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**REVIEW ARTICLE**

# Pregnancy and Oral Health and Dental Management in Pregnant Patient

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**Abstract**
Pregnancy is a unique, exciting time in a woman's life, and there are so many changes going on in human body during pregnancy and mouth is no exception , so good oral hygiene is extremely important during pregnancy . Usually oral health is often the most neglected form of health during all stages of life & the most important cause for this neglection is lack of awareness among people & this problems also increases when a lady is pregnant because of mis-perceptions and mis-leading information in the society or due to lack of knowledge. But the fact is during pregnancy many complex physiologic changes occur in the women's body, which can adversely affect oral health and in turn those oral health problems may lead to pregnancy outcomes like preterm birth or low birth weight. Proper oral care is of utmost importance during pregnancy to avoid these complications. Avoiding foods that may cause oral problems, proper brushing and flossing and having dental consultations on a regular basis are steps to ensure good oral health during pregnancy.
**Keywords:** Pregnancy, Oral health, CCBs, dental plaque

## 1 | INTRODUCTION

Pregnancy; the reproductive process through which a new baby is conceived, incubated and ultimately born into the world. Pregnancy is a unique, exciting time in a woman's life, as it highlights the woman's amazing creative powers. The growing fetus in the womb depends entirely on its mother's healthy body for all needs. Consequently, pregnant women must take steps to remain as healthy as they possibly can. There are so many changes going on in pregnant ladies and their mouth is no exception. Good oral hygiene is extremely important during pregnancy. Oral health and pregnancy effect each other, the increase of hormone levels can leave pregnant lady's mouth more vulnerable to dental problems from bacteria and plaque & this in turn

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effect developing fetus adversely.

It should be the duty of health providers to educate pregnant women about the impact of good oral health on the well-being of the mother and fetus. Prenatal oral health counseling is very important in informing the pregnant woman on the risks that poor oral health poses for the mother and fetus.

## 2 | PREGNANCY & ORAL CHANGES:

During pregnancy many complex physiologic changes occur in the women's body, which can adversely affect oral health.

1. **Effect on Periodontal Tissues:**

Although the main cause that effects the health of periodontal tissues adversely is presence of bacteria in biofilms of dental plaque . But there are also secondary causes or factors that induce the oral changes and thus can adversely effect the periodontium , these can be certain medications like CCBs , smoking , medical conditions like diabetes , vitamins deficiency or hormonal changes like in pregnancy.

Several hormones, including the sex steroids, have an influence on the cellular components of the periodontal tissues and may interfere with the mechanisms involved in the pathology of periodontitis. Fluctuations in the levels of these hormones in physiologic or non-physiologic conditions may result in significant alterations in the periodontium, especially in the presence of preexisting plaque-induced gingival inflammation. Effects of these sex hormones (progesterone & estrogens) on the periodontium, include the following changes –

**Involvement in vascular functions such as angiogenesis and vascular permeability:** Higher estrogen levels in the body stimulate angiogenesis i.e formation of new blood vessels, while increased circulating progesterone levels increases capillary permeability and dilation, resulting in increased gingival exudate that may facilitate the recruitment of more inflammatory cells in the gingival area and the crevicular fluid. The enhanced vascular permeability may also be partly due to stimulating effects of progesterone on prostaglandin synthesis. (1)

**An effect of estrogen on salivary peroxidases:** The salivary per-oxidases are the enzymes that are secreted in mammals through salivary glands or other mucosal glands which act as natural anti-bacterial & active against a variety of microorganisms. Elevated estrogen changes the redox potential of the salivary peroxidases thus affecting the action of salivary peroxidases. (2)

Estrogen-mediated suppression: **The increased level of estrogen in body** leads in suppression of leukocytes production in the bone marrow and inhibition of polymorphonuclear leukocyte chemotaxis and phagocytosis. (3)

**Progesterone-induced reduction of the anti-inflammatory:** effects of glucocorticoids, either directly via receptor binding on osteoblasts or indirectly by antagonizing glucocorticoid receptors. (4)

Therefore, periods of hormonal flux during puberty, pregnancy, menopause or use of contraceptives have been associated with periodontal manifestations. These manifestations include –

Gingivitis & pregnancy tumor – Relationship between pregnancy and gingivitis confirmed the existence of a significant increase in gingivitis throughout pregnancy and between pregnant versus postpartum or non pregnant women.

