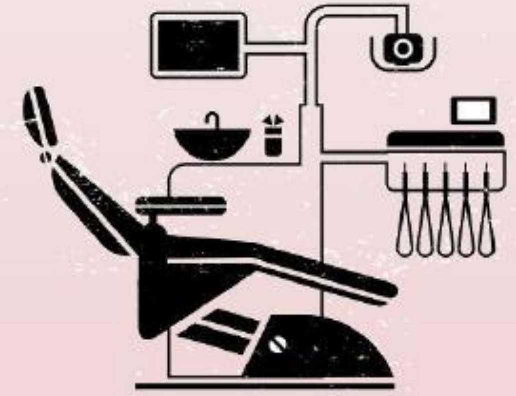

Pregnancy and Dentistry

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Semnan Dental School

Stages of Pregnancy

- 1st trimester- 1-12 weeks/ first 3 months: Phase of Fetal organ formation hence avoid elective dental treatment where possible.

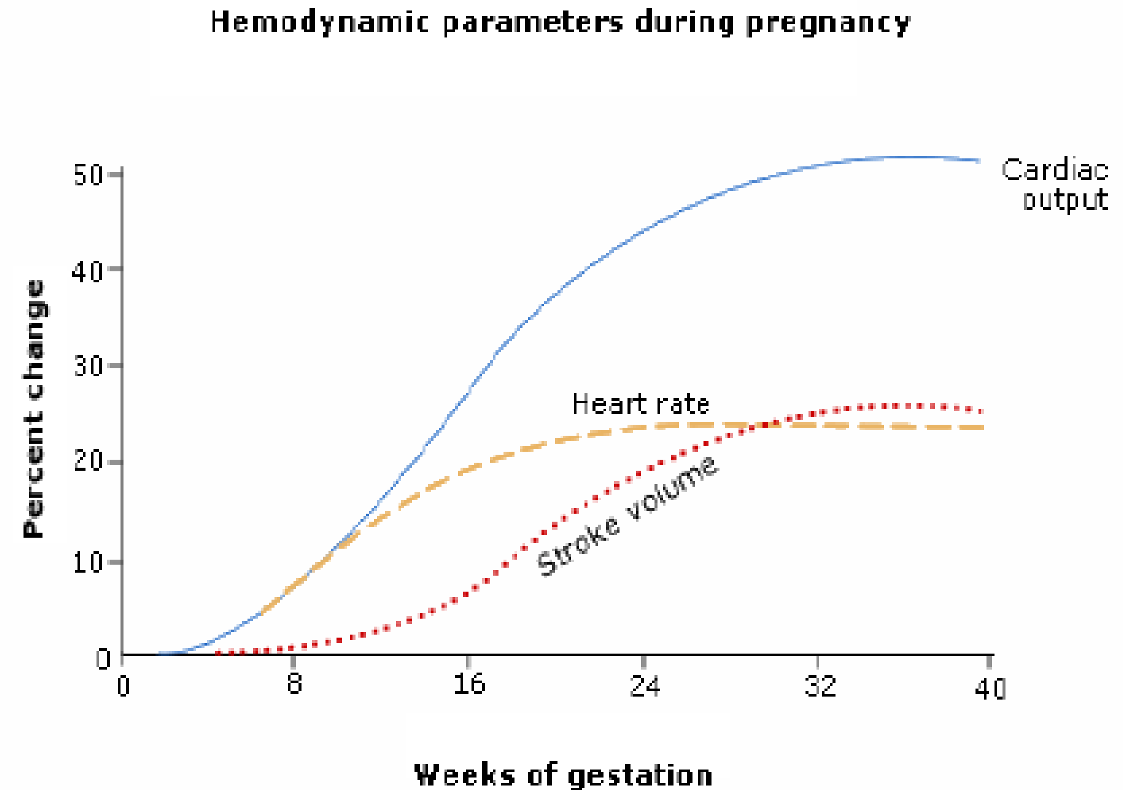
- 2nd trimester- 13-24 weeks/ 3rd to 6th month: Fetal growth and maturation. Safest time to provide preventive and interceptive dental care

- 3rd trimester- 25-40 weeks/ 6th to 9th month: Concerns associated with fetus and easy parturition. Dental treatments should be of short duration and for only dental emergencies to prevent stress induction on expectant mother

Effects of hormonal changes in pregnant mother relevant to the dental practitioner

Effects of cardiovascular changes

- Cardiac output and **pulse rate continuously increases** and peaks at 3rd trimester (30-50% above normal)
- Systolic and diastolic **blood pressure drops by 10-15mmgHg** in the first trimester but returns to normal in the second trimester
- Patient may develop **systolic murmur** limited to gestational period

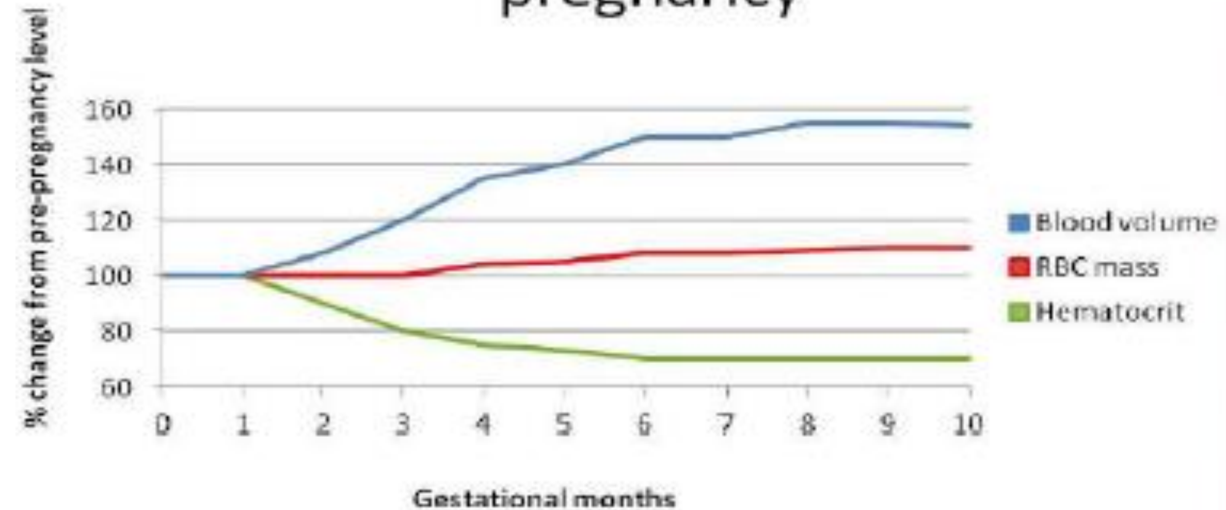


Hematological changes

- During the 2nd trimester, there is an **increase in plasma volume** over RBC count which **dilutes the blood** and **reduces Hematocrit value**

