



## CLINICAL GUIDELINES FOR MANAGEMENT OF A PREGNANT PATIENT IN DENTAL OFFICE-A COMPREHENSIVE REVIEW.

**Dr. Sidharth Sharma**

SidhaTri Multispeciality Clinic Rohru Dist. Shimla, Himachal Pradesh.

**Dr. Isha Sharma**

MD Scholar Rajiv Gandhi Government Post Graduate Ayurvedic College Papprola Dist. Kangra, Himachal Pradesh.

**Dr. Trishala Sharma (PT)**

SidhaTri Multispeciality Clinic Rohru Dist. Shimla, Himachal Pradesh.

### ABSTRACT

Treatment of the pregnant patient plays a vital role as the clinician is dealing with two lives viz. mother and fetus. With evolution of medical science is no longer considered a medically compromised state, but rather an extension of healthy state. Pregnancy brings in several physiological alterations in female patient. Changes can be seen at various systemic levels such as gastro-intestinal, vascular, genitourinary, cardiovascular, oro-facial etc. During pregnancy, an increased hormonal level is seen in the body of the female patient. Changes occur as a result of increasing maternal and fetal requirements that might limit the treatment modality available to the clinician. These requires a unique set of management considerations for dentist. Dental care should be rendered without adversely affecting the developing fetus and the pregnant female. Lack of knowledge of physiology and metabolic changes in pregnancy and can land clinician with many complications and sometimes fatality. This article presents a comprehensive guideline that are need to be considered seriously in management of a pregnant patient in dental office. 1,2

**KEYWORDS :** pregnancy, dental management, drug use, prenatal counseling, pregnancy granuloma/epulids/tumor

### INTRODUCTION:

Oral health care in pregnancy is often avoided and misunderstood by physicians, dentists and patients. The physical and emotional changes Poor oral hygiene may be a that occur during pregnancy affect the oral precipitating factor. The lesions are often deep health of pregnant women to a greater extent. A few studies have reported the potential effects of periodontal treatment during pregnancy on pregnancy outcomes, periodontal status, and inflammatory biomarkers. Previous researches have demonstrated that the host response to periodontal infection had resulted in the local production of cytokines and biological mediators such as prostaglandins and interleukins, as well as the systemic production of serum antibodies. Here we discuss the medical and dental challenges faced by the pregnant patient in during gestation and the various degrees of the defiance for the practicing clinicians.

The things to be kept in the mind while dealing with the pregnant patient is also discussed in the article.

### CHANGES DURING PREGNANCY:

Two types of changes are seen in pregnancy:

- 1) Medical changes
- 2) Dental changes

### MEDICAL CHANGES

Endocrine changes are the most significant basic alterations that occur with Pregnancy.

**a) FATIGUE:** Common physiological finding during first trimester. Tendency towards Syncope and postural hypotension has also been noted.<sup>2</sup>

During 2<sup>nd</sup> trimester: sense of well being and relatively few symptoms.

During 3<sup>rd</sup> trimester: increasing fatigue, discomfort and mild depression may be reported.

**b) Gastrointestinal System:** Decrease in the lower oesophageal sphincter tone due to inhibition of the production of the peptide hormone motilin by the increased amounts of

progesterone results in the slowing of gastric emptying finally leading to increased episodes of gastric refluxes and regurgitation. Antacids and H<sub>2</sub> antagonist like ranitidine are used to prevent such incidents.<sup>1</sup>

**c) Blood And Hemodynamic Changes:** Anemia and decreased hematocrit value, Clotting factors are increased, Increased WBC count, Immune suppression, Increased oxygen demand. Changes in physiological parameters are summarized in Table 1.<sup>2</sup>

**Table 1- Hemodynamic Changes In Pregnancy (Mean Values)**

PARAMETER	NON-PREGNANT	TRIMES TER 1	TRIME STER 2	TRIMES TER 3
Heart Rate(beats/min)	70	78	82	85
Systolic Blood Pressure(mmHg)	115	112	112	114
Diastolic Blood Pressure(mmHg)	70	60	63	70
Cardiac Output(L/min)	4.5	4.5	6	6
Central Venous Pressure(mmHg)	9.0	7.5	4.0	3.8
Blood Volume(ml)	4000	4200	5000	5600

### D) Immune System Changes:

Suppression of maternal immune system secondary to decreased neutrophil chemotaxis, cell mediated immunity and natural killer cell activity.<sup>2</sup>

### E) Morning Sickness:

Repeated vomiting of the gastric contents. Best to avoid morning dental appointments. Avoid citrus fruits or fatty foods. Dental practitioners should recommend patient to rinse with baking soda and water after vomiting to neutralize acidity in the saliva and prevent enamel erosion.