Ehlers et al compared the dental evaluation and gingival crevicular fluid from 40 pregnant women and 40 age-matched nonpregnant control subjects. They found that 80% of pregnant women had gingival inflammation compared with 40% of control subjects. (5)

The interproximal papillae become red, edematous and tender to palpation, and they bleed easily if subjected to trauma. In some patients, the condition will progress locally to become **a pyogenic granuloma or "pregnancy tumour,"** which is most commonly seen on the labial surface of the papilla.

Tooth mobility – Mobility is highest during the last month of pregnancy. Increase of mobility during pregnancy was caused by alterations of the periodontal membrane and not because of the changes in the alveolar socket bone. The upper incisors are

most mobile during the last month of pregnancy . (6) During pregnancy the fibers and bone that support and hold the teeth in its socket can temporarily loosen causing the teeth to be slightly movable. This is usual a normal occurrence and will repair itself after pregnancy. Pregnancy associated gingivitis can also cause tooth mobility, as well as the more advanced periodontal disease.

Periodontitis – If gingivitis is not treated, it will progress into a more severe gingival disease called Periodontitis. Periodontitis can be associated with an infection of the gums and supporting bone of the teeth and can result in recession, tooth mobility, bone loss and bacteremia.

**2. Tooth surface loss in pregnancy –** Tooth surface loss, primarily through acid-induced erosion ,may be seen if there has been nausea and associated repeated vomiting during pregnancy. The palatal surfaces of the upper incisors and canines are often the most affected . The woman commonly presents complaining of sensitivity, which is a consequence of the resulting dentine exposure. These women should be advised to avoid tooth brushing directly after vomiting as the effect of erosion can be exacerbated by brushing an already demineralized tooth surface. (7)

**3. Dental caries & pregnancy-** Dental caries is a bacterial infection which is multifactorial in nature and caused by the bacterial fermentation of dietary sugars resulting in the localized destruction of the tooth. The important organisms in the initiation and progression of dental caries are the Streptococcus mutans , Lactobacilli and Actinomyces sp. Although pregnancy has no direct relation in the alteration of tooth structure.

The increased levels of *Streptococcus mutans* and *Lactobacilli* are found in late pregnancy and during lactation. (8)

**4. Mucosal Changes in pregnancy –** In pregnancy , due to increased level of the estrogen there is enhanced proliferation and desquamation of the oral mucosa.These desquamating cells enhance the microenvironment by providing nutrition and a suitable environment for bacterial growth, therefore potentially predisposing to caries. (9)

**5. Halitosis –**

1. Halitosis or bad breath is common during pregnancy. Bad breath in women during pregnancy can be due to hormonal imbalances, morning sickness, dehydration, calcium deficiency or oral problems. An increase in the levels of estrogen and progesterone might exacerbate the response of the gums to plaque and cause gingivitis or inflamed gums. Swollen gums have pockets where food gets lodged and cause bad odor.

Pregnancy-induced nausea and vomiting due to morning sickness are experienced by 66% of pregnant women (10). Frequent vomiting leads to acidic environment in the mouth and this leads to demineralization of the teeth & makes the teeth more prone to food lodgment and decay, which results in halitosis. (11) Fetus in the womb absorbs calcium from the calcium deposits in the mother's body. Insufficient calcium in the mother's blood causes mineral to leach out from the bones and teeth & it may cause weaking of teeth that subsequently might results in cavities and decayed teeth causing bad breath. (12)

## 3 | ORAL HEALTH & ITS OUTCOMES ON PREGNANCY :

Oral bacteria and bacterial byproducts can gain access to the fetoplacental unit via hematogenous spread, where they may produce inflammatory responses that could lead to adverse pregnancy outcomes. (13) As described above the elevated levels of the sex hormones in pregnancy adversely affects the oral health , and in turn , the diseased periodontium or bad oral health may results in the bad outcomes in pregnancy. These risks in pregnancy related to bad oral health include the following.

