

REVIEW ARTICLE***Dental health care protocols during pregnancy.***Robina Rose Mathew¹, Devendra Chaudhary².**Abstract**

Oral health care is often overlooked and avoided by the patients and by many physicians and dentists. The Pregnant patient does not have to be considered as medically compromised, but rather as one requiring Modified treatment. In which the benefits derived from the treatment should overweigh the potential risks. Complex hormonal interactions and an increase of estrogen by 10 fold and progesterone by 30 folds along with the fetal growth, causes systemic as well as physical changes in a pregnant women. The list of changes in the different organ systems are boundless, however being briefly described.

Introduction

Pregnancy is a period of excitement and anticipation in the life of a women and staying healthy is essential. Prenatal health care involves making good choices and habits in order to have a healthy lifestyle during the course of pregnancy. In this frame of reference Oral health care is often overlooked and avoided by the patients and by many physicians and dentists. The Pregnant patient does not have to be considered as medically compromised, but rather as one requiring Modified treatment. In which the benefits derived from the treatment should overweigh the potential risks¹.

Physiologic adaptations to pregnancy and the significance while treatment:

Complex hormonal interactions and an increase of estrogen by 10 fold and progesterone by 30 folds along with the fetal growth, causes systemic as well as physical changes in a pregnant women. The list of changes in the different organ systems are boundless, however being briefly described.

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Cardiovascular system:

The increase in the serum mineralocorticoids induces sodium retention, owing to an increase in Plasma volume to 30- 40% along with a 10 – 15% increase in the Red blood cell volume. These changes start at early pregnancy upto the 30th week of gestation. When it occurs that the plasma volume increases ahead of the RBC volume this results in dilution anemia. Dilution anemia decreases the colloidal osmotic pressure promoting the extravasation of fluid, contributing to the occurrence of edema. Other changes worth to be noted are the decrease in blood pressure during early gestation period and susceptibility to postural hypotension as a result of vasomotor instability. Hence changing the dental chair positions should be done slowly. Decubitus hypotension syndrome or the vena cava syndrome is observed nearing the final phase of the pregnancy, as a result of a difficulty in the venous return to the heart, which is caused by compression of the inferior vena cava by the gravid uterus ². This condition manifests as a sudden drop in the blood pressure, with nausea, dizziness and fainting, when the patient is in the horizontal position. Therefore while on the dental chair, the pregnant patient should be positioned to the left lateral position keeping their right hips slightly raised (10-12 cm) and inclined to the left.

Respiratory system:

During pregnancy, patients very often have edema, nasal congestion, tendency for epistaxis. There is reduction in the Functional respiratory capacity due to the diaphragm being elevated due to the gravid

uterus. These can clinically result in lower tolerance to apnea and dyspnea. Making nasal breathing more difficult, this can gradually verge onto mouth breathing⁵. Occasionally resulting in Xerostomia, which is a predisposing factor for increased caries index.

Gastro intestinal system:

Hormonal effects of progesterone includes the decrease lower esophageal tone, inhibition of gastric and intestinal mobility, decreased volume of gastrointestinal secretions. All these results in delayed gastric emptying, gastro intestinal reflux/ Heart burn , nausea and vomiting. For patients with Hyper- emesis gravidarium (excessive vomiting), morning appointments should be avoided³.

Hematologic:

There is increase in certain clotting factors (V,VII, VIII, X and XII) and decrease in the anticlotting factors (IX and XIII). Hence pregnancy is considered as a 'hypercoagulable state' with an increased risk of thromboembolism upto 4- 5 times than when not pregnant. The 2 manifestations are deep vein thrombosis and pulmonary embolism, which are common in the first half of pregnancy³. Pregnant women with the Anti- phospholipid syndrome therefore are at high risk of thromboembolism, these patients are hospitalized for dental care as they are placed on subcutaneous low molecular weight heparin.

Immune system:

To allow the developing embryo to implant some of the cells actively invade the womb lining. This leads to an inflammatory cascade. This pro inflammatory stage dominated the first 12 weeks. During the following 15 weeks the fetus is in rapid growth, the Anti inflammatory stage prevails. During the final stage, the immune system switches back to the pro inflammatory stage without which the mother cannot go into labor¹⁹. Thus, Pregnancy is a unique immunological state, that is maintained in a highly orchestrated manner. The natural killer cells and neutrophils have enhanced action during pregnancy. There is the STAT5 pathway helping the regulatory T cell which are specialized form of white blood cells and are responsible for the immune tolerance.

Although maternal immune response changes during pregnancy these changes normally do not adversely affect the integrity of the mother. However pregnant mothers are more sensitive to some infections.

Your Teeth: What to expect when Pregnant-

Although many women make it nine months with no dental discomfort, pregnancy can make some conditions worse – or create new ones. Regular checkups and good dental health habits can help keep you and your baby healthy⁶.