- There is marked increase in clotting factors resulting in **hypercoagulability** and run the **risk of deep vein thrombosis** and **pulmonary Embolism**

- Despite the significant changes that occur to the coagulation system, standard **coagulation tests** *prothrombin time (PT), international normalized ratio (INR), activated partial thromboplastin time (aPTT)*] **do not change** during pregnancy or are very slightly decreased



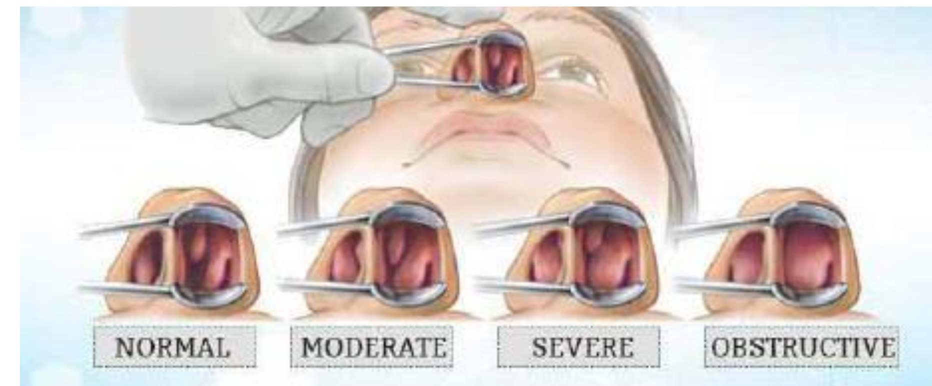
parameters	NON-PREGNANT	PREGNANCY(term)	CHANGE
BLOOD VOL (ml)	4000	5500	↑ 1500
PLASMA VOL (ml)	2500	3750	↑ 1250
RBC VOL (ml)	1400	1750	↑ 350
TOTAL Hb (gm)	475	560	↑ 85
TOTAL PROTEIN (gm)	180	230	↑ 50
PLASMA PROTEIN (gm/100ml)	7	6	↓
FIBRINOGEN-mg%	200-400	300-600	+50%
ESR (mm/hr)	10	40	↑ 4 fold

Respiratory System Changes

- There is increased respiratory minute volume (up to 40%) during the first trimester due to progesterone induced **respiratory alkalosis**.
- There is decreased respiratory lung movement due to enlarged uterus during the third trimester.

Both situations may indicate **dyspnea** (difficulty in breathing) **but are physiologic responses**

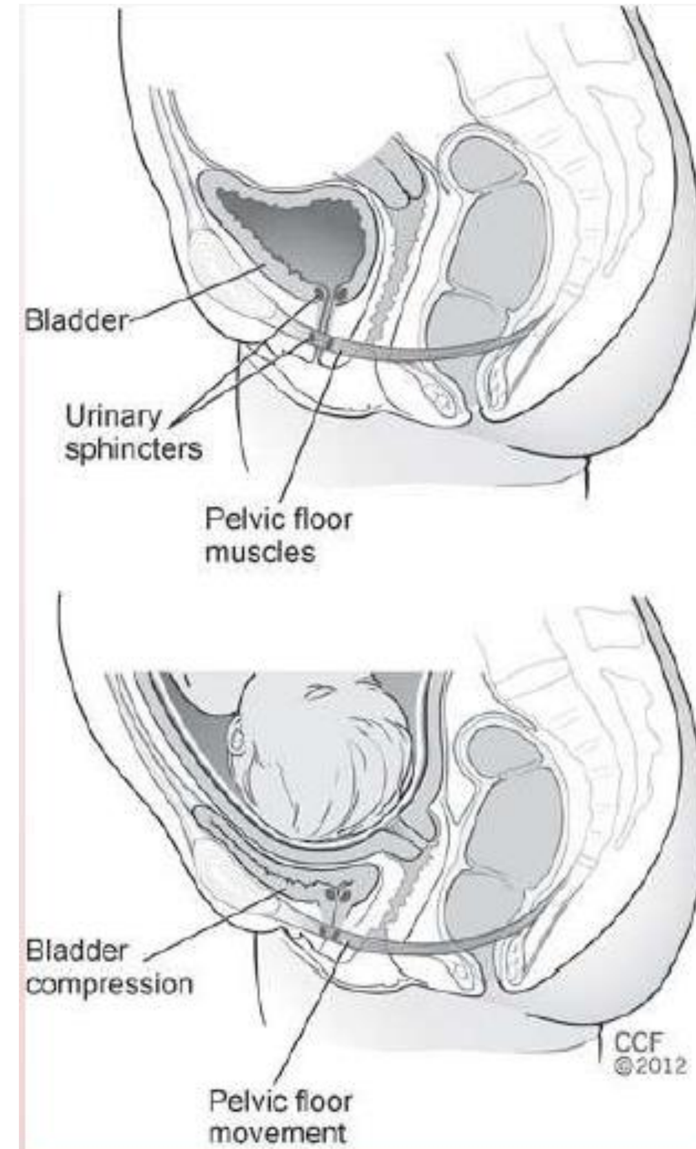
- Increased estrogen concentration may lead to **rhinitis**, **sinusitis** and other **upper respiratory tract infections**



Genitourinary System Changes

- Glomerular filtration rate and and plasma flow increase. This in addition to the uterus restricting the distention of the urinary bladder results in frequent micturition. (Bladder Compression)

- In 2nd and 3rd trimesters the patient should be asked to empty their bladders prior to treatment. During long dental procedures, office temperature should be regulated to at or above standard r.t.p. Otherwise low temperatures can trigger cold diuresis and trigger micturition reflex in the patient



- Around the 3rd trimester, uterine enlargement compresses inferior vena cava and restricts venous return hence patient may experience postural hypotension in supine position (**Supine Hypotensive Syndrome**)

Symptoms:

