DELTA DENTAL

DELTA DENTAL PLANS ASSOCIATION
NATIONAL SCIENCE ADVISORY COMMITTEE REPORT

Question to be investigated: Among pregnant women with periodontal disease, do additional dental cleanings during pregnancy reduce the risk of preterm delivery?

Executive Summary

The first question to be addressed is whether periodontal treatment during pregnancy, for women with periodontal diseases, reduces the level of preterm/low birthweight births. Although it seems to be widely assumed that such a positive relationship does exist, the evidence to support such a conclusion is moderate at best. In a good-sized body of literature, there are equal numbers of case-control studies that find positive results and negative results. Studies with weaker study designs are equally split, and the overall quality of this literature is mixed. No evidence of any harm to the patient from periodontal cleanings was found.

Even though the basic relationship between periodontal diseases in pregnancy and adverse birth outcomes is uncertain, or perhaps because of it, there are also mixed findings with the results of clinical trials intended to assess the effects of periodontal treatment during pregnancy. Three clinical trials were located which yielded positive results, the fourth found no effect. The question posed above, i.e., the effects of additional periodontal treatments above the standard protocols, has not been directly tested.

Background

Women with periodontal disease during pregnancy, when compared to women with none, are generally considered to be more likely to give birth to a preterm, low birthweight child. This is clearly an outcome to be avoided wherever possible. Delta Dental is therefore recommending that pregnant women showing signs of periodontal disease receive additional dental cleanings during pregnancy and need to know the evidence base for the efficacy of such a policy.

First, there is no evidence that periodontal cleanings harm the patient in any way. With safety established, the next issue is to confirm that there is at least an association between periodontal diseases during pregnancy and preterm birth or delivery of a low birthweight infant. However, if evidence is graded as strong, moderate, or weak, the evidence from the literature to support such an association is moderate at best. Among case-control studies, an association between periodontal diseases during pregnancy and delivery of a low birthweight or premature infant is supported by eight reports (Bosnjak et al 2006; Jarjoura et al 2005; Jeffcoat et al 2001; Lopez et al 2002a; Mokeem et al 2004; Moliterno et al 2005; Radnai et al 2004, 2006). However, there are also eight case-control studies which found no evidence of such an association (Bassani et al 2007; Buduneli et al 2005; Davenport et al 2002; Hujoel et al 2006; Khader et al 2006; Moore et al 2005; Noack et al 2005; Skuldbol et al 2006). Three other studies selected pre-eclampsia, a serious pregnancy complication, as the outcome. Two of these found an association between periodontal diseases during pregnancy and development of pre-eclampsia (Canaksi et al 2004; Kunnen et al 2007) while the third did not (Khader et al 2006). Among cohort studies, seven found a positive association between periodontal diseases in pregnancy and low birthweight or preterm birth (Boggess et al 2006; Dasanayake et al 2001; Dortbudak et al 2005; Lieff et al 2004; Madianos et al 2001; Offenbacher et al 2006; Sadatmansouri et al 2006), while one did not (Mitchell-Lewis et al 2001).

Among cross-sectional or retrospective studies, the weakest research designs, two studies found a positive association between periodontal diseases and low birthweight or preterm birth (Chapper et al 2005; Santos-Pereira et al 2007) while six did not (Lunardelli et al 2005; Marin et al 2005; Meurman et al 2006; Moore et al 2004; Moreu et al 2005; Rajapakse et al 2005).

Evidence is clearly mixed and of varying quality, leading to a cautious conclusion in a recent meta-analysis (Vergnes and Sixou 2007). However, this investigation is not to explore the association between periodontal disease and adverse birth outcomes *per se*, nor even the efficacy of dental cleanings during pregnancy. Instead, it seeks to find evidence for the efficacy of *additional* cleanings.

Research Sources and Thoroughness Estimate:

A MEDLINE search was carried out, augmented with some handsearching. Both search terms *pregnancy* and *periodontal diseases* were found in 753 articles. When the term *dental scaling* was added, there were 98 articles remaining in the list. The search was restricted to human studies and articles written in English. We wanted reports of (a) clinical trials; (b) case-control studies; and as a lower priority (c) cross-sectional or short-term prospective studies. A perusal of the titles and abstracts for these 98 articles identified 58 which were clearly irrelevant to the question under investigation. The assessment was therefore restricted to the remaining 40 articles. Some handsearching in the periodontal journals indicated that few relevant articles would be missed by restricting the articles to those in English. All 40 articles were published since the year 2000.

Findings and Conclusions

No clinical trials were found that specifically tested the effect of *additional* cleanings, i.e., the effect of carrying out more cleanings than are called for in standard protocols. All four clinical trials on this subject tested either the effect of any cleanings during pregnancy versus none, or the comparative effect of different treatment regimens. A brief synopsis of these four trials follows.

