

Perio-Pregnancy Inter Connection Revealed

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Received: February 18, 2026; **Accepted:** February 24, 2026; **Published:** March 02, 2026**ABSTRACT**

Pregnancy induces a variety of hormonal, vascular, and immunological changes that can significantly affect the oral cavity, particularly the periodontium. Periodontitis, a chronic inflammatory disease of the supporting structures of the teeth, has been increasingly linked to adverse pregnancy outcomes such as preterm birth, low birth weight, and preeclampsia. This review explores the complex relationship between pregnancy and periodontal health, emphasizing the bidirectional nature of their interaction. The findings highlight the importance of early diagnosis and management of periodontal disease in pregnant women.

Keywords: Periodontal Disease, Pregnancy Outcomes, Preterm Birth, Low Birth Weight, Pre-Eclampsia, Periodontitis, Inflammatory Mediators, Fusobacterium Nucleatum, Porphyromonas Gingivalis

Introduction

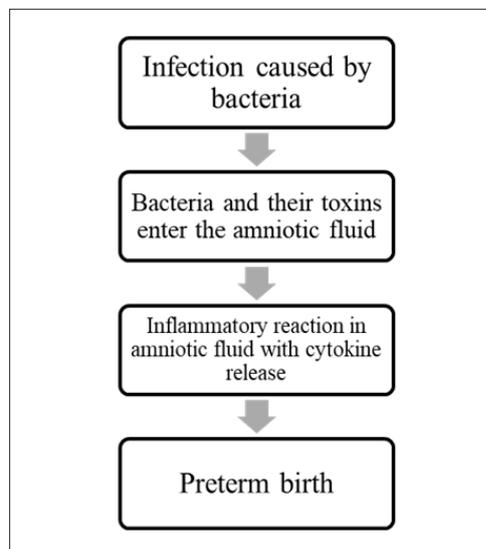
Pregnancy represents a unique physiological state in which hormonal, immunological, and vascular changes predispose women to an exaggerated gingival response. While pregnancy itself does not cause periodontitis, these changes may worsen pre-existing periodontal conditions. Importantly, growing evidence has suggested a possible link between maternal periodontitis and adverse pregnancy outcomes, including preterm birth, low birth weight, and pre-eclampsia. Such outcomes remain significant contributors to neonatal morbidity and mortality worldwide. Despite numerous studies, the relationship between pregnancy and periodontitis remains a subject of debate. Differences in study design, population characteristics, and diagnostic criteria for periodontitis have led to conflicting results. Nevertheless, the potential impact of oral health on maternal and fetal outcomes underscores the importance of this topic for both dental and medical practitioners. The aim of this review is to summarize current evidence on the association between pregnancy and periodontitis, to highlight possible biological mechanisms, and to discuss the implications for prevention and management in clinical practice.

Association Between Periodontal Disease and Adverse Pregnancy Outcomes**Association with Preterm Birth**

Periodontitis is an infection primarily caused by Gram-negative bacteria, and it may play a role in affecting pregnancy outcomes. During the second trimester, the balance of oral bacteria shifts, with anaerobic Gram-negative bacteria increasing in dental plaque compared to aerobic species [1]. Fusobacterium nucleatum and related oral bacteria have been detected in the amniotic fluid of women who experienced preterm births [2,3]. These harmful bacteria can release biologically active substances that influence the host's immune response. One such component, lipopolysaccharide (LPS), can stimulate macrophages and other immune cells to release various inflammatory molecules, including interleukins (IL-1 β , IL-6), tumor necrosis factor-alpha (TNF- α), prostaglandin E2 (PGE2), and matrix metalloproteinases [4,5]. If these substances enter the bloodstream and reach the placenta, they may elevate levels of PGE2 and TNF- α in the amniotic fluid, potentially triggering premature labor [1,6]. Furthermore, periodontitis and adverse pregnancy outcomes like preterm birth and low birth weight share several risk factors [2]. While recent research suggests a link between the two conditions, a direct causal relationship has not yet been definitively established. Nevertheless, the inflammatory mediators involved in periodontal disease are also known to contribute to the onset of labor, supporting the

possibility of a biological connection [7]. Additional maternal factors, such as a shortened cervix, have a stronger association with preterm birth when combined with conditions like bacterial vaginosis [5]. It is likely that maternal periodontitis acts together with other risk factors to increase the chances of preterm delivery [8].