Sweating

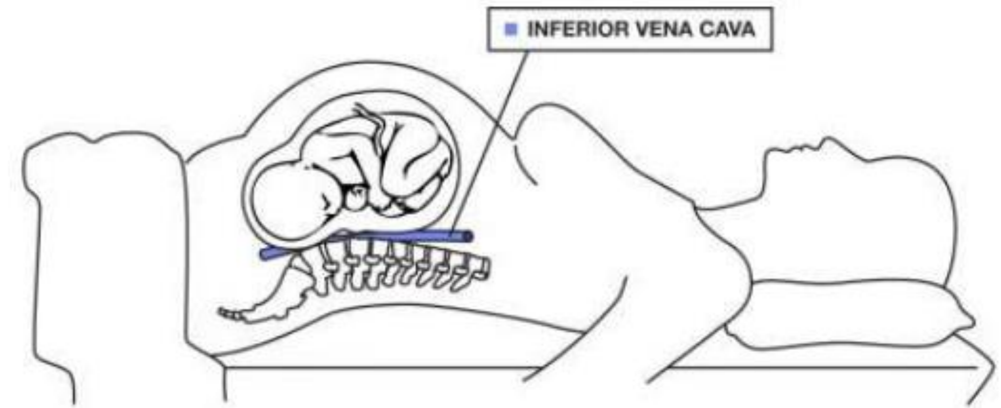
Nausea

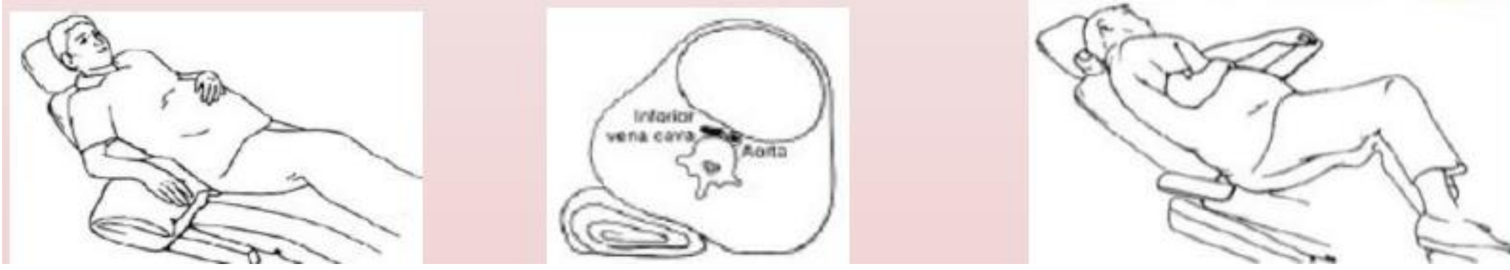
Weakness

Sense of lack of air

Other symptoms:

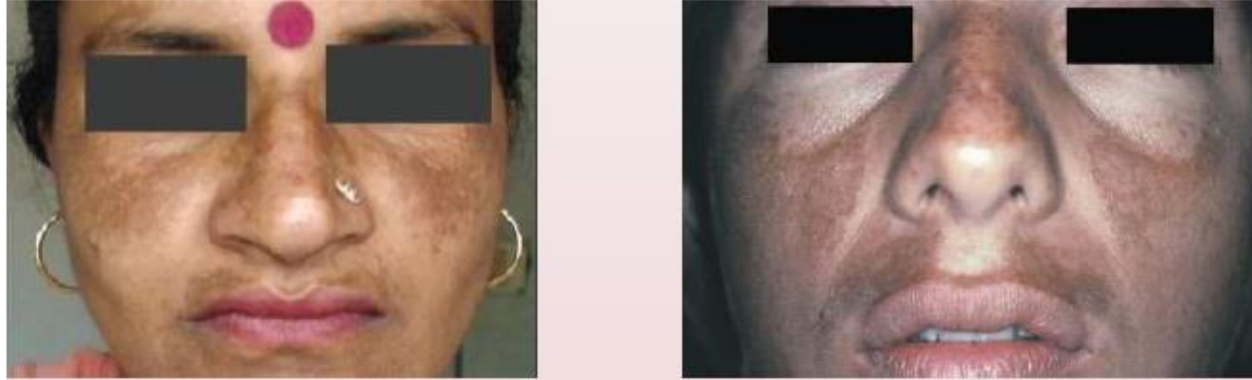
- Drop in blood pressure
- Bradycardia
- Possible loss of consciousness





Management of Supine Hypotensive Syndrome

- Caused by excess supination of the dental unit after seating the patient
- The patient exhibits **sweating, nausea, fatigue** and **dyspnea**
- Examinations may present **hypotension, bradycardia** and **syncope**
- Compression results in lymphatic channel obstruction and **pedal edema**
- Immediate Treatment
- Place the patient with head above feet
- Elevate right hip with a pillow and shift the uterine weight off the vena cava to the left side (left lateral displacement)
- Roll the patient onto her left side



- Facial changes as melasma "**mask of pregnancy**," appearing as **bilateral brown patches in the mid-face begin during the 1st trimester** and are seen in up to 73% of pregnant women

Parathyroid Hormone increased

- To increase calcium uptake to facilitate for fetal skeletal development.
This results in **decreased serum calcium** in mothers.

Pregnancy and Asthma in Dental Practice

- pregnant people with pre-existing and/or comorbid asthma, pneumonia, or other respiratory issues may be more prone to disease exacerbation and respiratory decompensation during pregnancy

- Bronchodilator inhalers have been classified as safe during pregnancy.

- In severe asthma, the use of oral corticosteroids, magnesium sulfate and beta agonists are recommended- *Medscape*

- Oxygen intake should be closely monitored to prevent maternal hypoxia and maintain fetal oxygenation

- NSAIDs should be given with precaution instead of Tramadol. Although NSAIDs stimulate bronchoconstriction, its benefits outweigh the risks of neonatal drug dependence induced by tramadol

Pancreatic Insulin changes

- Human placental lactogen (hPL) conserves blood glucose for neonates and in some cases cause **gestational diabetes Mellitus (GDM)** in the mother

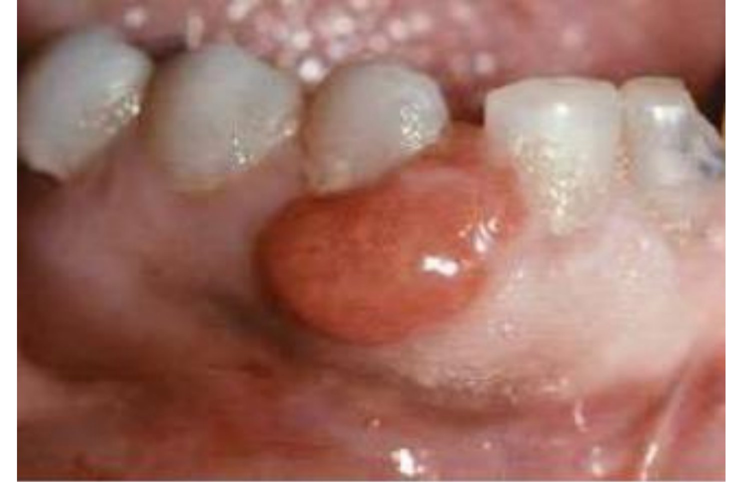
- GDM is associated with significantly increased risks of maternal and infant morbidity, including preeclampsia, and **periodontitis** induced by constant inflammatory response and state of insulin resistance (caused by hPL) and in uncontrolled cases ***with existing*** periodontal conditions; **tooth mobility**

