

# ARTICLE ANALYSIS & EVALUATION

## Maternal periodontal disease may be associated with increased risk of preterm low birthweight

### Original Article

Davenport ES, Williams CE, Sterne JA, Sivapathasundram V, Curtis MA. Maternal periodontal disease and preterm low birthweight: Case-control Study. *J Dent Res* 2002;81:313-8.

### Level of Evidence

3b

### Purpose

To evaluate whether maternal periodontal disease is associated with increased risk of preterm low birthweight

### Source of Funding

Government, United Kingdom: NHS Executive Research and Development Programme, Mother and Child Health, MCH 5-54

### Type of Study/Design

Case-control study

## Summary

### SUBJECTS

The women were randomly chosen from a population who gave birth at the Royal London Hospital between January 1997 and August 1998. They lived mainly in the East London and City Health Authority situated in the North Thames region. A total of 236 cases and 507 controls (sample size: 743) were enrolled.

### EXPOSURE

The exposure was periodontal disease, defined as mean pocket depth in millimeters. Pocket depth was measured as the maximum pocket depth for each tooth and then averaged across the teeth for each person.

### MAIN OUTCOME MEASURE

Giving birth to a preterm low-birthweight infant (weighing under 2500 g and born before 37 weeks' gestation) compared with the reference group of mothers who gave birth to a normal infant (weighing more than 2500 g and born after 38 weeks' gestation).

### MAIN RESULTS

A unit increase in pocket depth showed a negative association with preterm low-birthweight delivery, controlling for maternal age, ethnic group, maternal education, smoking, alcohol consumption, number of infections during pregnancy, and hypertension during pregnancy (odds ratio [OR] = 0.79; 95% CI 0.64 to 0.99). After 70 induced births were excluded from the analysis, the relationship was similar but not significant (OR = 0.87; 95% CI 0.69 to 1.11; Table 3).

## Commentary

### CONCLUSIONS

The study does not find any increased risk of preterm low-birthweight delivery with periodontal disease. The results suggest an inverse association between periodontal disease and preterm low-birthweight delivery.

### ANALYSIS

This study contradicts the earlier findings of Offenbacher et al,<sup>1</sup> which showed an OR of 7 relating periodontal disease to preterm low-birthweight delivery. Most other reports have also shown positive associations. This is a hospital-based unmatched case-control study. The authors report that they do not expect any selection bias as most mothers participated in this study; only 17 mothers declined to participate. It is possible that there could still be a selection bias if the cases had a different referral pattern than the controls. However, there is no reason to expect a selection bias.

The case and control definitions include a combination of gestation age and low birthweight. Intrauterine growth retardation (low birthweight) and premature delivery (low gestational age) have different etiologies and should ideally be evaluated separately. However, the Offenbacher et al study<sup>1</sup> used the same case definition; hence the inverse association cannot be explained by the choice of outcome in this study.

It is possible that the contradictory results may result from variation of association across racial or ethnic groups. The Offenbacher et al study<sup>1</sup> had a predominantly black population, whereas the United Kingdom study population was predominantly Bangladeshi

(Asian). Blacks have higher rates of periodontal disease, even after controlling for smoking and socioeconomic status, and are also at a higher risk for adverse pregnancy outcomes. However, the authors mention that the results were consistent across different ethnic groups in the United Kingdom study.

The authors could have presented results with and without controlling for prior low-birthweight delivery, as it is an important risk factor in this study, but they may have been influenced by prior periodontal disease. Overall, this study does a better job of controlling for confounders than other studies, which may explain the null results. It is unclear why the authors did not present any results with attachment loss. Even though attachment loss is correlated with pocket depth, the results may show some differences. Also, like most other studies, the authors did not factor missing teeth, which could be a potential source of bias. The explanation for the apparently protective effect of periodontal disease on preterm low-birthweight delivery is unclear, and unless confirmed by other studies, is likely due to random error or some form of bias that may not be obvious.

### REFERENCE

1. Offenbacher S, Katz V, Fertik G, Collins J, Boyd D, Maynor G. Periodontal infection as a possible risk factor for preterm low birth weight. *J Periodontol* 1996;67:1103-13.

### Reviewer:

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**TABLE 3. Association between Premature Low Birthweight and Measures of Periodontal Status**

	Mean (95% CI)		Odds Ratio (95% CI) [P Value] per Unit Increase <sup>a</sup>		
	Case Mothers (n = 236)	Control Mothers (n = 507)	All Subjects, Crude Association	All Subjects, Adjusted for Potentially Confounding Variables	Excluding 70 Cases Resulting from Induced Births
Mother's mean pocket depth (mm)	3.72 (3.62, 3.83)	3.85 (3.78, 3.92)	0.83 (0.68, 1.00) [0.05]	0.79 (0.64, 0.99)[0.036]	0.87 (0.69, 1.11)[0.26]
Mother's mean bleeding index	1.05 (0.97, 1.12)	1.09 (1.04, 1.14)	0.88 (0.67, 1.16)[0.38]	0.88 (0.64, 1.19)[0.40]	0.99 (0.70, 1.40)[0.96]
Mother's mean CPITN	2.59 (2.53, 2.66)	2.63 (2.59, 2.67)	0.85 (0.62, 1.17)[0.32]	0.84 (0.58, 1.21)[0.35]	0.95 (0.63, 1.44)[0.83]

<sup>a</sup>Adjusted for maternal age, ethnic group, maternal education, smoking, alcohol consumption, number of infections during pregnancy, and hypertension.

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