# DOES PERIODONTAL TREATMENT PREVENT ADVERSE PREGNANCY OUTCOMES A LITERATURE REVIEW

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## Abstract

***Objectives:*** *Periodontal disease is considered responsible for adverse pregnancy outcomes such as preterm birth (PTB) and low birth weight (LBW).PTB and LBW is the leading cause of death among children under five years of age. Therefore, this review aimed to investigate if periodontal treatment can prevent these adverse pregnancy outcomes.*

***Materials & Methods:*** *The search was conducted through Medline using several keywords. No language or year of publication restriction was entered while searching the Medline. The last search was done in October 2018. An only systematic review that included a randomized clinical trial and followed the systematic search strategy to answer the clearly defined question was included.*

***Results:*** *Most of the selected articles have not observed any clear effect of periodontal therapy on reducing adverse pregnancy outcome. However, few studies concluded that periodontal treatment is effective in reducing adverse pregnancy outcome only in high-risk patients with periodontitis. All studies emphasize that periodontal treatment is safe and effective for the periodontal disease and appropriate time for providing periodontal treatment is in the second trimester.*

***Conclusion:*** *There is not enough evidence to support that periodontal therapy during pregnancy effect in reducing adverse pregnancy outcomes such as PTB and LBW. There is only limited evidence that periodontal treatment is effective in high-risk pregnant women. Further studies should be conducted with a focus on the type of periodontal disease present during pregnancy, time, and nature of treatment provided.*

***Key Words:***

## Introduction

Periodontal disease is one of the most common oral infections which affect the supporting tissues of the teeth, i.e., gingiva, periodontal ligament, cementum and bone. It is linked with the formation of a highly pathogenic bacterial biofilm around teeth that generates an inflammatory host response. This destroys supporting periodontal tissues and bone, leading to subsequent tooth loss[1]. Host-derived inflammatory mediators released due to increasing bacterial load in periodontal disease play a vital role in promoting systemic diseases[2]. The relationship between periodontal disease and many systemic conditions such as cardiovascular disease, stroke, diabetes and adverse pregnancy outcomes have been reported extensively in literature[3,4]. During pregnancy, the progesterone and estrogen levels in plasma are increased and increase the destruction of periodontium by causing changes in sub-gingival micro-flora, low maternal immunity and production of pro-inflammatory mediators[5].

Due to hormonal changes, 50-70% of pregnant women develop gingivitis in the presence of poor oral hygiene. On the other hand, periodontal disease in pregnant women is considered as a risk factor

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and linked with adverse pregnancy outcome such as preterm birth (PTB) and low birth weight (LBW)[6,7] according to WHO preterm birth complications are the leading cause of death among children under 5 years of age, responsible for nearly 1 million deaths in 2013 alone[8].

The entry of microorganisms from the gingival crevicular fluid into the amniotic cavity is considered responsible for adverse pregnancy outcome. A randomized controlled trial conducted by Lopez et al. demonstrated that the rate of preterm birth and low birth weight in women with periodontal disease is decreased by providing the periodontal treatment during pregnancy[9]. In contrast, Michalowicz et al. showed that periodontal treatment had no positive effect on the occurrence of preterm birth. There are several reviews on this topic with inconsistentfindings[10]. There is a need for a comprehensive review of these studies to draw conclusive evidence regarding the effect of periodontal treatment on perinatal and maternal health. Therefore, this review aimed to investigate if periodontal treatment can prevent adverse pregnancy outcomes.

## Materials and Methods

Search method: Following terms were used in advance search of PubMed search builder together with the term "systematic review and meta-analysis":

1. "periodontal disease" and "pregnancy outcome" (21 articles found)
2. "periodontal disease" and "low birth weight" (25 articles found)
3. "periodontal disease" and "preterm birth" (16 articles found)
4. "periodontal therapy/treatment" and "pregnancy outcome" (7 articles found)
5. "periodontal therapy/treatment" and "low birth weight" (9 articles found).
6. "periodontal therapy//treatment" and "preterm birth" (4 articles found).

No language or year of publication restriction was entered while searching the Medline. The last search was done in October 2018.

Selection criteria: Only systematic reviews that included a randomized clinical trial (RCT) and followed the systematic search strategy to answer a clearly defined question were included.

Exclusion criteria: Nonsystematic literate review, case-control studies, case reports or randomised clinical trials were not be included in this review.