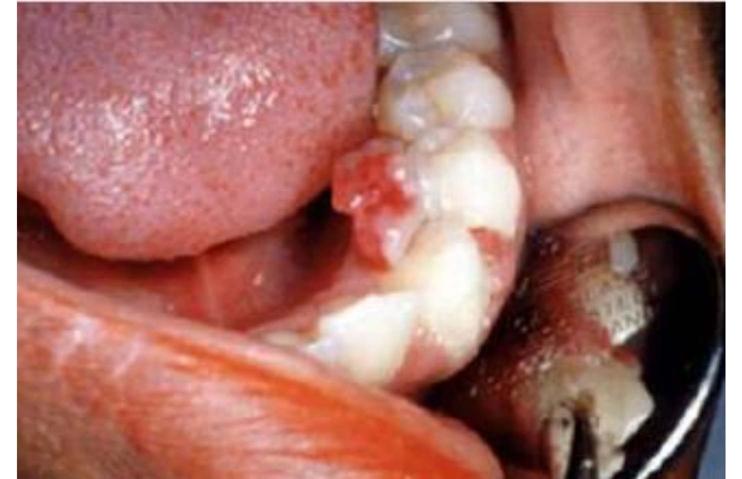
- Pregnancy does NOT cause periodontitis but aggravates existing ones

Adrenal Gland Secretions

- **Increase estrogen by 10 fold and**
- **progesterone by 30 folds**

- There is increased secretion of Estrogen, Progesterone and Cortisol (steroid). Steady increase of steroids may result in the formation of **pregnancy granuloma** in 1st trimester. Repeated irritation with circulating steroids lead to proliferation of the lesion
- The lesion is not associated with microorganism related infections and hence **should only be excised if it becomes very large (>2cm) or becomes infected**.
- **Laser excision** is reported to be well tolerated in pregnancy without any adverse effects
- **Plaque control**, **scaling**, **curettage** are the treatment of choice otherwise

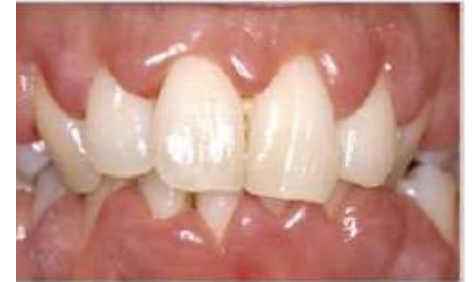


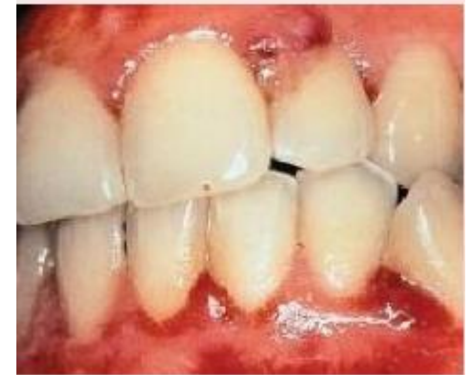


- hormone induced vascular permeability changes

may induce gingivitis and spontaneous gum bleeding during 2nd and 3rd trimester of pregnancy

Management include scaling and curettage during 2nd trimester and oral hygiene instructions



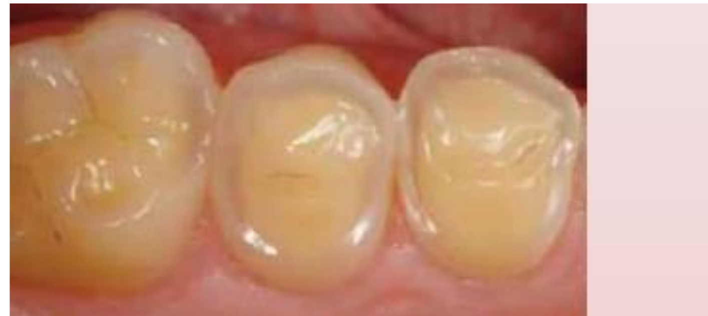


Gastrointestinal Tract Changes

- Acid Reflux
- Progesterone slows down intestinal motility and raises intragastric pressure.

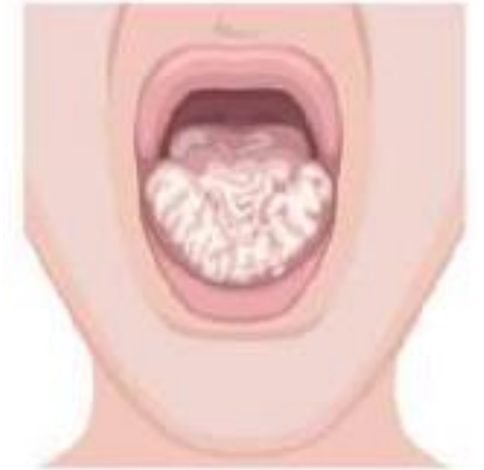
This results in **esophageal reflux**, **nausea**, **vomiting**. During this time a patient is **more prone** to have **dental erosion** if the esophageal reflux is uncontrolled with antacids & other PPIs

- During first Trimester, the patient may experience **hyperemesis gravidarum** (**morning sickness**). **such patient should NOT be given an early morning appointment**



Salivary changes

- Salivary flow decreases (Dry mouth) during the 1st and 3rd trimester leading to reduced buffering abilities and increased cariogenic activity. Topical fluoride may be prescribed to control such activities while also benefitting the fetus from reduced risks of caries
- Dry mouth results in increased incidences of oral candidiasis. This should be managed by cleaning the infected regions and applying topical antifungal agents
- Salivary flow increases (ptyalism) during 2nd trimester



Questions that a dentist may ask

- Can I take x-rays?
- Can I inject local anesthesia with epinephrine?
- What medications can I prescribe?
- Are topical agents safe?
- When should I perform necessary procedures?
- Can I use mercury restorations?