Dental Management includes a series of investigatory as well as diagnostic procedures and few precautions that are to be taken care of in a case of pregnant patient. Prior to rendering any treatment the clinician should:

- Evaluate patient; determine trimester and health status
- Confirm that medical prenatal care was provided, or facilitate entry into medical care.
- Provide periodontal therapy and oral hygiene instructions
- Educate the patient: Discuss the importance and benefits of good plaque control and fluoride.
- Minimize radiographic exposure
- Minimize drug use.
- Avoid prolonged appointment time in the dental chair

**DENTAL AND ORAL PROBLEMS DURING PREGNANCY**

**Oral Effects During Pregnancy:**

Changes in the gingiva include an increase in gingivitis that usually starts during the second to third month of pregnancy and increases in severity through the eighth month, where it decreases along with the abrupt decrease in hormone secretion. Increased concentrations of circulating estrogen and/or progesterone. Gingival changes are thought to be caused by at least two factors: 1. Increased metabolism of estrogen by gingiva that may increase the sensitivity to irritants, causing inflammation, 2. Increased synthesis of prostaglandins also.<sup>6,7</sup>

Four oral diseases have been described as affecting pregnant women to a greater degree than their non-pregnant counterparts: gingivitis, pregnancy granuloma, periodontitis, and dental caries.

**Gingivitis**

This condition in pregnancy was first described by Pitcarin in 1817. The topic is under debate for many years and there have been questions about the prevalence of periodontal disease in pregnancy, the role that local and hormonal factors may have in the pathogenesis, and the implication of certain microorganisms in the etiology of this disease. Based on clinical observation, the reported frequency of pregnancy gingivitis ranges from 30% to 100% (Fig. 1).



Fig. 1. Pregnancy Gingivitis In A Patient During Pregnancy.

**Etiology**

The causes of gingivitis in pregnancy is because of the host factors and microbial changes. Other than the host factors, increased gingival inflammation which is generally observed in the 2nd month of gestation can be justified with an increase in the circulating levels of estrogen and progesterone. The continuous rise in these two hormone levels up to the 8th month is reflected in the greatest amount of gingival inflammation noted during pregnancy.

**Pregnancy Granuloma/ Pregnancy Tumour/ Pregnancy Epulids:**

The term pregnancy tumor was first coined by Blum in 1912 Reactive lesion usually to local irritants or trauma. Observed in 5 % of the pregnancy and frequently after 1<sup>st</sup> trimester. Elevated levels of progesterone, local irritants and bacteria were effective.

**Histopathology**

Histopathological picture of pregnancy granuloma reveals its real identity and it is composed of capillaries, fibrous tissue,

and inflammatory cells, with marked vascularity being the most characteristic histologic feature. The epithelium is generally thin and atrophic, but may be hyperplastic. If the lesion is ulcerated, it shows a fibrous exudate of varying thickness over the surface and a moderately intense infiltration of polymorphonuclear leukocytes, lymphocytes, and plasma cells. The excessive vascularity accounts for the bright red color, and the hyperemia and edema account for the enlargement.

**Differential Diagnosis**

Pregnancy granuloma may be confused with other small, pedunculated hemorrhagic lesion of the marginal gingival tissue most of which include the following:

1. Peripheral fibroma
2. Pyogenic granuloma
- 3 Peripheral giant granuloma
4. Eosinophilia granuloma
5. Lymphomas or leukemic infiltrates
6. Hemangiomas

Treatment in absence of significant esthetic or functional concern or both, the lesion should not be excised because it may resolve after parturition. Local irritants should be removed. That which are painful, interfere with mastication, continue to bleed or suppurate after mechanical debridement require excision.<sup>8,9</sup>

The clinical picture below (Figure.2) shows the pyogenic granuloma and a significant gingival inflammation as the result of increased circulatory hormonal level.