## Results

The Medline search revealed 82 studies in total after entering all the keywords one by one. After removing duplicate studies, abstract screening of 32 studies was performed. After the abstract screening, 15 studies were excluded. After full-text review, three more studies were removed because these studies were not constructed on randomized clinical trials. Finally, 14 studies were included in this review article. Flowchart of the literature search is depicted in figure 1. Most of the systematic reviews have reported the high risk of bias due to lack of blinding and heterogeneity regarding participants included in the study and the type of treatment provided. Also, meta-analysis did not show any clear effect of periodontal therapy on the adverse pregnancy outcome such as PTB and LBW. Only two systematic reviewed have observed the positive effect of non-surgical periodontal therapy on LBW and PTB. No adverse effect of periodontal therapy was reported in any of the studies that reported various adverse pregnancy outcomes. The summary of all 14 systematic reviews including the number of RCT included in each review is shown in the table:1

## Discussion

The presence of periodontal disease in pregnant women is considered as a risk factor and associated with adverse pregnancy outcome in many studies.11, 12 However, limited evidence is present to confirm the relationship between periodontal therapy and adverse pregnancy outcomes. In this review, the focus was to summarize all the systematic reviews and meta-analyses, which had been conducted to find out the association between periodontal therapy and mainly two adverse pregnancy outcomes, i.e., low birth weight and preterm birth. Most of the selected systematic reviews found out the same conclusion of no relationship between periodontal treatment provided during pregnancy and PTB & LBW. These studies emphasize that is no clear effect of periodontal therapy on reducing adverse pregnancy outcome. On the contrary, two systematic reviews have ob-

**Fig: 1**

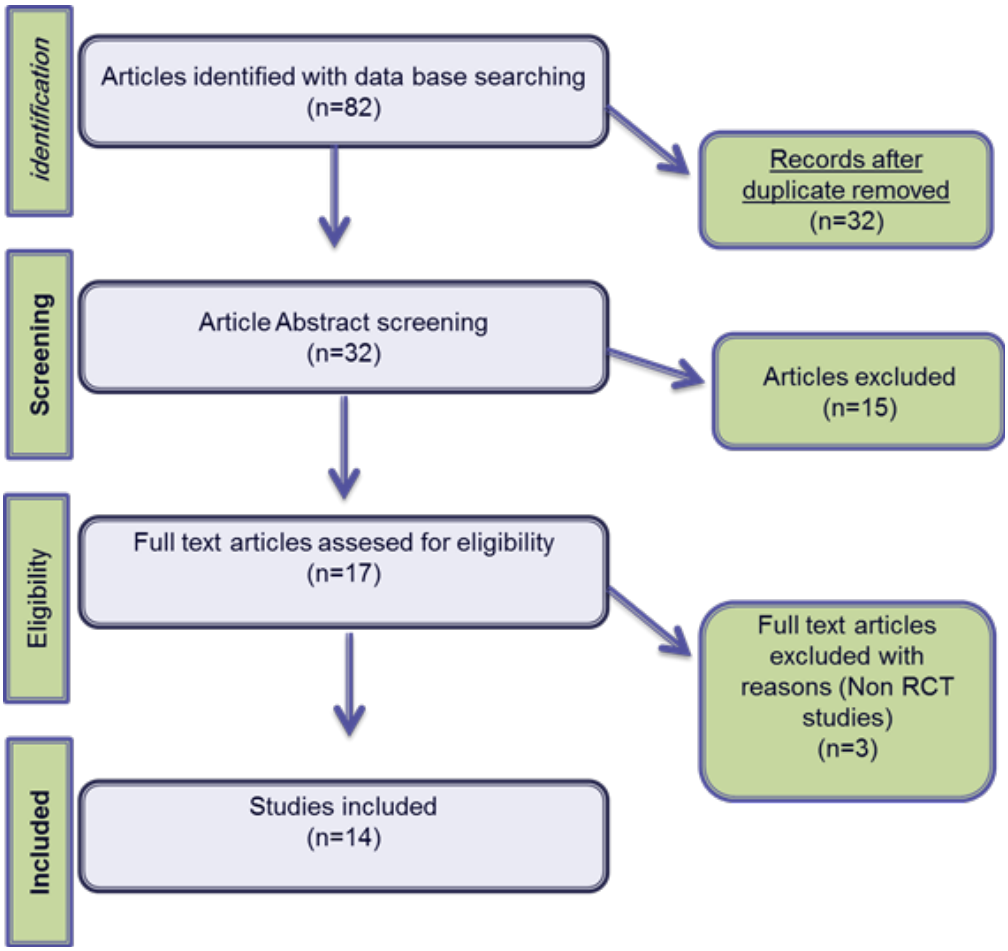


**Table 1: Overall comparison of mouth opening in participants wearing soft versus hard splint**

| | Title | Journal/Author/ year | RCT | Summary |
|---|---|---|---|---|
| 1 | Periodontal treatment for the prevention of adverse birth outcomes | Evidence-based dentistry Spivakovsky/2018 | 15 with 7161 participants | No clear evidence is present that can confirm the effect of that periodontal treatment during pregnancy on preterm birth. However, there is some evidence that it may decrease the occurrence of low birth weight19. |
| 2 | Treating periodontal disease for preventing adverse birth outcomes in pregnant women | Cochrane Data Base Iheozor-Ejiofor et al.2017 | 15 RCT | No enough evidence that periodontal treatment can decrease preterm birth20. |
| 3 | Effect of intra-pregnancy nonsurgical periodontal therapy on inflammatory biomarkers and adverse pregnancy outcomes: a systematic review with meta-analysis. | Systemic Reviews da Silva et al. 2017 | 4 RCT | Periodontal inflammatory biomarker levels from gingival crevicular fluid and some from serum blood were reduced after nonsurgical periodontal treatment during pregnancy. No effect was observed on inflammatory biomarker level from umbilical cord blood. In conclusion, periodontal therapy did not decrease adverse pregnancy outcome21. |

