

## IN THE LITERATURE

Commentary on: Boggess KA, Lieff S, Murtha AP, Moss K, Beck J, Offenbacher S. Maternal periodontal disease is associated with an increased risk for preeclampsia. *Obstet Gynecol* 2003;101:227–231.

### Promoting Oral Health To Reduce Adverse Pregnancy Outcomes

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Oral health is an integral component of an individual's general health and well-being. Research demonstrates that oral diseases and conditions are not only markers for underlying health problems but also important determinants influencing the development and management of adverse chronic health conditions (1). Studies have shown an association between periodontal disease and a number of systemic diseases including preeclampsia, atherosclerosis, diabetes, and coronary heart disease. Although most oral health issues are not unique to the female population, these conditions have important implications both for women's and their children's general health and well-being. Fluctuations in levels of estrogen and progesterone associated with puberty, pregnancy, and hormonal birth control use can exacerbate symptoms of gingivitis and promote the development and progression of periodontal diseases (2).

Research continues to be conducted to determine the potential influences of women's oral health status on adverse pregnancy and early childhood outcomes. The study by Boggess et al documents an association between poor maternal oral health and an increased risk for the development of preeclampsia. Although the sample size was too small to confirm a direct association, this investigation adds to the growing body of literature on the adverse effects of periodontal disease on general health.

Several studies have also shown an association between periodontal disease and preterm low birthweight, which is considered a leading problem in obstetric medicine and remains the leading cause of morbidity and mortality among neonates in the United States (3). Compared with normal-birthweight infants, low-birthweight infants are more likely to die during the neonatal period, and survivors face neurodevelopmental problems, respiratory problems, congenital anomalies, and complications due to neonatal intensive care, causing a tremendous impact on the health care system and the survivor's own family (4). Preterm low birthweight (<2500 g) can be a result of both a short gestational period and retarded intrauterine growth. In the United States approximately 10 percent of women deliver before term, and preterm delivery at less than 32 weeks' gestation constitute 1 to 2 percent of all births (5). Periodontal infections, which can be a reservoir for inflammatory mediators, may pose a potential threat to the placenta and fetus, thereby increasing the likelihood of preterm delivery (6).

Periodontal disease is a gram negative, anaerobic bacterial infection that affects the gingiva and bone supporting the teeth. This condition is characterized by plaque accumulation, which induces chronic inflammation of the periodontal tissues and gradual loss of periodontal attachment, often resulting in loosening and eventual loss of teeth. Since the inflammatory mediators that occur in periodontal disease also play an important part in the initiation of labor, there are plausible biological mechanisms that could link the two conditions (7).

Jeffcoat et al found that mothers with severe periodontitis have high levels of prostaglandin in their blood, and are more likely to deliver preterm babies (5).

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Preliminary analysis suggested that periodontal infection and preterm birth begins with endotoxins resulting from gram negative bacterial infections, such as periodontal disease. These endotoxins stimulate the production of cytokines and prostaglandins. It is known that certain cytokines (interleukin 1- $\beta$ , interleukin-6, and tumor necrosis factor- $\alpha$ ) in appropriate quantities stimulate labor. In turn, increased levels of prostaglandins in the blood may increase sensitivity to irritants, causing additional inflammation (8). It was reported that pregnant women with untreated periodontal disease were three to eight times as likely to give birth prematurely as women without the disease. By cleaning the diseased teeth and gums, Jeffcoat et al found that the risk of premature birth was greatly reduced.

Mitchell-Lewis et al also examined the effect of periodontal interventions on pregnancy outcomes (9). After the initial 2 years, the study revealed that, first, women with preterm low-birthweight babies harbored significantly increased levels of periodontal pathogens, and second, the incidence of preterm low birthweight in women who received basic periodontal therapy during pregnancy was substantially reduced, although this reduction did not reach statistical significance. The preliminary data revealed a reduction in the incidence of preterm low birthweight with periodontal therapy, from 18.9 percent in the untreated group to 13.5 percent in the group that received scaling before delivery.

Conversely, a study conducted on a group of Bangladeshi and white women by Davenport et al (10) on the delivery of infants, their weight, and gestational age concluded that "While it remains important for health care workers to promote good oral health, our results do not support a specific drive to improve the periodontal health of pregnant women as a means of improving pregnancy outcomes" (11). One reason for the discrepancy in the results may be the racial makeup of the population sample of the groups studied. For example, in the United States in 1991, the low birthweight rate was 13.6 percent among black babies and 5.8 percent among white babies (12). Therefore, it will be important for future studies to clarify the influence of mothers' genetic background on maternal periodontal disease as a risk factor for preterm low birthweight (11). Whereas it remains to be seen whether the preceding reports of associations are causal or not, all women should be encouraged to practice healthy behaviors to improve oral health.

Dental providers are reluctant to provide elective dental care for pregnant women. The American Dental Association suggests that elective dental care should be avoided,

if possible, during the first trimester and the last one-half of the third trimester (13). This time frame is widely recommended because it includes the periods of high risk of harm to the developing embryo or fetus, as well as the least comfort for the mother (8). Nevertheless, poor periodontal health is a condition that can be prevented. Although daily brushing and flossing aid in preventing the accumulation of bacterial plaque, appropriate use of dental services provides the opportunity for preventive counseling and health education, the early detection and treatment of oral problems, and the receipt of preventive therapies. A coordinated effort from the dental and obstetric communities to establish guidelines and develop program interventions could provide a greater opportunity for reducing known risk factors and provide early treatment, potentially resulting in reduced health care costs and improved maternal oral health and perinatal outcomes.

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