Dental Considerations

- timing of treatment for pregnant patients
- dental radiation exposure
- use of local anesthetics
- prescription of common antibiotics and analgesics
- nitrous oxide gas administration

Dental Radiography and Pregnancy

Everyday radiation

- According to the NRC, the average **American** receives **0.62 rads** per year, half of which is from background and cosmic radiation.
- In Some **Indian** regions, the average annual radiation is reported to be 4.5 mGy **(0.45 rads)** while in radiation prone regions it can go upto 10 mGy (1 rads)
- In some **Chinese** regions the average annual radiation dose is 6.4 mSv **(0.64 rads)**

Radiation risks in Pregnancy

- Most biological responses to radiation occur during the 1st **trimester,** mainly the first two weeks (upto 6th week) **any dose below 25 rads** (250 mGy) will **NOT** likely cause spontaneous abortion
- Studies also suggest A radiation dose of 500 mGy (**50 rads**) in the 1st trimester, when organogenesis is initiated) **causes congenital fetal abnormalities**
- **After 16th week** of conception, the safety threshold dose **rises to 50-70 rads** (<700 mGy)

- exposure to the brain from 4 bitewings is approximately 0.07 mGy (0.007 rads), and from a panoramic examination about 0.02 mGy (0.002 rads)

- A single periapical radiograph can cause **0.01 millirads** of radiation

- Thus, **It is safe to Do a diagnostic radiograph** on a pregnant person if deemed necessary. However **avoidance** of radiography **during the 1st trimester** is advised.

- Risks can be reduced even further by using **a shield: Lead apron** to protect the fetus and using **modern RVG**

TABLE 17-2 Comparative Radiation Exposures to Fetal or Embryonic Tissues

Source of Radiation	Absorbed Exposure (cGy)
Upper gastrointestinal series	0.330
Chest radiograph	0.008
Skull radiograph	0.004
Daily (cosmic) background radiation	0.0004
Full-mouth dental series (18 intraoral radiographs, D film, lead apron)	0.00001

Pregnancy and Dental Drugs

1. Analgesics

Drugs to Avoid in 3rd Trimester

- Aspirin causes post partum hemorrhage,
- Naproxen and **Ibuprofen** complicates parturition (delivery)
- Opioid group of drugs (**codone & codeine**) cause neonatal respiratory depression after withdrawal from prolonged therapy.

Acetaminophen Morphine	yes
Aspirin Ibuprofen Naproxen	Avoid in 3rd Trimester
Oxycodone Hydrocodone Pentazocine	With Caution

2. Antibiotics and Antiprotozoal Drugs

Avoid Antibiotics:

- ❖ Erythromycin (Estolate form) may cause **cholestatic hepatitis**
- ❖ Doxycycline,
- ❖ Vancomycin,
- ❖ Tetracycline: **inhibits bone growth**.

Amoxicillin and Penicillin Cephalosporin Metronidazole Clindamycin	Yes
Tetracycline Erythromycin (estolate form) Chloramphenicol	no

3. Local Anesthesia and sedatives

Avoid:

Prolonged exposure to **Benzodiazepines** result in **oral clefts** in neonates.

Administration of **Nitrous oxide** leads to **spontaneous abortion** in the 1st trimester. Nitrous oxide can be used upto 50% oxygen in 2nd and 3rd Trimesters.

Mepivacaine and **Bupivacaine** may cause **fetal Bradycardia**

Lidocaine with/without epi. Prilocaine Etidocaine	yes
Mepivacaine Bupivacaine	No
Nitrous Oxide	Not in 1st Trimester
Barbiturates Benzodiazepines	No

4. **Antifungal drugs**

Clotrimazole Nystatin	Yes
Fluconazole Ketoconazole	With caution. Best Avoided

5. **Corticosteroids**

Prednisolone	yes

6. **Fluoride Supplements**

The use of ***Topical fluorides*** and ***fluoride tablets*** are considered **safe** ***from the 2nd Trimester***

7. Anti Ulcer Drugs (Peptic & Duodenal Ulcer Prophylaxis)

Proton Pump Inhibitors	
Omeprazole	Yes
Esomeprazole, Pantoprazole	Safety not tested
H2 Receptor Blockers	
Ranitidine, famotidine	Yes
Antacids and mucosa protectives	Yes
Misoprostol	**No**. (*Causes spontaneous Abortion*)

8. Antihistamines and Anti-allergen

1st Generation anti histamines	
Chlorpheniramine	yes
Hydrozine, promethazine	No

2nd Generation anti histamines	
Cetrizine, Loratidine	Yes
Fexofenadine	Not Recommended

TABLE 17-3 Drug Administration During Pregnancy and Breast Feeding

Drug	FDA Pregnancy Risk Category	Use During Pregnancy	Risk	Use During Breast Feeding
Local Anesthetics				
Articaine	C	Use with caution; consult physician		Unknown
Bupivacaine	C	Use with caution; consult physician	Fetal bradycardia	Yes
Etidocaine	B	Yes		Yes
Lidocaine	B	Yes		Yes
Mepivacaine	C	Use with caution; consult physician	Fetal bradycardia	Yes
Prilocaine	B	Yes		Yes
Analgesics—Non-Narcotic				
Acetaminophen	B	Yes		Yes
Aspirin	C/D[3]	Caution; avoid in third trimester	Postpartum hemorrhage Constriction ductus arteriosus	Avoid
Cyclooxygenase (COX)-2 inhibitor	C	Avoid in third trimester	May lead to constriction, ductus arteriosus	Yes
Diflunisal, etodolac, mefenamic acid	C/D[3]	Use with caution; avoid in third trimester; consult physician	Delayed labor	No
Ibuprofen, flurbiprofen	B/D[3]	Caution; avoid in third trimester	Delayed labor	Yes
Naproxen	B/D[3]	Caution; avoid in third trimester	Delayed labor	Yes