1. **Preterm birth & low birth weight of developing baby:** Preterm birth is also known as premature birth, in which the birth of a baby occurs before the estimated due date usually before 37 weeks of gestational age, as opposed to the normal about 40 weeks.

It has been suggested that subclinical infections such as periodontitis can contribute to premature delivery and low birthweight as a result of pathogenic microorganisms or their microbial products, such as lipopolysaccharide (LPS), reaching the uterus via the bloodstream, inducing cytokine release in the decidua or the membranes, resulting in increased prostaglandin production or, indeed, uterine muscle contraction. (14) Inflammatory mediators like cytokines and prostaglandins, when produced in the periodontal tissues in response to LPS stimulation, may also pose a real threat to the fetoplacental unit and increase the risk of preterm delivery and low birthweight. (15)

Proposed bio-mechanism of linking periodontal diseases to preterm-lowbirth weight delivery in Figure 1

1. **Fetal growth restriction:** THE Circulating inflammatory mediators like cytokines, prostaglandins, interleukins, tumor necrosis factor are increased in the periodontitis. Besides these mediators , bacterial endotoxins resulting from periodontal disease are capable of causing of preterm births and restriction of fetal growth. (16)

2. **Vertical transmission of cariogenic Streptococcus mutans:** Vertical transmission is the passage of pathogens or microbes from mother to baby during the period immediately before and after birth. Transmission might occur across the placenta or through direct contact during or after birth from the mother to the infant, with a significant risk for future caries experience due to the transmission of the Strep mutans. (16)

3. **Severe and even life-threatening odontogenic infections:** Altered immune function in pregnancy, can develop high risk of developing severe odontogenic infections in patient with poor oral health and these infections can be life-threatening for both the mother and her baby. (17)

## 4 | DENTAL MANAGEMENT IN PREGNANT PATIENT :

Perceptions of the safety of dental treatment during pregnancy by patients, dental providers, and prenatal providers may all contribute to the lack of oral health care during pregnancy . Also lack of awareness in pregnant ladies about the oral health & pregnancy outcomes, lack of two way communication between gyane-obs and dentist , sometimes dentist's own reluctance to treat the pregnant patients can also be the cause of the misleading perceptions regarding the dental treatment in pregnancy.

In a 2012 study, it was reported that obstetricians were well informed on the relationship between periodontal disease and pregnancy outcomes, at the same time, many prenatal general practitioners and midwives may not understand the link between oral health and overall health. (18) The authors of the study also found that most of the time, prenatal care providers did not discuss oral health with their patients and that dental referrals were often only made when the patient self-identified an oral health problem. Although physiologic changes in pregnancy pose certain challenges in the dental and medical management of the pregnant patient, but this can be managed well. Many changes occur in the expectant mother during pregnancy, the timing may affect what dental treatment should be done and how it should be provided. According to these changes and timmings , the dental treatment has been categorized in four different categories to treat a pregnant patient that includes –

1. Emergency treatment – As name suggests it is the treatment that require immediate attention otherwise there can risk to patient's life. In dentistry emergencies include oral hemorrhage , Ludwig's angina , severe odontogenic infections, traumatic injuries.

2. Urgent treatment – Urgent dental treatment is considered where the patient is experiencing significant symptoms. A small delay in treatment is not expected to significantly affect the treatment outcome. This includes symptomatic irreversible pulpitis, Cracked tooth syndrome ,Dental abscess (not severe).