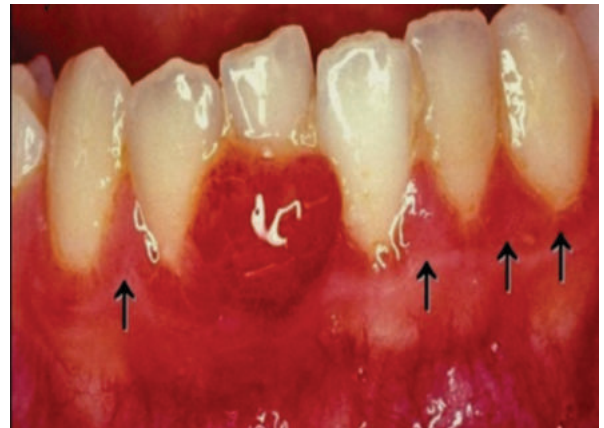


Figure.2

**Prevention Program:**

Ensure the learning of adequate oral hygiene (use of interproximal brushes, dental floss, brushing frequency and technique), with a view to reducing gingival inflammatory response to the local irritants usually associated to the hormonal changes observed during pregnancy.

Scaling, polishing and root planning may be performed whenever necessary during pregnancy. Non-alcohol based rinses should be used. Aggressive surgical treatment is not recommended for these conditions.<sup>2</sup>

**Periodontitis**

Gingivitis is a reversible process, whereas periodontitis results in the loss of tooth attachment and pocket formation. Though gingivitis is often associated with periodontitis, gingivitis does not necessarily develop into periodontitis because the putative pathogenic bacteria in periodontitis differ from those associated with gingivitis and because periodontitis is believed to be dependent on different immune mechanisms. The figure below(Figure.3) shows the clinical picture of a pregnant lady suffering from periodontitis.



Figure.3

**Effects of Periodontal Therapy During Pregnancy:**

OFFENBACHER ET AL has provided evidence that untreated periodontal disease in pregnant women may be a significant risk factor for preterm (< 37 weeks gestation), low-birth-weight (2500 g) infants. Periodontal intervention resulted in a significantly decreased incidence for preterm delivery. Pregnancy without periodontal treatment was associated with significant increases in probing depths, plaque scores, GCF IL-1 $\beta$ , and GCF IL-6 levels. Certain microbiota are seen in higher levels such as *Tannerella forsythia*, *Pgingivalis*, *A. actinomycetemcomitans*, *Treponema denticola*.<sup>10</sup>

Intervention resulted in significant improvements in clinical status (attachment level, probing depth, plaque, gingivitis, and bleeding on probing scores) and significant decreases in levels of *Prevotella nigrescens* and *Prevotella intermedia*, serum IL-6sr, and GCF IL-1 $\beta$ . Data show a 3.8-fold reduction in the rate of preterm delivery, a decrease in periodontal pathogen load, and a decrease in both GCF IL-1 $\beta$  and serum markers of IL-6 response.<sup>6</sup>

**Dental Caries**

The hydroxyapatite which is a constituent of enamel, does not respond to the biochemical and metabolic changes of pregnancy, nor does it respond to changes in calcium metabolism. The thought that morning sickness and vomiting can create an acid pH and therefore increase the decay rate is highly suspect as well. The short-term alteration of the pH of the oral environment is inconsequential compared to the months needed for the development of caries. The figure below (Figure.4) shows the developing occlusal caries in the pregnant patient in her posterior lower jaw.



Figure.4

**PROCEDURES THAT CAN BE DONE AND CANNOT BE DONE IN PREGNANT PATIENT**

**1<sup>st</sup> Trimester:**

Any invasive dental treatment is contraindicated in this time period because of the organogenesis of the fetus and they are most sensitive to radiation and chemicals. Any dental radiography unless and until of prime importance is contraindicated. Only emergency treatment are to be done in this period.

Instructions to oral hygiene and control of dental plaque and periodontal prophylaxis can be done in this time period.

**2<sup>nd</sup> Trimester:**

Comparative to 1<sup>st</sup> trimester second trimester is considered to be safe for any elective dental treatment. Root scaling and planning can be done in 2<sup>nd</sup> trimester as the organogenesis is considered to be completed. Simple restorative procedures that will eliminate potential problems and control active diseases may be performed.

**3<sup>rd</sup> Trimester:**

Scaling and root planning may be repeated to minimize hormonal gingival changes. Emergency dental treatment should be provided as the mother's severe pain, infection, or both can cause problem for the baby.

Complex and elective dental care is best deferred until the baby is born

Radiography is one of the more controversial areas in the management of a pregnant patient. Animal and human data concludes that no increase in gross congenital anomalies or intrauterine growth retardation occurs as a result of exposure during pregnancy less than 5-10 centigray (cGy). **Irradiation should be avoided during pregnancy, especially during the first trimester.** Radiation protection can be of utmost importance. Some of the methodologies include- a. Fast exposure technique, b. Filtration, c. Collimation d. Use of Lead aprons and importantly use of e. ALARA principle. **Maximum permissible dose: 0.005 Gy/5 mSv per year.**<sup>1</sup>

**RVG or CONVENTIONAL RADIOGRAPH**

In case of emergencies radiological investigations cannot be avoided. Although full body CT or MRI is deferred in these cases but conventional IOPA and RVG can be carried out to aid endodontic therapies. If available the clinician should prefer RVG rather than conventional radiograph as the rate and time of exposure is very much less than the conventional one.

