Dental Management of a Pregnant patient

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Pregnancy is a state of physiological condition that brings about various changes in the **oral cavity** along with other **physiological changes taking place throughout the female body.** These can include changes in the cardiovascular, respiratory and gastrointestinal systems.

Changes in Pregnancy

- **Blood Chemistry**
  - Increased number of blood cells
  - Increased clotting factors
  - Increased fibrinolytic activity
  - Iron deficiency and anemia
- **Cardiovascular System**
  - Tachycardia
  - Increased cardiac output and heart rate
  - Increased stroke volume
- **Respiratory System**
  - Displacement of diaphragm superiorly
  - Decreased functional reserve capacity
  - Increased the risk of apnea and dyspnea
  - Hyperventilation
- **Gastrointestinal System**
  - Nausea and vomiting
  - Heart burn and acidity
- **General Changes**
  - Mode and behavioral changes
  - Increased nutritional demands

Systemic Changes:

Gastrointestinal System

The stomach is displaced superiorly as the **uterus increases in size**, which **increases intragastric pressure., acidity, vomiting ,**

The increase in **progesterone levels causes a decrease in lower esophageal tone and gastric and intestinal motility**.

The combined effects of hormonal and mechanical changes in the gastrointestinal system and greater sensitivity of the gag reflex also increases the risk of gastric acid reflux.

The stomach is displaced superiorly as the uterus increases in size, which increases intra-gastric pressure.

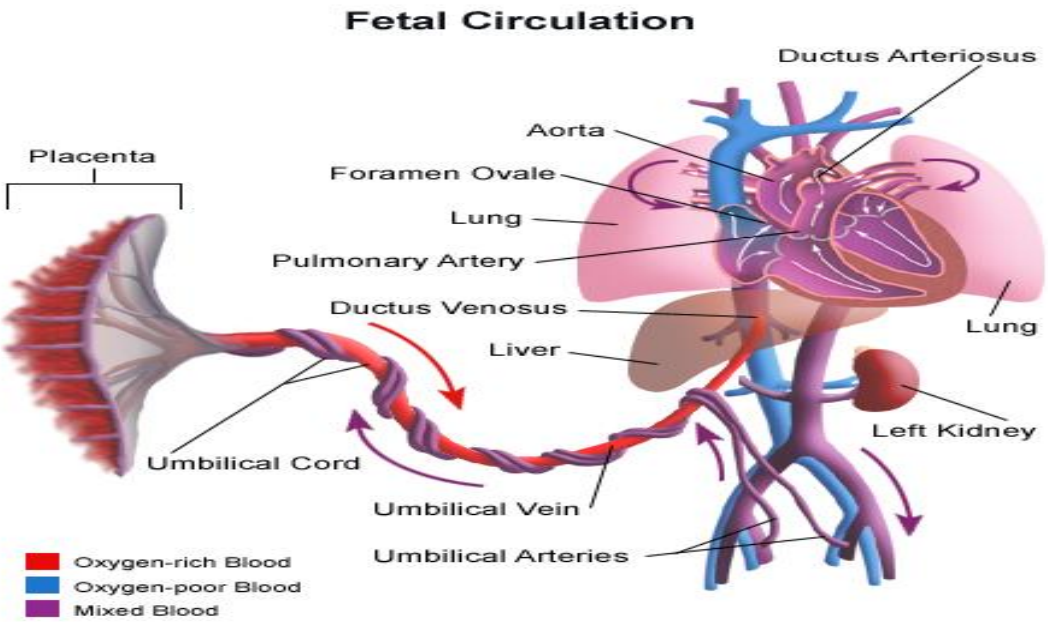
Liver dysfunction may lead to preeclampsia (a placental-induced triad of hypertension, proteinuria, and edema)

Cardiovascular System:

Increases in cardiac output, plasma volume and heart rate.

Postural hypotension due to vasomotor instability .