Mechanism by Which Infection May Induce Preterm Birth



Association with Low Birth Weight

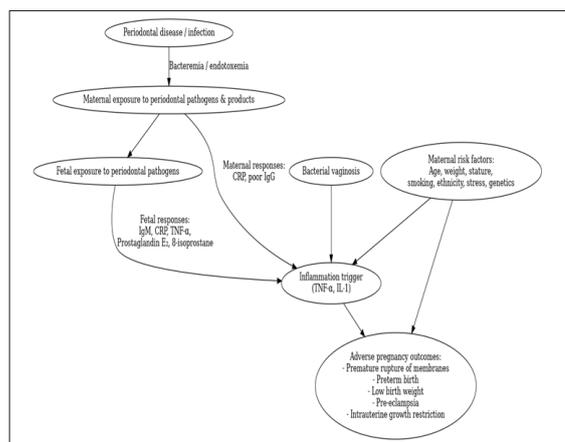
Research has shown that periodontitis may contribute to an increased risk of low birth weight in newborns. According to the World Health Organization's 1976 definition, low birth weight refers to infants born weighing less than 2,500 grams. This condition can result either from a shortened gestational period or from restricted fetal growth within the uterus [2]. A typical human pregnancy lasts around 40 weeks, and births occurring before 37 weeks are classified as preterm. Those occurring before 32 weeks are considered very preterm [2]. Despite medical advancements, the rate of preterm low birth weight has not significantly declined in the past decade, affecting approximately 10% of live births in the United States [6]. In Spain, data from 2005 reported a preterm birth rate of 7.4% and a low-birth-weight rate of 7.2%. Globally, both preterm birth and low birth weight remain major perinatal health challenges, contributing significantly to infant illness and death. Compared to infants of normal weight, those born with low birth weight face a higher risk of neonatal mortality and are more likely to experience complications such as delayed neurological development, respiratory disorders, and congenital abnormalities [2,7].

In industrialized countries, preterm low birthweight (LBW) deliveries make up around 10% of all births and are responsible for nearly two-thirds of infant deaths. Of these, about one-third are planned (elective), while the remaining two-thirds occur spontaneously. Among spontaneous preterm births, roughly half result from premature rupture of membranes and the other half from preterm labor. Around 10–15% of these spontaneous cases happen before 32 weeks of pregnancy, leading to very low birthweight infants (<1500 g) who are at higher risk of long-term complications such as chronic lung disease and cerebral palsy [6].

Association with Pre-Eclampsia

Periodontal disease may contribute to a higher likelihood of

developing preeclampsia. This hypertensive condition affects approximately 5–10% of pregnancies and is a leading cause of both maternal and perinatal illness and death [7]. Preeclampsia has various possible causes, many of which involve vascular alterations in the placenta similar to those observed in atherosclerosis [6]. Having periodontitis during pregnancy, or experiencing its progression while pregnant, is linked to a two- to 2.5-fold increase in the risk of preeclampsia [7]. Women with both periodontal disease and elevated levels of C-reactive protein (CRP), an inflammation marker, were found to have a significantly higher risk of developing preeclampsia compared to those without periodontal disease. The elevated CRP suggests that periodontal infection had triggered a systemic inflammatory response, offering a biological explanation for the link to preeclampsia [7].



Mechanisms Related to Periodontal Disease Leading to Adverse Pregnancy Outcomes

Periodontal pathogens and their inflammatory mediators can spread to the placenta and contribute to adverse pregnancy outcomes such as preterm birth, Pré-eclampsia, fetal growth restriction, and even fetal death [1,3].

Periodontal Pathogens in Pregnancy

Intrauterine infection from pathogens like *Porphyromonas gingivalis* and *Fusobacterium nucleatum* is linked to 25–40% of preterm births. These bacteria reach the placenta through the blood stream [3,9].

Porphyromonas Gingivalis

- Disrupts immune regulation, enhances inflammation and increases Oxidative stress.
- Causes apoptosis of placental cells, poor remodeling of uterine arteries, and reduced blood supply to the fetus.
- Associated with pre-eclampsia, fetal malnutrition and fetal death [9,10].

Fusobacterium Nucleatum

- A vaginally anaerobic bacterium that colonizes the placenta.
- Uses adhesion proteins to invade placental cells and blood vessels.
- Trigger immune responses that can restrict fetal blood supply and growth.
- Linked with preterm birth and adverse pregnancy outcomes [3].

Periodontal disease can increase inflammatory mediators' life TNF alpha, Interleukin-1 beta and Interleukin-6, which are linked to contractions, premature rupture of membranes, preterm birth, and adverse pregnancy outcomes [4,5].

Host immune response also plays a role imbalance between defense mechanisms and microbial factors can worsen outcomes. Elevated maternal IgM antibodies are linked to preterm birth, while the role of IgG antibodies remains unclear and debated [6].

Antibodies and Pregnancy Outcomes

Our body makes antibodies against bacteria in gum disease. Some antibodies like IgG can protect against problems like preterm birth and low birth weight. If the protective antibodies are low, the risk of preterm birth becomes much higher. Certain genes can also make women more sensitive, increasing their risk of pregnancy problems when they have gingival disease [6,9].