**DRUG ADMINISTRATION:**

**Principal Concern:**

Toxic or teratogenicity to fetus. Like any drug causing respiratory depression may cause maternal hypoxia resulting in fetal hypoxia, injury and death.

*Ideally no drug should be administered during pregnancy especially during first trimester.* However, adhering to this rule is sometimes impossible. Before prescribing or administering a drug to a pregnant patient the dentist should be familiar with US FDA Categorization. Table 2- summarizes on commonly used drugs in everyday dental practice.<sup>2,5,11</sup>

**Table 2- Commonly Used Drugs Indentistry And Their Relation To Pregnancy**

GROUP OF DRUGS (USED OUTSIDE DENTAL OFFICE )	SAFE TO USE	UNSAFE/CONRAI NDICATED
Analgesics	Paracetamol (all trimesters) Ibuprofen (1 <sup>st</sup> & 2 <sup>nd</sup> trimester)	Aspirin Ibuprofen (3 <sup>rd</sup> trimester) Diclofenac Naproxen Ketoprofen Ketorolac Diflunisal Etodolac
Antimicrobial	Penicillin group Cephalosporins Erythromycin Azithromycin Clindamycin	Tetracyclines Metronidazole

Antifungal	Nystatin Clotrimazole	Ketoconazole
<b>GROUP OF DRUGS TO BE USED IN DENTAL OFFICE</b>	<b>SAFE TO USE</b>	<b>UNSAFE/CONTRA INDICATED</b>
Local Anesthetics	Lignocaine Prilocaine	Bupivacaine

**1) Anaesthetics:**

Local anaesthetics administered with epinephrine are considered relatively safe for use during pregnancy and are assigned to pregnancy risk classification categories B and C.

Although both the local anaesthetic and the vasoconstrictor cross the placenta, sub toxic threshold doses have not been shown to cause foetal abnormalities. Concerns include risk for methemoglobinemia with high-dose prilocaine and articaine, as well as embryocidal effects associated with toxic doses of bupivacaine. The Collaborative Perinatal Project showed that the administration of benzocaine, procaine, tetracaine, and lidocaine during pregnancy did not result in an increased rate of foetal malformations.

**It Is Commonly Dispensed In A 1:100,000 Epinephrine Concentration, Or 10 g mL.**

The concern is that the accidental intravascular injection of 15 g of epinephrine will cause uterine artery vasoconstriction and decreased uterine blood flow. However, clinically significant doses of adrenergic agents must be avoided to preserve placental perfusion and fetal viability<sup>2,3</sup>

**2) Analgesics:**

The analgesic of choice during pregnancy is acetaminophen (category B).

Aspirin and nonsteroidal anti-inflammatory drugs convey risks for constriction of the ductus arteriosus, as well as for postpartum haemorrhage and delayed labour. Risk increases if administered during 3rd trimester. Risk is more closely associated with prolonged administration and high dosage that can lead to congenital abnormalities and respiratory depression.<sup>2</sup>

**3) Antibiotics:**

Penicillin, erythromycin (except in estolate form), and cephalosporin (first and second generation) are considered safe for the expectant mother and the developing child. However, these antibiotics have lower maternal blood levels compared with controls because of a shorter half-life and increased volume of distribution.

Blood volume and creatinine clearance increase in the pregnant patient. This can lead to a lower serum concentration of antibiotics in the pregnant patient versus the non pregnant patient. The use of metronidazole in pregnancy is controversial. Although it has not been associated with adverse foetal effects, it is currently recommended for use in the second and third trimesters only, with an FDA classification of B. *Tetracycline has an FDA classification of D and should be avoided in pregnant patients.*<sup>2,3</sup>

**4) Anxiolytics:**

The following guidelines are used if Nitrous oxide is used during pregnancy

- 1) Use of N<sub>2</sub>O-O<sub>2</sub> should be minimized to 30 min.
- 2) At least 50 % oxygen inhalation should be delivered to ensure adequate oxygenation at all times.
- 3) Appropriate oxygenation should be provided to avoid diffusion hypoxia at the termination of administration.
- 4) Repeated and prolonged exposures to nitrous oxide are to be prevented.
- 5) The second and third trimester is safer periods for treatment because organogenesis occurs during the first trimester.<sup>2</sup>