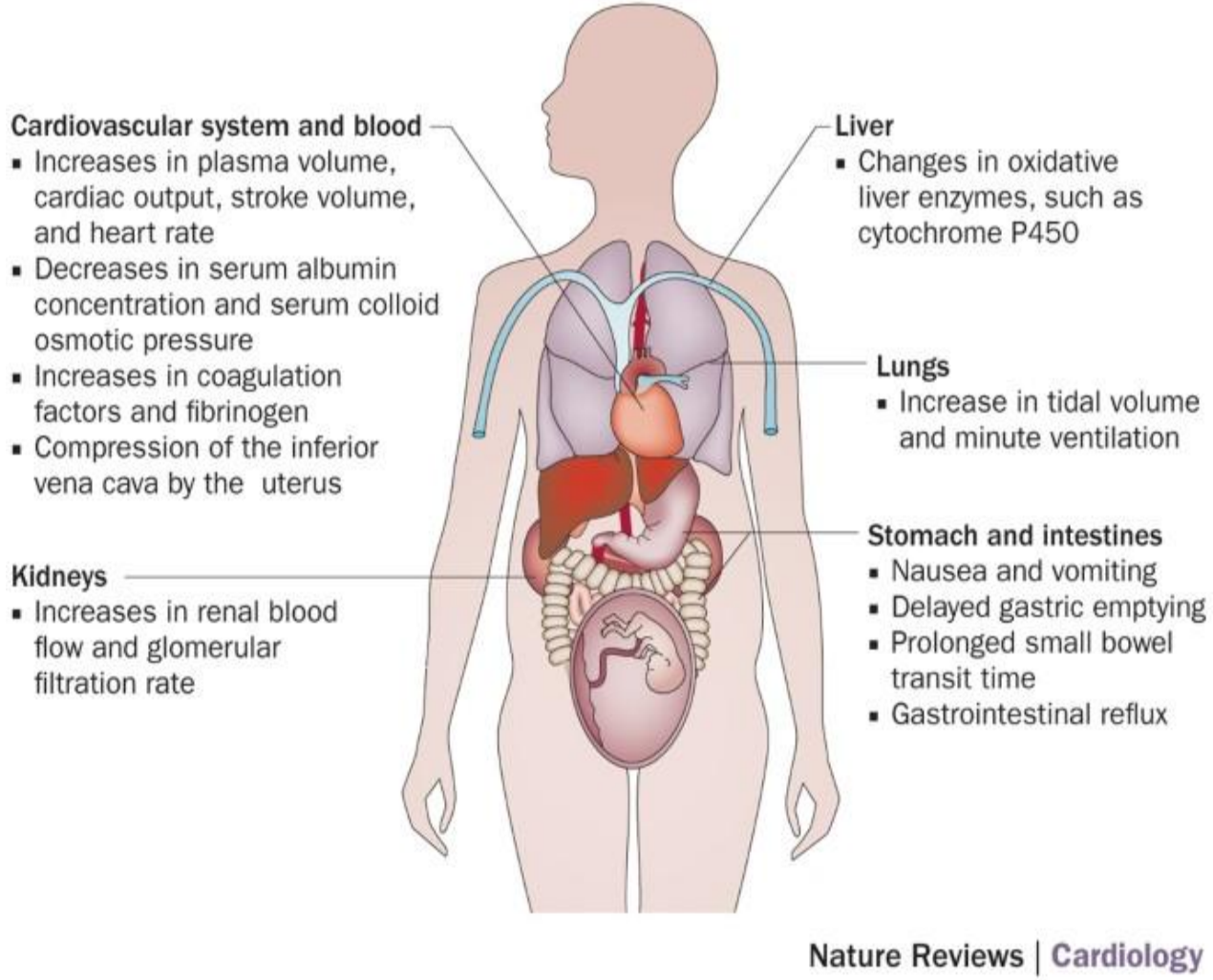
As the uterus increases in size, it causes **pressure on** the **vena cava** and **aorta**, which can result in **decreases in cardiac output**, **venous return** and **utero placental blood flow**, thus **supine hypotension syndrome**.



Respiratory System

Increased estrogen production during pregnancy causes the capillaries in the mucosa of the nasopharynx to become engorged, which results in edema, nasal congestion and predisposition to epistaxis.

Nasal breathing becomes more difficult, and there is a tendency to breathe with the **mouth open**, especially at night.



Renal and genitourinary System

Increased glomerular filtration rate (GFR), biochemical changes in the urine and blood and increased frequency.

