Obstetric outcomes after treatment of periodontal disease during pregnancy: systematic review and meta-analysis


CRD summary
This review assessed whether periodontal disease treatment with scaling and root planing during pregnancy was effective in reducing preterm birth rate. The authors concluded that treatment had no significant effect on incidence of preterm birth, low birthweight infants, spontaneous abortions/stillbirths and overall adverse pregnancy outcomes. This was a well-conducted review and the authors' conclusion is likely to be reliable.

Authors' objectives
To determine whether treatment of periodontal disease with scaling and root planing during pregnancy was effective in reducing preterm birth rate.

Searching
MEDLINE, Cochrane Central Register of Controlled Trials (CENTRAL) and Web of Science were searched without language restrictions to July 2010. Search terms were reported. Reference lists of selected trials were scanned for further studies. Handsearches of Journal of Periodontology and Journal of Clinical Periodontology were carried out.

Study selection
Randomised controlled trials (RCTs) of pregnant women with confirmed periodontal disease (periodontitis or gingivitis) who were treated with scaling and root planing versus no treatment or prophylaxis were eligible for inclusion in the review. The primary outcome of interest was preterm birth. Trials of patients with threatened preterm delivery who received tocolytic treatment were excluded.

Definitions of periodontal disease varied among the included trials. The review authors used criteria from the Centre for Disease Control and Prevention and American Association of Periodontology (2003) to classify disease severity according to probing depth and clinical attachment loss. Most of the included patients were classified as having mild periodontitis. The primary outcome was spontaneous or indicated preterm birth before 37 weeks gestation among all successful pregnancies. Secondary outcomes included: number of low birth weight (<2,500g) infants; spontaneous abortions or stillbirths; overall adverse outcomes of pregnancy; spontaneous preterm births; preterm birth before 35 weeks gestation; and number of very low birthweight (<1,500g) infants. Almost half of the included studies were conducted in USA. There were no UK studies.

Two independent reviewers selected the trials for inclusion. Consensus was reached with the involvement of a third reviewer.

Assessment of study quality
Trial quality was assessed using the Cochrane risk of bias tool and includes appraisals of sequence generation, allocation concealment, blinding, outcome assessent and reporting bias. Trial quality was rated as high (low risk of bias), low (high risk of bias) or unclear.

Two independent reviewers carried out the quality assessment. Agreement was reached by consensus.

Data extraction
Data were extracted to enable calculation of odds ratios (OR) and 95% confidence intervals (CI). Authors were contacted for data clarification, where necessary.

Two independent reviewers carried out data extraction. Consensus was reached with the involvement of a third reviewer.
Methods of synthesis
Where there was no statistical heterogeneity, odds ratios and 95% confidence intervals were pooled in a fixed-effect meta-analysis (Mantel-Haenszel method). A random-effects model (Der-Simonian and Laird) was used otherwise. Statistical heterogeneity was assessed using the $X^2$ test and $I^2$ statistic. Subgroup analyses explored the relative effects of low- and high-quality trials. Publication bias was assessed using a contour funnel plot and Harbord's modified test.

Results of the review
Eleven RCTs were included in the review (n= 6,558). Five trials were considered to be high quality, five trials low quality, and one was unclear.

Overall, no statistically significant difference was reported between treatment and control groups for preterm birth before 37 weeks gestation (OR 0.93, 95% CI 0.79 to 1.10, $I^2$=61%; 11 trials).

There was no benefit with treatment in the subgroup analysis of high-quality trials (OR 1.15, 95% CI 0.95 to 1.40, $I^2$=1%; five trials, n=4,718). There was a statistically significant benefit with treatment in low-quality trials (six trials, n=1,840).

Overall, there was no statistically significant difference between groups for any of the secondary outcomes. This result was unchanged in the subgroup analysis of high-quality trials. Only in low-quality trials was statistical significance reported for low birthweight and overall adverse pregnancy outcomes.

There was evidence of publication bias.

Authors' conclusions
Treatment of periodontitis with scaling and root planing in pregnancy had no significant effect on the incidence of preterm birth, low birthweight infants, spontaneous abortions/stillbirths and overall adverse pregnancy outcomes.

CRD commentary
The review question was clear. Sufficiently detailed inclusion criteria were reported. The search strategy included a range of data sources and efforts to minimise language bias were evident. The review process was carried out with robust methods to minimise error and bias. An appropriate quality assessment tool was applied. Adequate study details were presented. The chosen methods of synthesis were appropriate, heterogeneity was explored and useful subgroup analyses were conducted to highlight the results of high-quality studies.

This was a well-conducted review, and the authors' conclusion is likely to be reliable.

Implications of the review for practice and research
Practice: The authors stated that treatment for periodontal disease should not be routinely offered to pregnant women for the purposes of preventing preterm birth.

Research: The authors stated that further RCTs may be warranted to explore the effects of successfully controlled periodontal disease on the incidence of preterm birth and (if feasible) to explore the effectiveness of pre-pregnancy treatments.

Funding
None stated.

Bibliographic details