Erosion:- Morning sickness is common in the first trimester and followed by the gastric reflux that happens in the later months due to the changes in the gastro intestinal system attribute to the more acidic environment of the oral cavity during pregnancy. Thus frequent vomiting results in damage to enamel and tooth erosion especially in the palatal/ lingual surface of teeth. The patient is advised not to brush suddenly after episodes of vomiting, instead wash the mouth with cold water. In these cases fluoride treatment and restorations can control sensitivity and discomfort to dentition.

Dental caries:- Pregnant women are at higher risk of **Tooth Decay** due to increased acidity in the oral cavity, frequent sugary dietary cravings, limited attention to oral health. Early caries appears as white, demineralized areas that later break down into brownish cavitations⁷. Untreated dental caries can lead to oral abscess. Patients with untreated caries and associated complications should be referred to a dentist for definitive treatment.

Gingivitis:- Seen throughout pregnancy but mostly during first trimester. The elevated circulating estrogen increases the capillary permeability and an amplified inflammatory reaction to local irritants and certain plaque bacteria (such as *P. intermedia*, *P. gingivalis*) that feed on estradiol are implicated in the etiology of maternal gingival inflammation³. Often pre existing gingivitis may predispose to pregnancy gingivitis. Plaque related changes can range from mild gingivitis to destructive periodontitis. Thorough oral hygiene measures including brushing twice daily with soft bristle tooth brush, careful flossing and use of chlorhexidene mouth rinses are recommended.

Periodontitis:- is a destructive inflammation of the periodontium. Pregnancy does not cause Periodontitis but can aggravate the prevailing condition. Toxins produced by the bacteria stimulate a chronic inflammatory response, and the periodontium is broken down and destroyed, creating pockets that become infected. Eventually, the teeth loosen. This process can induce bacteremia, which indirectly triggers production of cytokines, prostaglandins and interleukins. Elevated levels of these inflammatory markers have been found in the amniotic fluid of women with periodontitis and preterm birth compared with healthy control patients. Xylitol and chlorhexidine lower maternal oral bacterial load and reduce transmission of bacteria to infants when used late in pregnancy and/or in the postpartum period. Both topical agents are safe in pregnancy and during breastfeeding⁴.

Pregnancy oral tumor/ Pyogenic granuloma/ Epulis gravidarum:- is a vascular lesion is caused by increased progesterone in combination with local irritants, overhanging restoration and bacteria. Lesions are typically erythematous, smooth, and lobulated; located on the labial interdental papilla between anterior teeth⁴. The tongue, palate, or buccal mucosa may also be involved. Pregnancy tumors are most common after the first trimester, grow rapidly, and typically recede after delivery. Management is usually observational unless the tumors bleed, interfere with mastication.

Dental treatment for Pregnant Patient:

First trimester (1- 12 weeks):

Organogenesis occurs during the first trimester and the fetus is at a high risk of teratogenesis (congenital malformations in embryo). Also, this part of pregnancy poses chances of spontaneous abortion. If treatments happen to be done on near this time, it could create concerns for both the patient and the doctor as to if it could have been avoided².

Second Trimester (13- 24 weeks):

By this time organogenesis is complete, the risks to foetus is low and uterine size has not increased to the extent that sitting in the dental chair is uncomfortable. Propping a woman on her left side,

often repositioning, and keeping visits brief can reduce problems.

Further as the uterus increases in size with the growing fetus and the placenta, it comes to lie directly over the inferior vena cava, the femoral vessels, and the aorta. Hence care should be given to avoid supine chair position. As this could result in the Supine hypotensive syndrome, which occurs due to the compression of the inferior vena cava and aorta by the fetus. Characterized by symptoms such as weakness, pallor, decreased blood pressure, light headedness, syncope in severe conditions unconsciousness and convulsion. Such a condition can be prevented, by having a full term pregnant patient roll on her left side with right hip elevated to 10 – 15 cm by the aid of pillows or rolled towels and head above feet level⁵.

Third Trimester (25- 40 weeks)

Since the uterus is now fully grown patient position on the dental chair has to be taken care of. During this phase the focus is primarily on forthcoming birth process and safety and comfort of the patient is the major concern. It is preferable to any treatment necessary in the first part of the trimester.

Therefore as a final thought, Coronal scaling, polishing and root planing maybe performed at any time as required to maintain oral health. Emergency dental work such as root canal treatment or extraction is necessary and to be ideally done in the second trimester. Where as elective procedures such as tooth whitening and other cosmetic restorations should be postponed until after birth⁶.