Due to increased filtration, clearance of creatinine, uric acid, and urea is increased

Common dental problems during pregnancy

Like any other system, the oral cavity exhibits a number of changes during pregnancy and thus requires special attention by the dental care professionalsز

Oral health is essential in general health and well-being to maintain overall quality of life.
Pregnancy is a natural physiological process accompanied by temporary changes in women's physical structure, hormone levels, metabolism, and immune systems .
An increased carbohydrate consumption, vomiting acid, reduced saliva production, and an increased acidity of saliva are associated with pregnancy; however, this may alter the risk of oral diseases, such as periodontal disease and dental caries .
Changing oestrogen levels and progesterone makes the mouth absorbent and the host's immune system less efficient, increasing the chance of a dental infection .
It has been **observed that dental caries and gingivitis occurred 1.97 times and 1.81 times more frequently in pregnant women than in non-pregnant women**, respectively.
Gingivitis and periodontal diseases are associated with adverse pregnancy outcomes, including preterm birth (PTB) and low birth weight (LBW) . Pregnant women are more likely to develop gingivitis, an early stage of periodontal disease, which occurs when the gums become red and swollen from inflammation that could be aggravated by hormonal changes during pregnancy
Complex **psychological** and **physiological** changes occur in **women's body during pregnancy**. These changes affect **both oral health status** and **oral health-related quality of life (OHRQoL)**.

Facial changes as "**mask of pregnancy**," appearing as bilateral brown patches in the mid-face begin during the first trimester and are seen in up to 73% of pregnant women.

It's common to develop blotchy spots of darker skin when you're pregnant, a condition **called melasma** or **chloasma. Women with darker complexions** are more likely to have **melasma than women with lighter skin**.

Changes in skin pigmentation due to melasma usually disappear on their own after delivery Melasma usually resolves after parturition. **Preterm low birth weight baby reported with periodontal disease**. It seems to be an independent **risk factor and was decreased by good oral hygiene and periodontal treatment**.

Dental care in pregnancy

Pregnancy causes many changes in the physiology of the female patient. These alterations are sometimes subtle but can lead to disastrous complications if proper precautions are not taken during dental treatment.

Physiologically, changes occur in the **cardiovascular**, **hematologic**, **respiratory**, **gastrointestinal, genitourinary**, **endocrine**, **and oro-facial systems.**

The changes that occur are the result of increasing maternal and fetal requirements for the growth of the fetus and the preparation of the mother for delivery.

Increased hormonal secretion and **fetal growth induce several systemic**, as well as **local physiologic** and **physical changes in a pregnant woman**.

Local physical changes occur in different parts of the body, including the oral cavity. These collective changes may pose various challenges in providing dental care for the pregnant patient.

Treatment of the pregnant patient has the potential to affect the lives of two individuals (**the mother** and the **unborn fetus**).

Certain principles must be considered in the treatment of the pregnant patients so that, **it benefits to the mother while minimizing the risk to the fetus**

Dental Care During Pregnancy

SCREENING AND PREVENTION

Every pregnant woman should be assessed for dental hygiene habits, access to fluoridated water, oral problems (e.g., caries, gingivitis), and access to dental care. Oral examination should include the teeth, gums, tongue, palate, and mucosa. Patients should be counseled to perform routine brushing and flossing, to avoid excessive amounts of sugary snacks and drinks, and to consult a dentist. Status of and plans for oral health should be documented. Many dentists are reported to be reluctant to treat pregnant women.[24] Physicians and dentists can overcome this situation through education, clear communication, and the development of ongoing collaborative relationships. Physicians can share information on the safety of dental treatment in pregnancy with dental colleagues and provide clear referral recommendations.