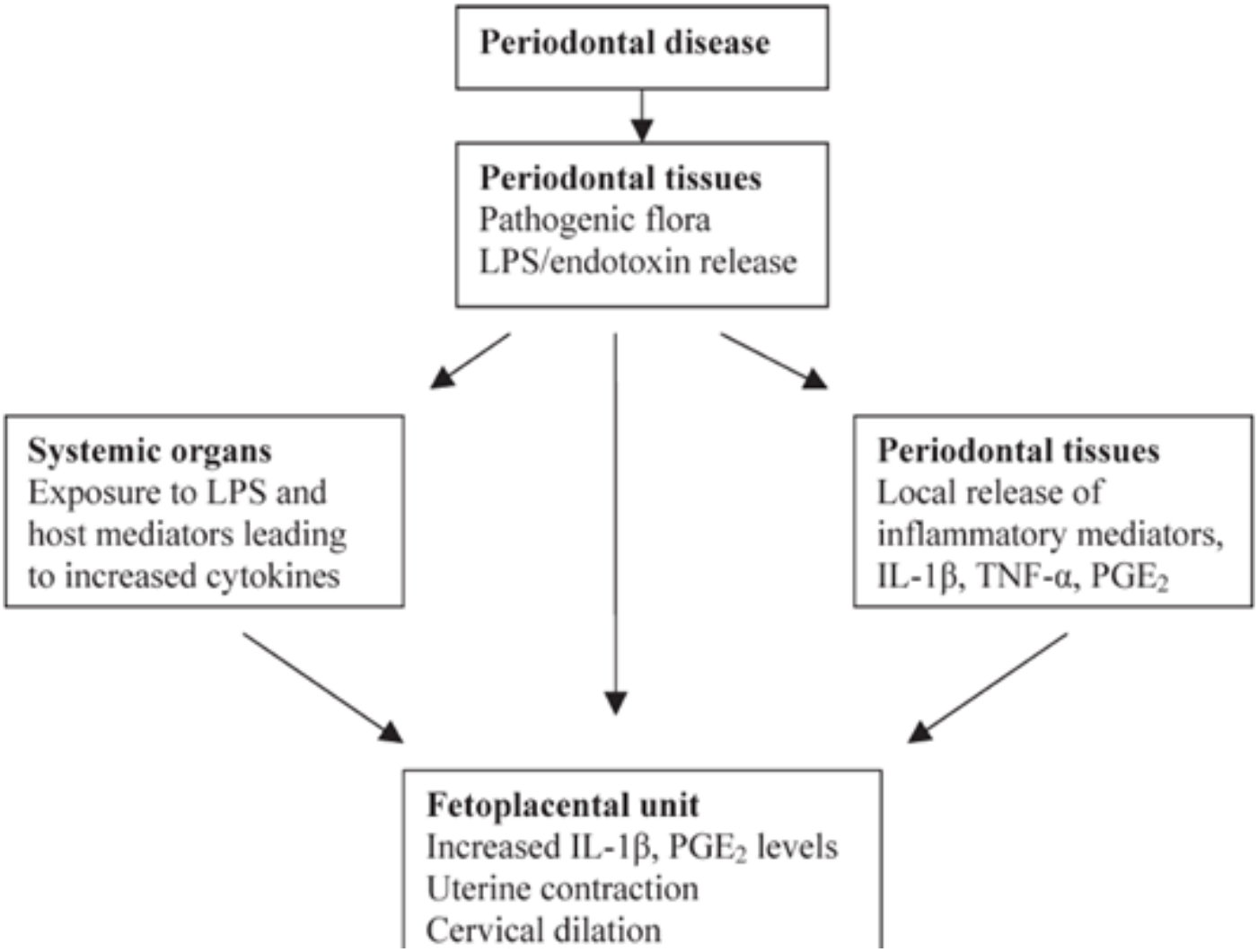


**FIGURE 1:**

3. Necessary treatment – Necessary dental treatment is treatment that may improve the health of the pregnant woman or fetus during the time course of pregnancy. Examples include: Minor pain due to a fractured tooth ,Periodontally compromised teeth that may be avulsed and aspirated during intubation if the woman undergoes general anesthesia at delivery , Caries that is either symptomatic or suspected to become symptomatic during the time course of pregnancy, Asymptomatic irreversible pulpitis.

4. Elective treatment – Elective dental care is not expected to affect the health of the pregnant woman or the fetus during the time course of pregnancy. This includes cosmetic surgery , veneers (no caries) ,tooth whitening.