Analgesics—Narcotic				
Codeine	C/D*	Use with caution (low dose, short duration); consult physician	Neonatal respiratory depression	Yes
Hydrocodone	C/D[3]	Use with caution (low dose, short duration); consult physician	Neonatal respiratory depression	—
Oxycodone	C/D[3]	Use with caution (low dose, short duration); consult physician	Neonatal respiratory depression	Yes
Pentazocine	C	Use with caution (low dose, short duration); consult physician	Neonatal respiratory depression	Yes
Propoxyphene	C	Use with caution (low dose, short duration); consult physician	Neonatal respiratory depression	Yes
Antibiotics				
Cephalosporins	B	Yes		Yes
Clindamycin	B	Yes		Yes
Fluoroquinolones (norfloxacin, ciprofloxacin, ofloxacin, and enoxacin)	C	Use with caution; consult physician	Arthropathy	Caution
Macrolides				
Erythromycin	B	Yes; avoid estolate form		Yes
Azithromycin	B	Yes		Yes
Clarithromycin	C	Use with caution; consult physician		Yes
Metronidazole	B	Yes		Yes
Penicillins	B	Yes		Yes
Tetracycline	D	Avoid	Tooth discoloration, inhibits bone formation	Avoid
Tetracycline—periodontal dosages	C	Avoid	Tooth discoloration, inhibits bone formation	Avoid

Antivirals			
Acyclovir	C	Yes	Yes
Famciclovir	B	Yes	Yes
Valacyclovir	B	Yes	Yes
Antifungals			
Fluconazole	C	Yes	Yes
Nystatin	B/C	Yes	Yes
Corticosteroid			
Prednisone	B	Yes	Yes

TABLE 17-3 Drug Administration During Pregnancy and Breast Feeding—cont'd

Drug	FDA Pregnancy Risk Category	Use During Pregnancy	Risk	Use During Breast Feeding
Sedative-Hypnotics				
Barbiturates	D	Avoid	Neonatal respiratory depression	Avoid
Benzodiazepines (diazepam, lorazepam)	D	Avoid	Possible risk for oral clefts with prolonged exposure	Avoid
Triazolam	X			
Nitrous oxide	Not assigned	Best used in second and third trimesters and for <30 minutes; consult physician		Yes
Sialagogues				
Cevimeline	C	No information		No information
Pilocarpine	C	Yes		Avoid

*D**, Risk category D if used for prolonged period or at high dose; D^3, risk category D if administered during the third trimester.

Data from Moore PA: Selecting drugs for the pregnant dental patient, J Am Dent Assoc *129:1281-1286, 1998;* Drug information for the health care professional, *ed 2, Rockville, Maryland, 2000, United States Pharmacopeial Convention; and Briggs GG, Freeman RK, Yaffe SJ:* Drugs in pregnancy and lactation: a reference guide to fetal and neonatal risk, *ed 5, Baltimore, 1998, Williams & Wilkins.*

Dental treatment can be done at any time during pregnancy

preventive, emergency, and routine dental procedures are all suitable during various phases of a pregnancy, with some treatment modifications and initial planning

A Proposed Treatment Plan

- 1st Trimester
- Educate the patient about maternal oral changes during pregnancy.
- Emphasize strict oral hygiene instructions and thereby *plaque control.*
- Limit dental treatment to periodontal prophylaxis and emergency treatments only

- 2nd Trimester
- Oral hygiene instruction, and *plaque control.*
- Scaling, polishing, and curettage may be performed if necessary.
- Control of active oral diseases, if any.
- Elective dental care is safe.

- 3rd Trimester
- Oral hygiene instruction, and *plaque control.*
- Scaling, polishing, and curettage may be performed if necessary.
- Avoid elective dental care during the second half of the third trimester.

Pregnancy Related Oral Health Problems

- Pregnancy Gingivitis
- Pregnancy Epulis
- Candidiasis
- Increased Tooth Mobility
- Dental Caries
- Erosion
- Saliva changes
- Dental Problems in relation to Labor and Delivery

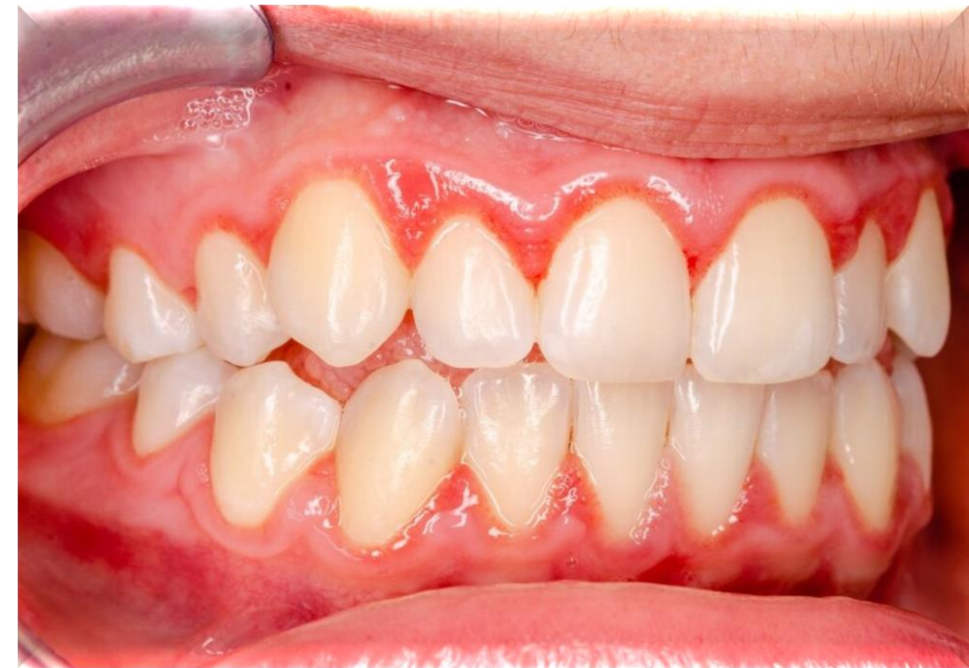
Pregnancy Gingivitis

- Most common oral manifestation (50-100% of women)

- Caused by hormonal and vascular changes of pregnancy Occurs commonly in the 2nd to 8th months