CARIES RISK REDUCTION IN CHILDREN

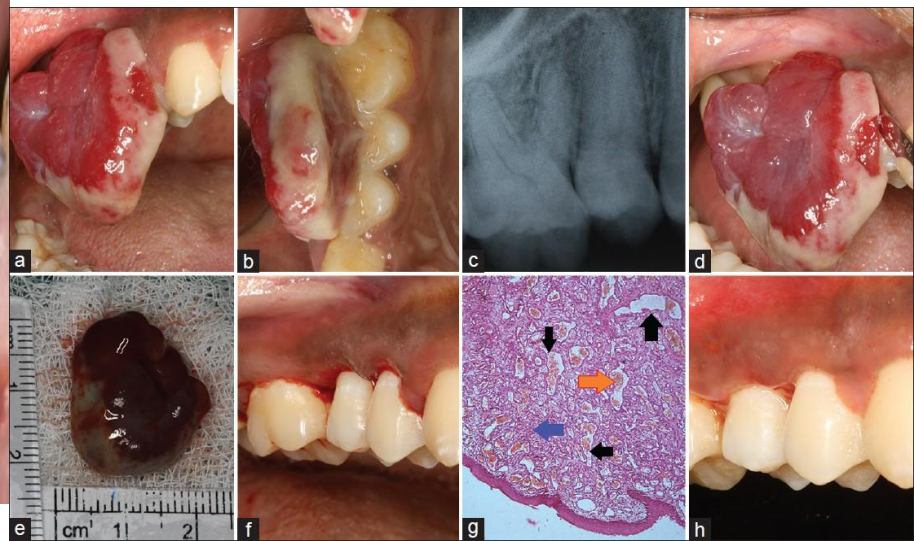
Xylitol and chlorhexidine lower maternal oral bacterial load and reduce transmission of bacteria to infants when used late in pregnancy and/or in the postpartum period. Both topical agents are safe in pregnancy (U.S. Food and Drug Administration [FDA] pregnancy category B) and during breastfeeding.Studies have used different dosing levels, and the optimal dose for consistent prevention is unclear.

PREGNANCY ORAL TUMOR:

The life cycle of a woman unfolds into different phases as the hormonal response influences it. It can be divided into many stages such as **childhood**, **puberty**, **reproductive phase**, **pregnancy**, and **menopause**. The periodontium of a woman is sensitive in all these stages as the hormones produce a conditioned response to the existing gingival status. Pregnancy tumor is a gingival enlargement commonly initiated due to conditioned response of hormones in pregnant women.

Pregnancy oral tumor occurs in up to **5 percent of pregnancies** and is indistinguishable from pyogenic granuloma. This vascular lesion is caused by increased progesterone in combination with local irritants and bacteria. Lesions are typically **erythematous**, **smooth**, and **lobulated**; they are located **primarily on the gingiva**.

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, or do not resolve after delivery. **Lesions surgically removed during pregnancy are likely to recue**



LOOSE (MOBILE) TEETH

Teeth can loosen during pregnancy, even in the absence of gum disease, because of increased levels of progesterone and estrogen affecting the periodontium (i.e., the ligaments and bone that support the teeth).

For uncomplicated loose teeth not associated with periodontal disease (see below), physicians should reassure patients that the condition is temporary, and alone it will not cause tooth loss.

GINGIVITIS

Gingivitis is the most common oral disease in pregnancy, with a prevalence of 60 to 75 percent.Approximately one half of women with preexisting gingivitis have significant exacerbation during pregnancy.

Gingivitis is inflammation of the **superficial gum tissue**. During pregnancy, gingivitis is aggravated by **fluctuations in estrogen and progesterone levels in combination with changes in oral flora and a decreased immune response**.

