

# White Papers

New Research and Commentary on the Oral-Systemic Relationship\*



## Scientific Advisory Panel

Ernesto De Nardin, PhD

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JoAnn R. Gurenlian, RDH, PhD

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Maria Emanuel Ryan, DDS, PhD

Ann Eshenaur Spolarich, RDH, PhD

Ray C. Williams, DMD

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## Stress, Depression, Cortisol, and Periodontal Disease

Amy E. Rosania, Kathryn G. Low, Cheryl M. McCormick, and David A. Rosania

### Abstract

**Background:** Stress and depression may affect the onset and progression of periodontal disease. However, to the best of our knowledge, no published study has established whether the mechanisms by which stress and depression influence periodontal disease are physiologic, behavioral, or both. This cross-sectional pilot study explored the associations between psychological factors, markers of periodontal disease, psychoneuroimmunologic variables, and behavior.

**Methods:** This study included 45 periodontal patients referred by three dentists. Participants completed composite health, chronic stress, depression, and demographic questions, and salivary cortisol (CORT) was measured. A hygienist assessed the magnitude of periodontal disease.

**Results:** Stress, depression, and CORT were correlated with measures of periodontal disease. In addition, oral care neglect during periods of stress and depression was associated with attachment loss and missing teeth. After controlling for age, family history, and brushing frequency, depression and CORT were significant predictors of the number of missing teeth. A similar model also predicted the number of teeth with clinical attachment loss > 5 mm.

**Conclusions:** Stress and depression may be associated with periodontal destruction through behavioral and physiologic mechanisms. Addressing psychological factors, such as depression, may be an important part of periodontal preventive maintenance.

(*J Periodontol* 80:260-266, 2009. Reprinted with permission.)

### What does this study teach us?

This is a significant study because it addresses two important and timely areas of interest about a periodontal-systemic relationship. Clinicians are becoming more interested in individualized medicine as an key consideration in effective patient care. We know that variations

\*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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## This Issue's Advisors



**Ernesto De Nardin, PhD**  
Professor, Department of Oral Biology  
State University of New York at Buffalo  
School of Dental Medicine



**Joan I. Gluch, RDH, PhD**  
Acting Associate Dean of Academic Affairs  
Director, Community Health  
Adjunct Associate Professor  
University of Pennsylvania School of  
Dental Medicine



**Anthony M. Iacopino, DMD, PhD**  
Dean  
Professor, Restorative Dentistry  
Director, International Centre for  
Oral-Systemic Health  
University of Manitoba Faculty of Dentistry

in periodontal disease severity and response to therapy are influenced by many individual factors, such as coexisting systemic conditions, genetics, smoking, oral hygiene, and age. But we also know that the variations cannot be fully explained by these factors alone, so research looks to psychological factors which have been shown to influence many other parameters of health and disease.

*From the study, the authors found a definite correlation between psychological factors such as stress and depression, and periodontal disease.*

A systematic review published in 2007 by Peruzzo, *et al.*<sup>1</sup> identified a positive relationship between psychosocial factors/stress and periodontal disease, and concluded with the recommendation for further well-designed studies from a more comprehensive and representative perspective. This article attempts

to expand the body of research to analyze behavioral, psychological, and immunologic correlates of periodontal disease through a pilot cross-sectional study with periodontal patients currently in maintenance therapy.

Because the complex network of these interrelated factors can influence the susceptibility, development, severity, and outcome of the disease, as well as modalities for its treatment, therapeutic approaches must account for and affect each particular component of this complex system in order for successful healing to occur. In this study, the authors evaluated the contribution of psychological factors such as depression and stress, physiologic markers such as salivary cortisol (CORT), and environmental/behavioral components such as oral hygiene (tooth brushing and flossing), as well as other confounding factors such as gender and cigarette smoking, on the severity of periodontal disease in a sample of 45 subjects. While each factor has been reported in the literature to be independently associated with periodontal disease, the novelty of this report is the inter-influence that each factor may have on the association.

The authors found a definite correlation between psychological factors such as stress and depression, and periodontal disease. However, due to the low number of subjects chosen from active patients in a periodontal maintenance program, caution must be exercised in interpreting and applying the results of this pilot cross-sectional study, particularly avoiding any extrapolation to suggest causal links exist between psychosocial factors and periodontal diseases.

## What are the clinical implications of this study?

There are known biological and psychological links between depression and stress and periodontal disease. Depression can affect the immune system and, in turn, down-regulates the defense mechanisms that are involved in the protection against periodontal disease. In addition, depression and stress can negatively impact oral hygiene behaviors, such as tooth brushing and flossing which,

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in turn, can multiply the chain of events that may lead to the severity of, and/or susceptibility to the disease.

These findings have important clinical implications because they suggest that addressing psychological factors such as stress and depression represents an important part of overall preventive periodontal maintenance and, more importantly, may also prevent translation of oral inflammation into systemic inflammation in susceptible individuals. The simple stress profile and depression scale utilized in this study provide psychological status information related to each patient (stress levels related to employment, domestic, and health environments; attitudes and personality traits related to relaxation, anxiety, hostility, obsessive-compulsiveness, and positive/negative perceptions of life events), and may represent valuable tools for implementation in a modern dental practice, emphasizing individualized diagnosis, treatment planning, and maintenance.

*These findings have important clinical implications because they suggest that addressing psychological factors may prevent translation of oral inflammation into systemic inflammation in susceptible individuals.*

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

This study underscores the importance of a comprehensive wellness approach with patients as a foundation in periodontal care. Clinicians should begin with a thorough health history, and ask specific questions about past and current levels of acute and chronic stress, as well as past and current diagnoses and symptoms of depression. They should then educate patients with previous and current experience with stress, depression, and other psychosocial factors regarding their potential risks for periodontal disease.

It is noteworthy that the study did unveil a correlation between stress and depression and decreased oral hygiene; for example,

*It is noteworthy that the study did unveil a correlation between stress and depression and decreased oral hygiene.*

study subjects with elevated stress brushed and/or flossed their teeth less frequently. Participants who reported that they neglected oral care during periods of stress or depression had more missing teeth than those who did not.

Overall, the authors suggest that, independent of oral hygiene, stress and depression are important correlates of periodontal disease and need to be addressed, evaluated, and where necessary, treated.

## Reference

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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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