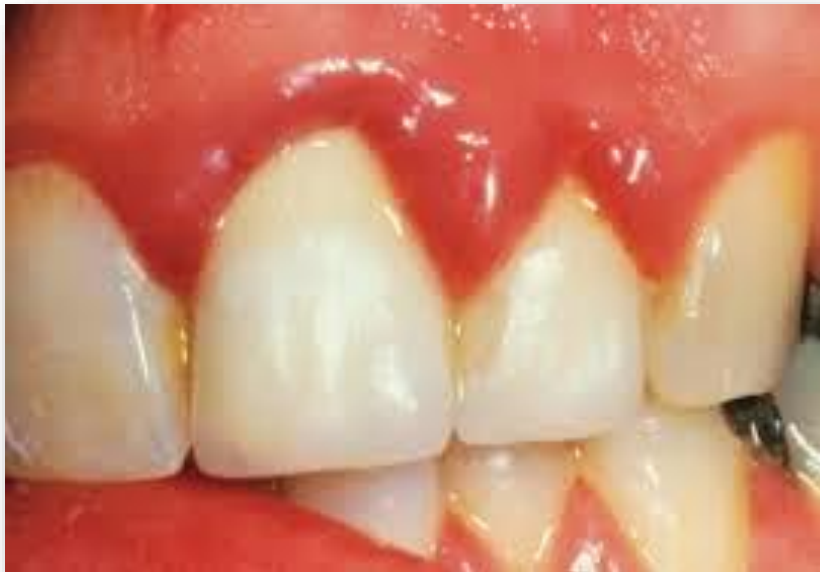
- Tendency to bleed very easily

- Treatment: Scaling, root planning, curettage, OHI



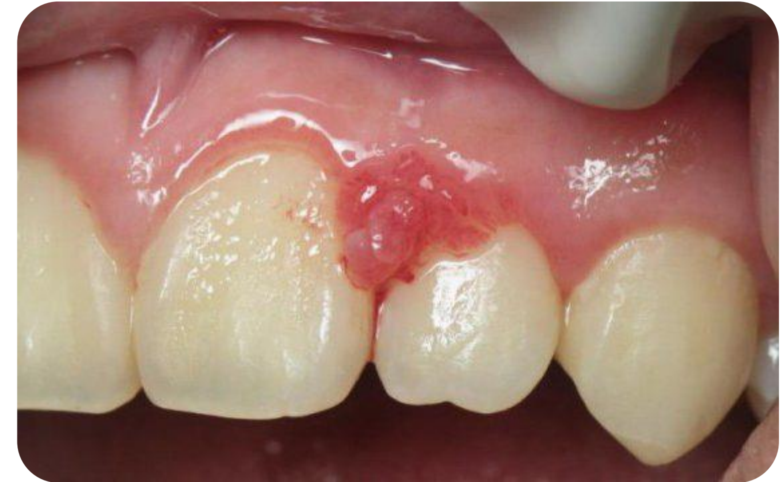
Pregnancy Gingivitis Pathophysiology

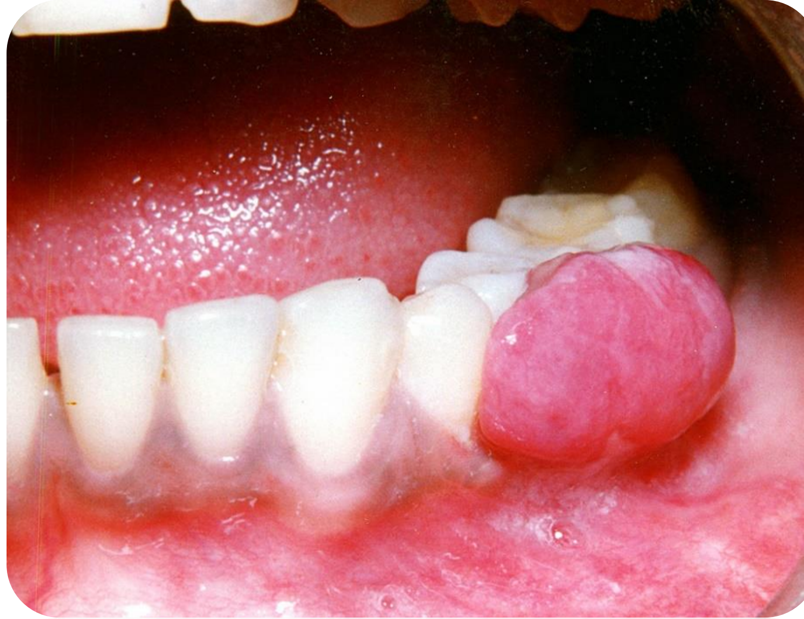
- Elevated circulating estrogen increases capillary permeability.
- Preexisting gingivitis may predispose to pregnancy gingivitis.



Pregnancy Granuloma

- Occurs in up to 5% of women.
- Most common in buccal maxillary anterior areas.
- Usually starts in an area of gingivitis.
- Rapid growth up to 2 cm.
- Single tumor-like growth
- usually in interdental papillae
- *Purplish to bluish* in color, may be *ulcerated- bleeds easily*



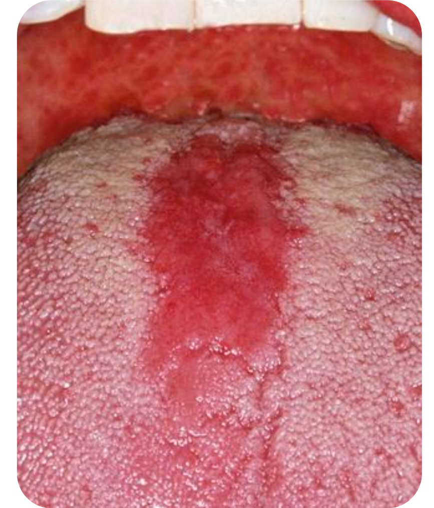


Treatment:

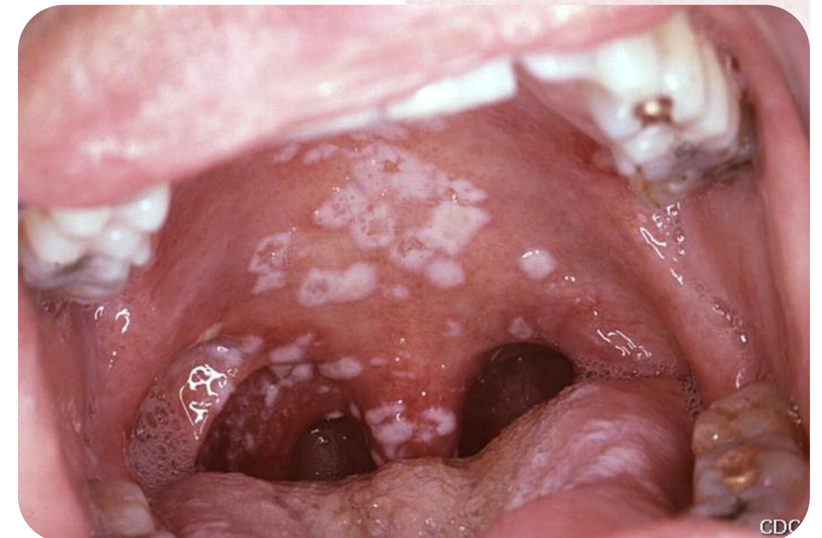
- Scaling and root planning
- Excision if it is too large or bleeds too easily
- May regress spontaneously after pregnancy