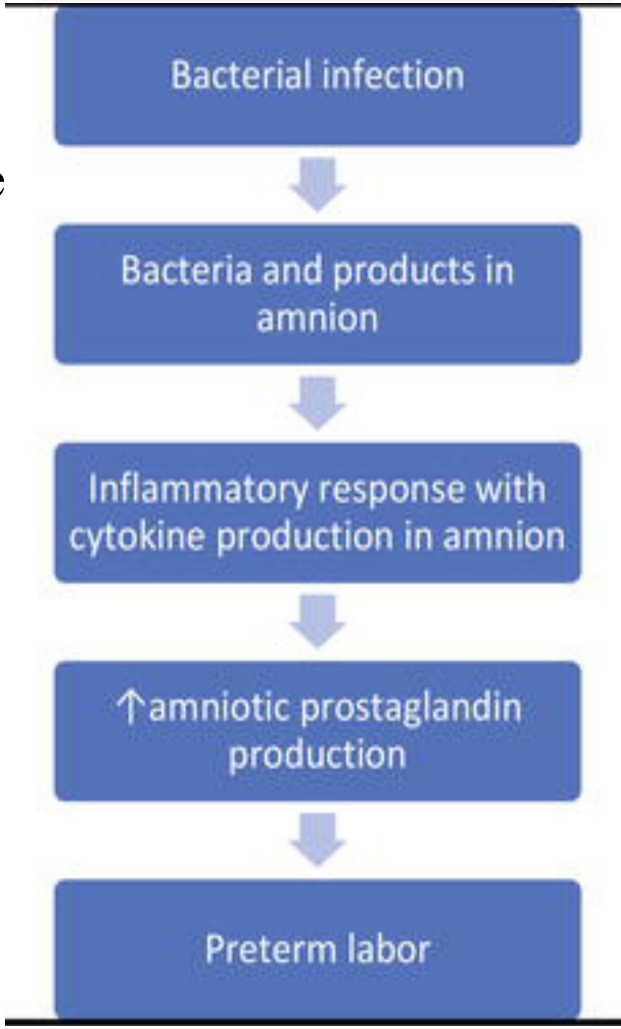
Thorough oral hygiene measures, including tooth brushing and flossing, are recommended. Patients with severe gingivitis may require professional cleaning and need to use mouth rinses such as chlorhexidine (Peridex).

PERIODONTITIS

Periodontitis is a destructive inflammation of the periodontium affecting **approximately 30 percent of women of child-bearing age**.**The process involves bacterial infiltration of the periodontium**. 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 recurrent bacteremia, which indirectly triggers the hepatic acute phase response**, resulting in production of **cytokines**, **prostaglandins (i.e., PGE2),** and **interleukins (i.e., IL-6, IL-8)**, **all of which can affect pregnancy**.

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**.

In one study, researchers found minimal oral bacteria in the amniotic fluid and placenta of women with preterm labor and periodontitis.It seems probable that this inflammatory cascade alone prematurely initiates labor.
The mechanism is thought to be similar for low birth weight; the release of PGE2 restricts placental blood flow and causes placental necrosis and resultant intrauterine growth restriction.



Periodontitis and Poor Pregnancy Outcomes
Periodontitis has been associated with several poor pregnancy outcomes, although the mechanism by which this occurs **remains unclear** and **controversy exists**.
Preterm birth is the leading cause of neonatal morbidity in the United States, costing **approximately $26.2 billion per year.**
Studying the direct effect of any risk factor on the outcomes of preterm birth and low birth weight is extremely difficult because of the many confounding variables that may affect the same outcome.

Studies that involved more black patients had participants with more periodontal-related preterm labor. Another possible explanation is that **treating periodontitis during pregnancy is too late to achieve a positive result**.
The focus should be on **improving the condition before pregnancy**

Management :

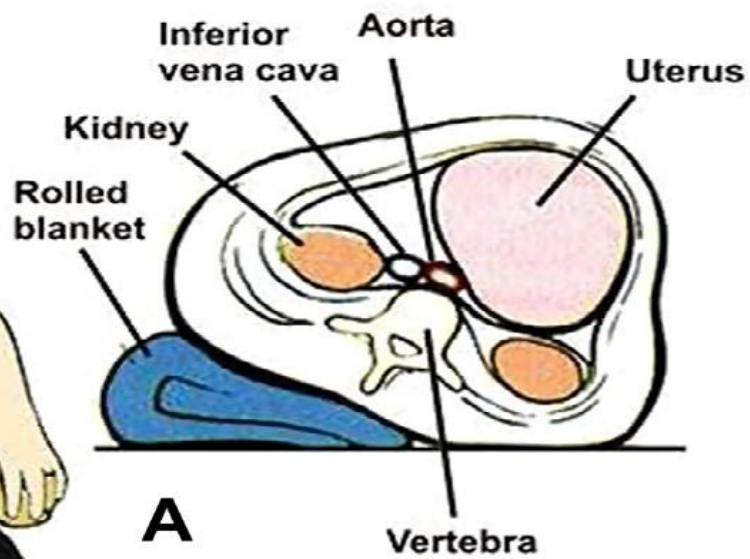
The management of periodontitis in pregnancy is based **on early diagnosis and deep root scaling**. The authors of one RCT demonstrated that deep root scaling reduced the risk of birth **before 37 weeks**' gestation (preterm birth), with **a risk reduction of 0.5** (confidence interval [CI], 0.2 to 1.3).