A healthy pregnant woman having a normal pregnancy should have her urgent and emergency dental needs taken care of at any time during pregnancy. (19, 20) The decision of whether to perform dental treatment in a hospital or an outpatient dental office setting will depend on the patient's health and the type of pathology. (21)

## 5 | TIMMINGS OF DENTAL TREATMENTS IN PREGNANT PATIENTS:

According to traditional concepts, dental treatment of any kind has been avoided during the first trimester of pregnancy, so as not to harm the fetus during organogenesis. But nowadays , there is not

enough evidence to ignore dental treatment even during the first trimester of pregnancy , emergency dental procedures are indicated at all times during pregnancy and can be performed during any trimester when a delay in necessary treatment could result in significant risk to the mother and an indirect risk to the fetus. (16) For elective dental procedures, the ideal period for complete dental treatment of a pregnant woman is the beginning of the second trimester. At this stage, there is no risk of teratogenesis, nausea and vomiting have subsided, and the uterus is not yet large enough to cause discomfort. However, it is important to remember that extensive reconstruction, crown and bridge as well as removable partial dentures should be deferred until after pregnancy. (16)

1. First trimester recommendations for dental treatment are (16) –

a. Educate the patient about maternal oral changes during pregnancy

b. Emphasize strict oral hygiene instruction and thereby plaque control

c. Limit dental treatment to periodontal prophylaxis and emergency treatments only

d. Avoid elective procedures

e. Avoid routine radiographs. Use selectively and when needed

2. Second trimester recommendations for dental treatment are (16) –

a. Oral hygiene instruction and plaque control

b. Scaling, polishing, and curettage may be performed if necessary

c. Elective dental care is safe (root canals, extractions, restorations)

d. Avoid routine radiographs. Use selectively and when needed

3. Third trimester recommendations are (16) –

a. Oral hygiene instruction and plaque control

b. Scaling, polishing, and curettage may be performed if necessary

c. Active oral diseases should be controlled

d. Radiograph use should be minimized

e. It's safe to perform elective procedures, but avoid elective dental care during the second half of the third trimester.

- General recommendations for dental treatment in pregnancy – There should be short duration of appointments in dental office for pregnant lady. Minimizing the stress level is very important in pregnant lady. Since due to physiological changes and also due to growing fetus there is decrease in cardiac output , and this cardiac output can be further decreased due to pressure from developing fetus on dental chair , so to avoid this mishappening patient position is very important , the use of left lateral position with short duration of appointments and to avoid the supine position on dental chair is helpful. Use of hi-speed films & use of lead aprons in dental radiography has been quite.

- Use of amalgam restorations in pregnant lady is controversial due to the release of mercury. (22) And thus mercury is known to cause the congenital malformations , use of these restorative materials should not be used .

## 6 | DRUGS USE IN DENTISTRY IN PREGNANT PATIENTS:

The major concern of administration of drug use in pregnancy is all about their safety to the developing fetus. To determine the risks associated with the use of drugs in pregnancy , US FDA has recommended different drug categories out of which category A & B are considered to be safe –

Drugs safe in pregnancy for the purpose of dental treatment or diagnosis (23), these are :

a. Local anesthetics – lignocaine is safe in pregnancy as it falls in category B

b. Analgesics – paracetamol category B , aspirin falls in c/d & it should be avoided in 3rd trimester , ibuprofen low dose & it should be avoided in 3rd trimester

c. Antibiotics – The safe antibiotics in dental prescribing are Amoxicillin & amoxicillin-clavulonate , azithromycin , cepahlosporins , erthyromycin (except estolate form).

d. Moutwashes – chlorohexidine moutwashes can be safely prescribed in pregnant ladies as they fall in category B according to US FDA.

Thus knowledge of drugs and their effects is also an important factor in safe prescribing of antibiotics, painkillers in dental practise.

## 7 | CONCLUSION:

From the above overall discussion we can conclude that the hormonal changes induced during pregnancy increases the risk of developing gum diseases, which in turn can be dangerous for the mother and can also impact the health of the baby. There should be done patient counselling by the physician or midwives prenatally or referral by them to dental professional to educate the patient about the two way interconnection of pregnancy and oral health. The patient should also be instructed about the proper brushing & flossing techniques and dietary instructions should also be given so that patient can maintain good oral environment during this crucial time period, and thus can prevent pregnancy complications that could arise from bad oral health.

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