Jeffcoat and colleagues (2003) randomly allocated 366 women with periodontitis at 21-25 weeks' gestation to one of three treatment groups with stratification on the following factors: 1) previous spontaneous preterm birth at <35 weeks and 2) body mass index <19.8, or bacterial vaginosis as assessed by Gram stain. The treatment groups consisted of: 1) dental prophylaxis plus placebo capsule; 2) scaling/root planing plus placebo capsule; and 3) scaling/root planing plus metronidazole. An additional group of 723 pregnant women meeting the same criteria for periodontitis served as an untreated reference group. The rate of preterm birth at <35 weeks was 4.9% in the prophylaxis group, compared to 3.3% in the scaling/root planing plus metronidazole group, and 0.8% in the scaling/root planing placebo group (p= 0.75 and 0.12, respectively). The rate of preterm birth was 6.3% in the reference group. These results suggest that scaling/root planing in pregnant women with periodontitis may help prevent preterm and low birthweight deliveries.

Lopez et al (2005) conducted a randomized controlled trial to determine the effect of routine plaque control and scaling on the pregnancy outcomes in women with gingivitis. They recruited 870 pregnant women with gingivitis, aged 18-42, who were receiving prenatal care in Santiago, Chile. Women were randomly assigned to either a treatment group (n = 580), receiving periodontal treatment before 28 weeks of gestation or to a control group (n = 290), receiving periodontal treatment after delivery. Periodontal therapy consisted of plaque control, scaling, and daily rinsing with 0.12% clorhexidine. Maintenance therapy was provided every two-three weeks until delivery, and consisted of oral hygiene instruction and supragingival plaque removal by instrumentation. The

primary outcomes assessed were delivery at less than 37 weeks of gestation or an infant weighing less than 2,500 g. The incidence of preterm or low birthweight delivery in the treatment group was 2.14% and in the control group it was 6.71% (OR 3.26; 95% CI 1.56-6.83; p = 0.0009). Multivariate logistic regression analysis showed that, after adjusting for several known risk factors, periodontal treatment significantly reduced the rate of preterm or low birthweight delivery in this population of women with pregnancy-associated gingivitis. An earlier publication gave similar interim results (Lopez et al 2002b).

Michalowicz and colleagues (2006) randomly assigned women at 13-17 weeks of gestation to undergo scaling/root planing either before 21 weeks (413 patients in the treatment group) or after delivery (410 patients in the control group). Patients in the treatment group also underwent monthly tooth polishing and received instruction in oral hygiene. Preterm birth (before 37 weeks of gestation) occurred in 49 of 407 women (12.0%) in the treatment group and in 52 of 405 women (12.8%) in the control group. Although periodontal treatment improved periodontitis measures ($p<0.001$), it did not significantly alter the risk of preterm delivery ($p=0.70$; (hazard ratio for treatment group vs. control group, 0.93; 95% CI, 0.63-1.37). There were no significant differences between the treatment and control groups in birth weight (3239 g vs. 3258 g, $p=0.64$) or in the rate of delivery of infants that were small for gestational age (12.7% vs. 12.3%; OR=1.04; 95% CI, 0.68-1.58). This study concludes that treatment of periodontitis in pregnant women improves periodontal disease and is safe, but does not significantly alter rates of preterm birth, low birth weight, or fetal growth restriction.

Offenbacher et al (2006) conducted a randomized, delayed-treatment, controlled pilot trial (67 subjects) to evaluate the effects of second-trimester scaling/root planing and the use of a sonic toothbrush on the rate of preterm delivery (<37 weeks gestation). Logistic regression models were used to test for effects of treatment on preterm delivery. Periodontal intervention resulted in a significantly decreased incidence for preterm delivery (OR = 0.26; 95% CI = 0.08-0.85) after all necessary adjustments were made in the data. Periodontal intervention resulted in significant improvements in clinical status (attachment level, probing depth, plaque, gingivitis, and bleeding on probing scores). Results from this pilot study provide further evidence supporting the potential benefits of periodontal treatment on pregnancy outcomes. Treatment was safe, improved periodontal health, and prevented periodontal disease progression. Preliminary data show a 3.8-fold reduction in the rate of preterm delivery,

Strength of Evidence

Evidence is mixed. Even with the initial question of whether periodontal conditions during pregnancy are related to birth outcomes, there are equal numbers of positive and negative outcomes. Many of the studies in this body of literature have evident flaws, such as uncertain structuring of cases and controls, small numbers of subjects, and lack of blinding of examiners when blinding would have been appropriate.

With the clinical trials, three found positive relationships and one found no relationship. But these studies all tested the question of *any* periodontal treatment during pregnancy versus none, or the effects of different types of therapy. There really is no evidence at all to directly test the question posed for this investigation.

Homogeneity of Findings

Moderate at best.

NSAC Members' Conclusions and Comments.

The dental community seems to generally lean toward the view that periodontitis during pregnancy is clearly a risk factor for low birthweight or preterm delivery. However, while there is fairly extensive literature devoted to this subject it is full of contradictory findings. The jumbled conclusions presented by this literature make it hard to justify a policy for additional periodontal cleanings that Delta Dental is proposing. More rigorous clinical trials will be needed, and these need to be structured to test the question of additional treatment during pregnancy rather than just any treatment.

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