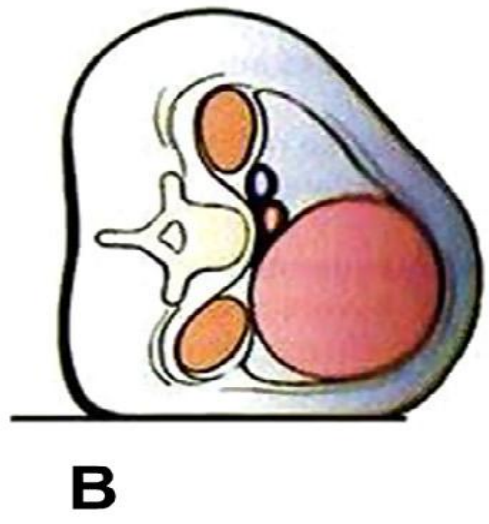
For birth before 35 weeks' gestation (very preterm birth), the risk reduction was 0.2 (CI, 0.02 to 1.4) for women with periodontitis.
In another RCT of deep root scaling combined with patient education, regular plaque removal, and routine chlorhexidine rinses, researchers also noted a reduction in the incidence of preterm low birth weight (risk reduction, 0.18; CI, 0.05 to 0.6).

These studies, in addition to a recent U.S.-based RCT that found no benefit of treatment,reported no harm to the mother or fetus from treatment of maternal periodontal conditions.
Women with preexisting periodontal disease can reduce the risk of recurrence or worsening disease during pregnancy through proper oral hygiene.

The American Academy of Periodontology recommends that all women who are pregnant or planning to become pregnant undergo a periodontal examination and any necessary treatment.

Dental chair positioning and pregnancy





DIAGNOSIS

Dental radiography may be performed in pregnancy for acute diagnostic purposes.When possible, radiography should be **delayed until after the first trimester**.

Screening radiography should be deferred until after delivery. Modern fast film, **avoidance of retakes**, and use of **lead aprons and thyroid shields all limit risk**.

The teratogenic risk of radiation exposure from oral films is 1,000 times less than the natural risk of spontaneous abortion or malformation.

ROUTINE DENTAL TREATMENT

Ideally, dental procedures should be scheduled during **the second trimester of pregnancy** when organogenesis is complete.

Urgent dental care can be performed **at any gestational age**.

The third trimester presents the additional problems of **positional discomfort** and the **risk of vena caval compression**.

Propping a woman on her left side, repositioning often, and keeping visits brief can reduce problems.

Deferring dental care until after delivery can be problematic because new mothers are focused on the care of their newborn and may have dental insurance only during pregnancy.

ORAL SURGERY :

Oral surgery involves the use of **local anesthetic, antibiotics**, and **sedative drugs**, that may have a negative impact **on the health** and **wellness of an unborn child**. The common belief has been that, if an oral surgery procedure is recommended, **but it's not an emergency**, **the second trimester is the ideal time**.
In the **first trimester the fetus's vital organs are rapidly developing**, so exposure to x-rays, anesthesia and other **drugs should be avoided**.
In the third trimester, women can be very uncomfortable on their backs. Laying flat too long puts pressure on two major blood vessels, the inferior and superior vena cava, producing supine hypotensive syndrome. This also can disrupt the flow of blood to the uterus.

Although many elective procedures may be delayed until the baby has been delivered, several circumstances exist in which care cannot be postponed, **including those involving trauma**, **acute infections of the head and neck** , erupting or impacted teeth that are causing problems, benign and malignant tumors .
Because of a fear of injuring either the mother or unborn child, some practitioners may withhold care or medications from their patients, inadvertently causing harm. An understanding of the **patient's physiologic changes**, the effects of chronic infection, and the **risks or benefits of medications is necessary to adequately treat a patient**

The guidelines laid down by food and drug authority should always be borne in mind while selecting the medications used for pregnant and lactating mothers. The FDA established five letter risk categories - A, B, C, D or X - to indicate the potential of a drug to cause birth defects if used during pregnancy.

The FDA has categorized the potential for drugs to cause birth defects, providing definitive guidelines for prescribing drugs during pregnancy.