Antiphospholipid Syndrome & Gingival Disease

Antiphospholipid syndrome (APS) is a condition where the body makes harmful antibodies like anticardiolipin antibodies, also. These antibodies can be found in people with periodontitis. They attack a protein that normally prevents blood clotting problems. When these antibodies bind to the protein, they trigger inflammation, blood clots and problems in the placenta. This can lead to miscarriages, preterm birth, or other pregnancy complications [7]. Gingival disease might raise the level of harmful antibodies that make pregnancy riskier.

The Effect of Nutritional Intake on Periodontal Disease and Adverse Pregnancy Outcomes During Pregnancy

Poor diet like too much sugar, fat, low fiber, low nutrients can produce gingival inflammation and increase risks like preterm birth and pre-eclampsia. Balanced nutrition strengthens immunity and promotes healthier pregnancy [10].

Role of Macronutrients

- Carbohydrates: Too much sugar raises inflammation, increases harmful bacteria, and may cause preterm birth and pre-eclampsia.
- Fats: Fats like omega-3 fatty acids are healthy fats that reduce inflammation, and lower risk of pre-eclampsia, low omega-3 which results in pregnancy risk in a higher rate. Fish oil supplements during pregnancy may protect against periodontal diseases [10].
- Role of micronutrients:
- Vitamin B complex (B1, B2, B3, B6, B9, B1).
- These are important for cell growth and neural development. Deficiency of these vitamins results in preterm birth, low birth weight, Pré-eclampsia, stillbirth.
- Vitamin C: Helps collagen production, immunity and reduces inflammation. Low vitamin C worsens gingival disease and pregnancy complications.
- Zinc: Essential for growth and immunity deficiency in zinc also results in preterm birth, low birth weight and maternal complications.
- Bad diet- worsens gum disease & increase risks of preterm birth, low birth weight, and pre-eclampsia.
- Good diet with omega 3, vitamins A, B, C and minerals like zinc supports periodontium health and reduces inflammation and leads to healthier pregnancy outcomes.

- Pregnancy increases the need of micronutrients and its deficiency can harm the fetal Important supplements include folic acid which prevents neural tube defects, iodine prevents cretinism, zinc which reduces preterm birth [10].

European Studies on Periodontal Diseases and Adverse Pregnancy Outcomes

Generally, most available data come from case-control or cohort studies examining the link between periodontal disease and preterm birth, with fewer studies on preterm premature rupture of membranes (PPROM) or pre-eclampsia. In a Czech cohort, 78 women admitted for preterm birth were compared with 77 controls with normal pregnancies. Women with PPRM showed significantly higher gingival and plaque scores, probing depth, and attachment loss ($p < 0.0001$), even after adjusting for smoking [2,5,11]. A Swiss study on 56 women also found that periodontal inflammation was greater in those with PPRM ($P < 0.05$). In contrast a large French multicenter study of over 1100 women with preterm birth and similar controls found no link between periodontitis and spontaneous preterm birth or PPRM, though generalized periodontitis was associated with preterm birth due to pre-eclampsia [5]. Other risk factors in cases included non-French nationality, low education, unemployment, obesity, and smoking. Similarly, an Italian multicenter study found no association between periodontitis and pregnancy complications like preterm birth, low birth weight, pre-eclampsia, Intrauterine growth restriction, or PPRM, with no major differences in demographics, smoking, or education between cases and controls. In contrast, Nordic studies did not find a relationship between preterm birth and periodontitis either, though systemic risk factors like multiple pregnancies and smoking were confirmed in the Danish study.

Studies from Nordic and German populations similar ethnic and socioeconomic backgrounds and had access to good Healthcare, which contributed to overall good periodontal health [2]. This may explain the low occurrence of periodontal pathogens in these groups. For example, Finnish mothers rarely carried subgingival Porphyromonas gingivalis and Prevotella intermedia [9]. Likewise, in German women, bacteria such as P. gingivalis, P. intermedia, Aggregatibacter actinomycetemcomitans, Tannerella forsythia and Fusobacterium nucleatum were either absent or detected only in small numbers. Additionally, no periodontitis-related factors were linked to higher risks of preterm low birth weight in these groups. However, a Hungarian case-control study found that chronic localized periodontitis was associated with preterm low birth weight, with significantly higher levels showed that participants generally shared of most tested pathogens in infected mothers compared to controls [2].

Conclusion

Pregnancy-related hormonal and immunological changes can worsen existing periodontal disease, which has been associated with adverse pregnancy outcomes such as preterm birth, low birth weight, and pre-eclampsia. Periodontal pathogens and inflammatory mediators may contribute to these complications through systemic and placental effects. Although evidence is not entirely consistent, maintaining good periodontal health during pregnancy through early diagnosis, proper oral care, and multidisciplinary management is essential for promoting both maternal and fetal well-being.

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