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| 4 | Periodontal treatment for preventing adverse pregnancy outcomes: a meta- and sequential trial analysis. | PLoS One. Schwendicke et al. 2015 | 13 RCT | Periodontal treatment during pregnancy could decrease the risks of adverse pregnancy outcomes, particularly in high risks in pregnant women. However, no decisive evidence was observed due to risks of bias, risks of random errors, and unclear effects of confounding16. |
| 5 | The effects of periodontal treatment on pregnancy outcomes | Journal of clinical periodontology Michalowicz et al. /2013 | 13 RCT | Non-surgical periodontal therapy during pregnancy does not change the rate of PTB or LBW deliveries22. |
| 6 | Treatment of periodontal disease and prevention of preterm birth: systematic review and meta-analysis. | Am J Perinatol. Boutin et al. 2013 | 12 RCT | No evidence that periodontal treatment can decrease preterm birth. Substantial heterogenicity was observed between different RCTs who evaluated the influence of periodontal therapy on adverse pregnancy outcome23. |
| 7 | Scaling and root planning treatment for periodontitis to reduce preterm birth and low birth weight: a systematic review and meta-analysis of randomized controlled trials. | J Periodontol. Kim et al. 2012 | 11 RCT | This systematic review concluded that treatment of periodontitis has a significant effect in reducing the risk of preterm birth only in the pregnant women who are at high risk of preterm birth15. |
| 8 | Periodontal disease treatment and risk of preterm birth: a systematic review and meta-analysis. | Cad Saude Publica. Rosa et al. 2012 | 13 RCT | The periodontal treatment should not be considered as an effective tool to reduce the incidence of preterm birth24. |
| 9 | The effect of periodontal therapy on preterm low birth weight: a meta-analysis. | Obstet Gynecol. Fogacci et al. 2011 | 14 RCT | The meta-analysis in this systematic review could not confirm that periodontal therapy decreases the incidence of preterm birth and low birth weight25. |
| 10 | Evidence grade associating periodontitis with preterm birth and low birth weight: II: a systematic review of randomized trials evaluating the effects of periodontal treatment. | J Clin Periodontol. Chambrone et al. 2011 | 13 RCT | The data did not find any relation between the periodontal treatment of pregnant women and the risk of PB and LBW26. |
| 11 | Periodontal treatment during pregnancy and birth outcomes: a meta-analysis of randomized trials | International Journal of evidence-based healthcare George et al./2011 | 10 RCT | There is enough evidence that periodontal therapy during pregnancy has the potential to decrease the incidence of PTB and LBW13. |
| 12 | A meta-analysis of randomized controlled trials shows no evidence that periodontal treatment during pregnancy prevents adverse pregnancy outcomesOct;142(10):1192-3. | J Am Dent Assoc. Baccaglini et al. 2011 | 11RCT | No effect of scaling and root planning during pregnancy was observed on the rate of PTB or other adverse pregnancy outcomes27. |
| 13 | Effect of periodontal treatment on the incidence of preterm delivery: a systematic review. | Minerva Stomatologica Pimentel et al. 2010 | 7 RCT | Enough supporting evidence was found that non-surgical periodontal treatment during pregnancy decreases the frequency of preterm babies with low birth weight14. |
| 14 | Obstetric outcomes after treatment of periodontal disease during pregnancy: systematic review and meta-analysis | BMJ Polyzos et al./ 2010 | 11 RCT | It was concluded that non-surgical periodontal therapy is not an effective approach to decreasing the rate of adverse pregnancy outcome9. |

served the positive effect of periodontal treatment on both preterm birth and low birth weight13, 14. Also, a statistically significant effect of periodontal therapying reducing PTB and LBW showed in pregnant women with periodontitis who were at a higher risk of preterm birth15or other adverse perinatal outcomes 16.

The reason for controversial evidence could be that influence of specific aspects of the periodontal disease such as periodontal diagnosis (extent and severity of disease) among the different study population, heterogenicity of treatment provided and success of non-surgical therapy provided during pregnancy. The most important variation among included studies might be the difference in the exact definition of periodontitis. The periodontal treatment during pregnancy is safe and effective for periodontal disease and most appropriate time for providing periodontal treatment is the second trimester 17. However, the patient should be informed that such treatment is unlikely to reduce the rate of preterm birth or low birthweight infants9. According to López et al. the periodontal therapy if done before pregnancy, it would be more beneficial18. There is insufficient evidence to define what type of periodontal treatment is superior in preventing any adverse pregnancy outcome.

In conclusion, there is no strong evidence that periodontal therapy during pregnancy affects in reducing preterm birth. Only limited low-quality evidence supports that periodontal therapy might have a positive effect in reducing low birth weight. It is not clear from the literature that which periodontal treatment is superior in reducing adverse pregnancy outcomes. Further studies are required to a focus on the type of periodontal disease present during pregnancy, time, and nature of treatment provided.

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