They are as follow:

Category A

Adequate and well-controlled studies have failed to demonstrate a risk to the fetus in the first trimester of pregnancy (and there is no evidence of risk in later trimesters).

Category B

Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.

Category C

Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Category D

There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Category X

Studies in animals or humans have demonstrated fetal abnormalities and/or there is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience, and the risks involved in use of the drug in pregnant women clearly outweigh potential benefits

Dental care is safe and essential during pregnancy

- Pregnancy is not a reason to defer routine dental care or treatment
- Diagnostic measures, including needed dental x-rays, can be undertaken safely
- Emergency care should be provided at any time during pregnancy
- Delay in necessary treatment could cause unforeseen harm to the mother and possibly to the fetus

Consideration of oral surgery for dental pregnant patients

Two areas of surgical management with potential creating fetal damage are :

(1) dental radiography and

(2) drug administration. It is virtually impossible to perform an **oral surgical procedure properly with neither radiographs nor the administration of medications**; therefore one option is to defer any elective oral surgery until after delivery to avoid fetal risk

However, if surgery during pregnancy cannot be postponed, efforts should be made to lessen fetal exposure to teratogenic factors.6 The first trimester.

The most critical and rapid cell division and active organogenesis occur **between the second and the eight week of postconception**.

MANAGEMENT OF ACUTE DENTAL CONDITIONS

If mild cellulitis is present, penicillin, amoxicillin, and cephalexin (Keflex; all FDA pregnancy category B) are reasonable first-line antibiotics.

Erythromycin base (not erythromycin estolate, which is associated with **cholestatic hepatitis in pregnancy**)
or clindamycin (Cleocin; both FDA pregnancy category B) can be used in the **type 1 hypersensitivity penicillin**–allergic patient.

For severe cellulitis, the patient should be hospitalized and treated with intravenous **cephalosporins** or **clindamycin.**

To manage dental pain, **acetaminophen** (FDA pregnancy category B), **ibuprofen (Motrin; FDA pregnancy category B in the first and second trimesters, category D in the third trimester)**, and **limited use of oxycodone (Roxicodone; FDA pregnancy category B in the first and second trimesters, category D in the third trimester) are appropriate depending on the gestational stage.**

Therefore, the **greater risk** of susceptibility to **stress** and **teratogens occurs during this time** and **50% to 75% of all spontaneous abortions occur during this period**.

Drugs and infection during this period can interfere with this process and **lead to grave congenital anomalies**. If an oral surgical procedure is necessary during the **first trimester of pregnancy**, local anesthetic would be the method **of choice, if possible**.

The second trimester

Organogenesis is completed and **therefore the risk to the fetus is low.** This is the safest period for providing dental care during pregnancy.

The third trimester

The blood volume of the parturient is at its peak at about the thirtieth week, remaining at an elevated level until the time of delivery. **Although there is no risk to the fetus during this trimester**, the pregnant mother may experience an **increasing level of discomfort**.

Short dental appointments should be scheduled with appropriate positioning while the chair to prevent supine hypotension. It is safe to perform **routine dental treatment in the early part of the third trimester**, but from the **middle of the third trimester routine dental treatment should be avoided.**

Dental radiographs

Dental radiography is one of the more controversial areas in the management of a pregnant patient.

Irradiation should be avoided during pregnancy, especially during the **first trimester**, because the **developing fetus** is particularly susceptible to **radiation damage**.

However, should dental treatment become necessary, **radiographs may be required to accurately diagnose and treat the patient**. Therefore the dentist must be aware of how to proceed safely in this situation.

Teratogenecity of radiation depends of **fetal age and the dose of radiation**. The greatest risk of the fetus for **teratogenecity and death is during the first 10 days after conception**.

The most critical period of fetal development is **between 4 and 18 weeks after conception**.

The safety of dental radiograp

The safety of dental radiography has been well established, provided features such as fast exposure techniques (e.g. high speed film or digital imaging), filtration, collimation, and lead aprons are used.

Of all aids, the most important for the **pregnant patient is the protective lead apron**.

The National Commission for Radiation Protection (NCRP) recommends that the cumulative fetal dose should not exceed 0.005 Gy.

