos FS, et al. J Clin Dent. 2005;16(suppl):S1-S19.
2. Data on file. Colgate-Palmolive. New York, NY.

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