

# White Papers

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



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## Periodontitis and Plasma C-Reactive Protein During Pregnancy

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### Abstract

**Background:** Periodontitis has been associated with increased risk of adverse pregnancy outcomes and elevated C-reactive protein (CRP) concentrations in non-pregnant adults. We examined the relationship between periodontitis and CRP among women who provided dental radiographs and had blood collected during early pregnancy, excluding smokers and diabetic patients.

**Methods:** From Project Viva, an ongoing cohort study, we measured plasma CRP in 35 subjects with periodontitis (*i.e.*, at least one site with  $\geq 3$  mm of alveolar bone loss) and a random sample of 66 periodontally healthy subjects matched on age and race/ethnicity. We performed linear regression analysis with log-transformed CRP levels as the outcome.

**Results:** The mean ( $\pm$  SE) CRP level was 65% higher (95% confidence interval:  $-2\%$ ,  $180\%$ ;  $P = 0.06$ ) in women with periodontitis ( $2.46 \pm 0.52$  mg/l) than in controls ( $1.49 \pm 0.22$  mg/l), adjusting for factors related to CRP levels, including age, race/ethnicity, pre-pregnancy body mass index, alcohol intake, education, income, and gestational age at blood collection.

**Conclusions:** These findings suggest that periodontitis may increase CRP levels in pregnancy. CRP could potentially mediate the association of periodontitis with adverse pregnancy outcomes.

(*J Periodontol* 77:821-825, 2006. Reprinted with permission.)

\*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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**What does this article teach us?**

This investigation represents the first study of periodontitis and C-reactive protein (CRP) in pregnant women. CRP is synthesized by the liver in response to inflammatory-produced cytokines; cytokines are a vital component in the pathogenesis of periodontitis. Periodontitis has been associated with an increased risk of adverse pregnancy outcomes, including premature low birth weight infants.

The study used a cohort design of 35 subjects with periodontitis from Project Viva, an on-going investigation related to the roles of gestational diet and social factors on pregnancy outcomes and infant health. These subjects were compared with a random sample of 66 periodontally healthy subjects who were matched on age and race/ethnicity. Findings revealed a 65% higher CRP level among pregnant women with periodontitis compared to those without periodontitis.

*...what is clear is that the presence of infection/inflammation, whether measured by serum CRP levels or clinical measures of periodontal disease, is associated significantly with a higher incidence of adverse pregnancy outcomes.*

This report provides another small piece of the puzzle in examining the relationship of periodontitis to adverse pregnancy outcomes. Several investigators are studying the causal relationship between periodontitis and pregnancy. Is there a direct effect of the oral flora on the placenta and the fetus? Does the fetus become infected with oral flora? Do inflammatory mediators from the periodontal pocket reach the placenta and the fetus? This report may indicate that periodontal disease leads to an enhanced CRP level which could amplify the inflammatory response that affects the placenta and fetus.

**What are the clinical implications of the study?**

Identifying factors that place women at risk for adverse pregnancy outcomes and developing prevention strategies has significant implications for both the mother and child. This study is important because systemic inflammation plays a major role in the pathogenesis of preterm delivery. In particular, CRP has been associated with pre-eclampsia, intrauterine growth restriction, and chronic infections, such as intrauterine infection and chorioamnionitis.

*...serum CRP levels, if reduced with periodontal treatment, could signal a reduced risk for adverse pregnancy outcomes.*

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Measuring serum CRP levels in pregnant women may ultimately become a sensitive indicator of “at risk” or “at high risk” mothers-to-be for preterm low birth weight infants, as well as other adverse pregnancy outcomes. If this is so, serum CRP levels, if reduced with periodontal treatment, could signal a reduced risk for such outcomes.

What is clear is that the presence of infection/inflammation, whether measured by serum CRP levels or clinical measures of periodontal disease, is associated significantly with a higher incidence of adverse pregnancy outcomes.

*...physicians must be understanding of the dental professional's role in controlling the inflammatory process which can impact the systemic health of the pregnant woman.*

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

Published reports, such as the one reviewed here, continue to affirm that women with periodontal disease may be at greater risk for adverse pregnancy outcomes. And, indeed, in its 2004 position statement, the American Academy of Periodontology recommended that women who are pregnant or planning a pregnancy undergo periodontal examinations and receive, as needed, appropriate preventive or therapeutic services.

Importantly, the present study also provides evidence to support collaborative initiatives among health care providers in medicine and dentistry. Dentists and dental hygienists can consult with obstetric specialists throughout a patient's pregnancy to monitor both her periodontal condition and CRP levels, as well as support the need for regular, comprehensive prenatal care. The physician, in turn, must be understanding of the dental professional's role in controlling the inflammatory process which can impact the systemic health of the pregnant woman. This approach may allow for pregnant women with elevated CRP levels to be classified as “high risk,” and thus evaluated more carefully for evidence of adverse oral health and pregnancy outcomes.

It is noteworthy that in the past year both CIGNA and Blue Shield of California, citing evidence that pregnant women with periodontal

*...the dental profession needs to educate physicians and the public at large on how to ensure excellent periodontal health in women who are pregnant, or who are planning to become pregnant.*

disease risk delivery of pre-term babies, have launched enhanced benefits to cover additional diagnostic and therapeutic periodontal services for expectant mothers.

Preventive oral health education can be offered that helps the patient understand the relationship between periodontal disease and adverse pregnancy outcomes. This includes encouraging adherence to a daily home care regimen that incorporates proper techniques to remove plaque biofilm. Using a dentifrice containing triclosan, which offers both long-lasting antibacterial and anti-inflammatory protection, would be an appropriate adjunct to complement mechanical plaque removal. In addition, this is an opportune time to discuss oral health care for infants and timing of the initial dental visits for the baby.

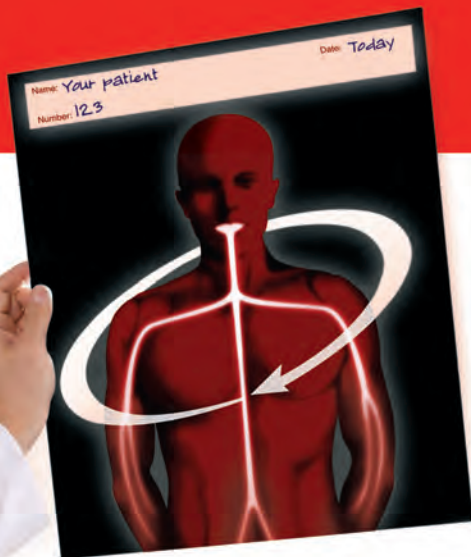
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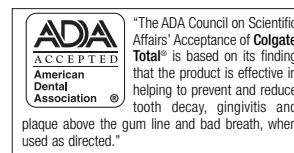
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