Dental radiography-

X-rays are a type of electromagnetic radiation that have the ability to ionize the material through which it passes. Ionizing living matter results in a damage to the cells or the DNA. Depending on the amount of radiation and the stages of pregnancy, a damage to the foetal cells may result in miscarriages, birth defects or mental impairment. The American Dental Association (ADA) states that routine or “administrative” x-rays should be avoided during pregnancy, but pregnancy is not a reason to delay clinically indicated dental radiographs for emergency diagnostic purposes. Because the dental radiation

exposure of the fetus is negligible. The teratogenicity of the radiation depends on the fetal age and the dose of the radiation. The greatest risk to the fetus for teratogenicity and death, is during the first 10 days after the conception¹⁴. The most critical period of the fetal development is between 4-18 weeks after the conception. The National Commission for Radiation Protective (NCRP) recommends that the cumulative fetal exposure to radiation should not exceed more than 0.20 Gy, which can cause microcephaly and mental retardation. Modern fast film, avoidance of retakes, and use of double lead aprons and thyroid shields, rectangular collimation all limits the risk. A single dental X- ray exposes the patient to 0.01milli rads of radiation. Also during procedures like root canal treatment use of apex locators act as adjunct to radiographs.

Medications during Pregnancy:

Ideally, no drug should be administered during the first 13 weeks, especially not between 18 – 60 days of pregnancy. The primary concern is that the drug-will cross the placenta, producing teratogenic effects. Fortunately, most of the common agents routinely prescribed by the dental profession can be used with relative safety; however, better consultation with the patient’s obstetrician¹⁰. To manage dental pain, Acetaminophen (FDA pregnancy category B) are based on short-term use (over 2 or 3 days), Local anesthetics such as Lidocaine (Xylocaine; FDA pregnancy category B) mixed with the 1:100,000 epinephrine (FDA pregnancy category C) are safe for procedures when dosed appropriately with the aspiration technique. Penicillin, Amoxicillin, and Cephalexin (FDA pregnancy category B) are reasonable first-line antibiotics. Erythromycin base and succinate (not erythromycin estolate, which is associated with Cholestatic hepatitis in pregnancy) or Clindamycin (FDA pregnancy category B) can be used in the Penicillin–allergic patient. Drugs under FDA category C,D and X should be strictly avoided in during pregnancy and lactation. Metronidazole a category B drug is contraindicated during first trimester and lactating mother should avoid feeding 12 to 24hrs after intake of this drug¹¹.

U.S. Food and Drug Administration (FDA) drug risk categories-

Category	Definition	Explanation
A	Generally accepted	Controlled studies in pregnant woman show no evidence of fetal risk.
B	May be acceptable	Either animal studies show no risk but human studies not available or animal studies showed minor risks and human studies were done showing no risks.
C	Use with caution if benefits outweigh risks	Animal studies show risk and human studies not available.
D	Use only in life threatening emergencies when no safer drug available.	Positive evidence of human fetal risk.
X	DO NOT use in pregnancy	Risks involved outweigh benefits. Safer alternatives exist.

Commonly used drugs in the Dental office:

	Category B	Category C	Category D
Analgesics	Acetaminophen		Aspirin, Ibuprofen
Antimicrobials	Amoxicillin Cephalexin Chlorhexidine Clindamycin Erythromycin	Ciprofloxacin	

	n		
Local Anesthetic	Lidocaine Prilocaine	Articaine Epinephrine Bupivacaine	

Obstetric Emergency in Dental Clinic-

Although pregnancy is not a pathologic entity, it may precipitate events requiring emergency intervention by the dentist, the involvement of the local emergency medical services, or consultation with the patient’s obstetrician⁹. The pregnant patient may present with respiratory emergencies ranging from hyperventilation to apnea. If the patient has a pulse and is nonresponsive, you may suspect syncope. Syncope can be caused by hypotension, hypoglycemia, anemia, dehydration, neurogenic disorders, and emotional change¹³. Glucose abnormalities, such as gestational diabetes, are another common complication of pregnancy. The most common diabetic emergency in the dental office is from hypoglycemia. In a known diabetic patient with symptoms of nausea, transient weakness, and/or syncope with strong vital signs, a hypoglycemic episode should be suspected. Eclampsia, seizure of pregnant patient is a syndrome which includes hypertension, proteinuria, edema, and convulsion. Morning sickness, also known as Hyperemesis gravidarum, increases the risk of aspiration of vomitus due to the patient’s enhanced gag reflex and decreased gastric emptying time¹⁷.

Conclusion:

Preventive measures such as frequent updating of medical records, consulting with her obstetrician, reinforcing oral hygiene, dental examinations, and dental prophylaxis during your patient’s pregnancy may reduce the risk of dental emergencies during gestation. Treatment modifications include shorter appointments, keeping the patient in a semi-reclined and left lateral position, allowing the patient to change positions frequently during her dental

appointment, practicing radiation hygiene measures and adherence to precautionary and dose related strategies while prescribing drugs. In the event of a dental or medical emergency for the pregnant patient, preparation for such occurrences improves expected outcomes and reduces risks for both the patient and the practitioner¹⁸. Nevertheless pregnancy is time when women may be more motivated to make healthy changes.

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