**PATIENT POSITION DURING TREATMENT PROCEDURE-**

During any dental procedure on a pregnant patient the patient should be placed in Left lateral decubitus position. Fig.5 and fig.6



Figure 5

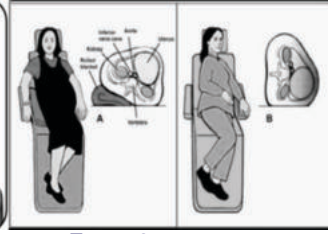


Figure 6

During late pregnancy, there are chances for Supine Hypotension Syndrome (Figure.7). Impaired venous return to the heart that results from compression of inferior vena cava by gravid uterus. So, when working on a gravid patient, the position of the patient is utmost important. The ideal position of the gravid patient in the dental chair is the left lateral decubitus position with the right buttock and hip elevated 15°. A preventive 6-inch soft wedge (rolled towel) should be placed on the patient's right side when she is reclined for the treatment.<sup>2,3</sup> (Figure 5)

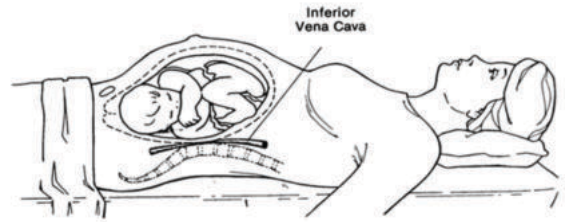


Figure.7

**How To Prevent Dental Diseases During Pregnancy**

Normal pregnancy does not necessarily contraindicate dental treatment if the stage of gestation and the extent of dental procedures are taken into account. The first trimester is the period of organogenesis. In addition, 75–80% of spontaneous abortions occur before the 16th week of gestation. Fetal sensitivity to the environment is most critical after the 30th week of gestation.

During a patient's first trimester, initiate a preventive care program consisting of plaque control and oral hygiene instruction. Simple scaling and oral prophylaxis may be accomplished, but no elective treatment should be started. Only emergency dental needs should be considered during this trimester.

Local irritants should be removed early on prior to the amplified hormonal effects of inflammation are manifested in the gingival tissues.

In the event that emergency treatment is indicated, it should be performed anytime during gestation to eliminate any associated physical or emotional stress. The pain and anxiety precipitated by a dental emergency may be more detrimental to a fetus than the treatment itself.

- Specific prevention of oral/dental diseases may include :**
- 1) Prenatal counseling
  - 2) Prenatal fluoride therapy
  - 3) Dietary advise

Essential elements of prenatal counseling for oral health

**PURPOSE:**

To educate parents about the dental development of the child and dental disease and Prevention, to provide suitable environment to child, strengthen and prepare the child and his or her dentition for life.

**METHODS:**

Education on development, prevention, Demonstration of oral hygiene procedures, counseling to instill positive attitude and motivation, Evaluation of patients learning, acceptance and needs.

**CONTENTS:**

Parents oral health, Education of parents about the dental disease processes and oral hygiene, to reduce the bacterial load and effect of transmission and prematurity, Motivation of parents for plaque removal and oral hygiene to improve their own health and to help their expected child, Discuss changes in maternal oral health; changes in gingival health, risk of caries from Carbohydrates, myths of pregnancy and needed dental treatment and when to best accomplish it.

**Child's Oral Health:**

Child development, including oral, emotional and general development affecting oral health and oral health delivery, Effect of lifestyle on the child, Post natal period: teething, tooth eruption patterns, timing of first dental visit, bottle use.

**Prenatal Fluoride Therapy:**

Fluoride plays a significant role in arresting and the progression of caries, it also have the potential of prevention of caries. Despite of such a strong influence of use of fluoride in dentistry its considered as controversial to use in the pregnant lady. Theory suggests that maternal body has the ability to impart caries protection to the fetus. On the same side fluoride seems to pass through placenta and the amount of fluoride that reaches to the fetus is still unknown. Because of the lack of supporting evidences in the favour of fluoride prenatal fluoridation has been discontinued in United States since 1960s

**Dietary Advice To Pregnant Patient :**

According to National Maternal And Child oral Health Policy, pregnant patient should eat a variety of healthy foods such as fruits, vegetables, grains.

Drink water throughout the day especially between meals and snacks. To reduce the risk of birth defect one should take 600 micrograms of Folic acid everyday throughout pregnancy. Source of Folic acid is broccoli, leafy green vegetables, legumes, papaya, orange and tomato.

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