Fetal exposure to radiation of more than **0.20 Gy will cause microcephaly and mental retardation**.

Radiographs employed in dentistry such as the panoramic and full mouth intraoral series are generally safe during pregnancy.

Despite the negligible risks of dental radiography, the dentist should not be cavalier regarding its use during pregnancy (or at any other time, for that matter).

Drug administration during pregnancy

Another controversial area in treating the pregnant dental patient is drug administration. The principal concern is that a drug may cross the placenta and be toxic or teratogenic to the fetus. Additionally, any drug that is a respiratory depressant can**cause maternal hypoxia**, **resulting in fetal hypoxia**, **injury**, or **death**.

Ideally, no drug should be administered during pregnancy, especially the first trimester. However, adhering to this rule is sometimes impossible.

Local anesthetics :

Local anesthetics pass the placental barrier by passive diffusion, but most of them are considered to be safe and non teratogenic.If possible, it would be wise to avoid local anesthetics with vasoconstrictors.

The using of epinephrine, a natural hormone, in local anesthesia in the doses used for dental treatment is not associated with fetal abnormality, and is considered to be safe during pregnancy. Although epinephrine is not teratogenic, caution should be taken to avoid accidental intravenous administration.

Antibiotics :

Selection of an antibiotic for pregnant or nursing women must be made with equal consideration for mother and child. Antibiotics with systemic effects cross the placenta and reach the fetus. **When prescribing approved antibiotics to pregnant women, it is important to remember that overall physiological changes that accompany pregnancy**, particularly in the third trimester, reduce the serum concentration of antibiotics.

Consequently, an adaptation often a doubling-of the therapeutic dose is recommended.

Analgesics

Acetaminophen, FDA category B, is the most useful analgesic to be use of Analgesics Acetaminophen, FDA category B, is the most useful analgesic to be use of pregnancy. **It can be used in any stage of pregnancy and in nursing mothers.**

Maternal anemia and fetal renal disease was reported, however, used in high dos pregnancy. It can be used in any stage of pregnancy and in nursing mothers. Maternal anemia and fetal renal disease was reported, however, used in high doses.

Common Drugs used in Dental Therapies with its Limitations and Remarks.			
Drugs	Use in Pregnancy	Use in Lactation	Remarks
Antibiotics			
Amoxicillin Metronidazole Erythromycin Penicillin Cephalosporins	yes	yes	Fetal ototoxicity with gentamycin. Discoloration of teeth with tetracycline. Maternal toxicity/fetal death with chloramphenicol
Gentamycin Clindamycin	yes	yes	
Tetracycline Chloramphenicol	no	no	
Analgesics			
Acetaminophen Morphine Meperidine	yes	yes	Postpartum hemorrhage associated with aspirin. Respiratory depression with morphine.
Oxycodone Hydrocodone Propoxyphene Pentazocine	With caution	With caution	
Aspirin Ibuprofen Naproxen	Not in 3rd trimester	no	

Local Anesthetics			
Lidocaine Prilocaine Etidocaine	yes	yes	Fetal bradycardia with Mepivacaine &Bupivacaine
Mepivacaine Bupivacaine	With caution	yes	
Corticosteroids			
Prednisolone	yes	yes	
Sedative/Hypnotic			
Nitrous oxide	Not in 1st trimester ++	yes	Spontaneous abortions with Nitrous oxide.
Barbiturate Benzodiazepines	no	no	Cleft lip/palate with Benzodiazepines

++ Because of neonatal respiratory depression.

Sedatives and hypnotics Nitrous oxide (N2O) has not been classified into any category by the FDA and its use in pregnancy is controversial due to unproven deleterious effects on the pregnant women and fetus.

Nitrous oxide also **causes vasoconstriction and may reduce uterine blood supply**. However, a single exposure of nitrous oxygen (N2O-O2) for less than 35 minutes has not been associated with any human fetal anomalies, including low birth rate.
Chronic exposure of pregnant dental health workers to N2O for more than 3 hours without the use of scavengers has resulted in decreased fertility and spontaneous abortions

Professional dental care is considered safe during pregnancy, can help pregnant women for maintaining good oral health, and manage any problems that may develop. Daily care at home is also an important part of keeping the teeth and gums healthy.
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