Candidiasis

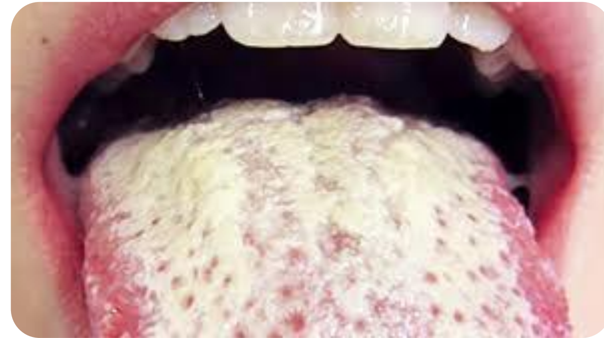
Physiological	Old age, infancy, pregnancy
Local trauma	Mucosal irritation, poor denture hygiene
Antibiotics	Particularly broad-spectrum antibiotics
Corticosteroids	Steroid inhalers, systemic steroids
Malnutrition	High-carbohydrate diet, iron, folate and vitamin B_{12} deficiencies
Endocrine disorders	Hypoendocrine states (e.g. hypothyroidism, Addison's disease), diabetes mellitus
Malignancies	Including blood disorders (e.g. acute leukaemia, agranulocytosis)
Immune defects	AIDS, thymic aplasia
Xerostomia	Due to irradiation, drug therapy, Sjögren's syndrome, cytotoxic drug therapy



- Wipes off
- Usually asymptomatic, but may burn
- Treatment: topical or systemic antifungals



Hairy and coated tongue



Saliva changes

- **Decreased buffers**
- **Decreased minerals**
- **Decreasing flow first and last trimester**
- **Increased flow second trimester**
- **More acidic**

a tooth for every pregnancy"
, or that
calcium is withdrawn from the maternal dentition to supply fetal requirements (i.e., "soft teeth").

Tooth mobility, localized or generalized, is an uncommon finding during pregnancy

Daily removal of local irritants,
adequate levels of vitamin C,
and delivery of the newborn

should result in reversal of tooth mobility

Increased Bacteria

- Increased acidity
  - Increase in decay-causing bacteria
- Increased Snacking
  - Morning sickness/low blood sugar
  - Between-meal snacks
- Increase in amount and frequency of starches/carbohydrates
  - Crackers are commonly recommended
  - Promotes decay-causing bacteria

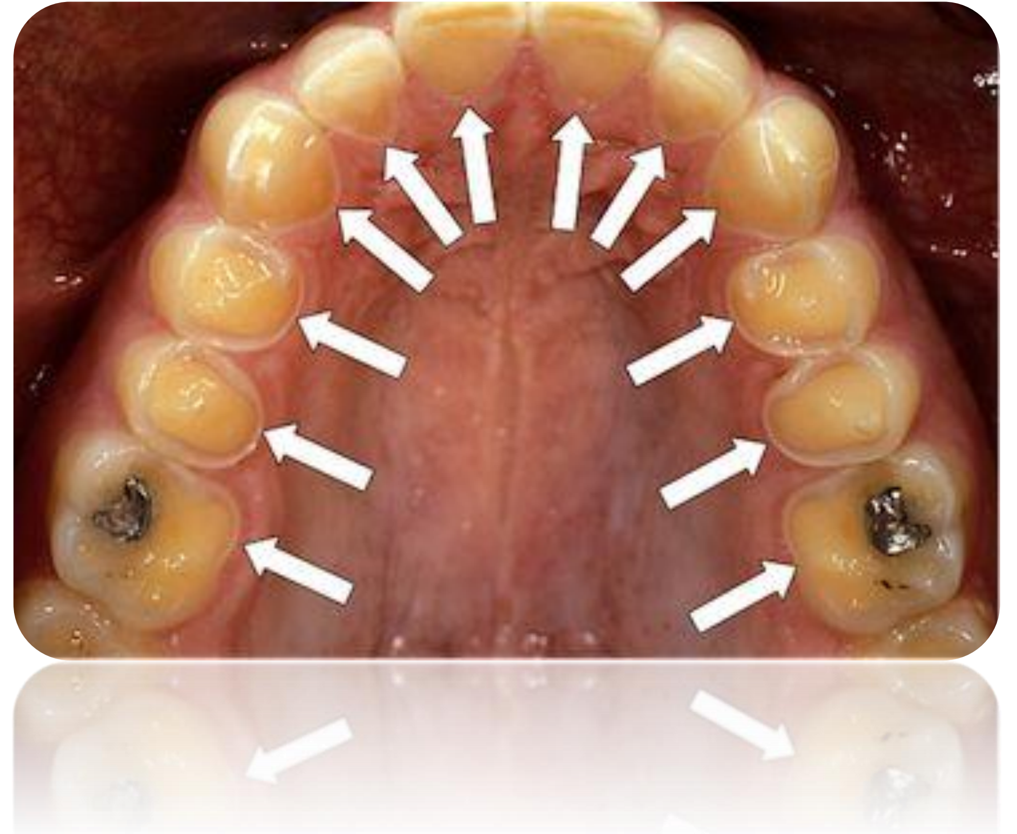
Treatment for Acid Exposure

- Do NOT brush immediately after vomiting

- Rinse

- Water with baking soda
- Antacid
- Plain water

- Eat some cheese



Use of Nitrous Oxide Gas

- used over 150 years
- safety is being debated
- SHORT TERM exposure do not cause birth defects or spontaneous abortion (30min, 50% O2)
- CHRONIC exposure may result in fetal loss and infertility
- literature suggests that nitrous oxide should be avoided until more conclusive research is available
- FDA Drug class: not yet assigned

Common Preventives

- Fluoride

– No increased risk during pregnancy

- Xylitol

– No studies; no harm reported

- Chlorhexidine

– No increased risk during pregnancy

Are topical agents safe?

- Fluoride
- Toothpaste & mouth rinse
- Xylitol chewing gum
- Chlorhexidine (11% alcohol)
- No over the counter mouth rinses with alcohol (Listerine 20% alcohol)

Pre-natal Fluoride

- Daily 2.2 mg tablet of sodium fluoride during 3rd through 9th months
- decreases caries rate in offspring.
- Safe and effective.

Is it safe to use mercury restorations?

- No evidence of harmful effect
- Benefits outweigh risks
- Canada, Germany, and New Zealand have some restrictions
- Determine the best option

TABLE 17-1 Treatment Timing During Pregnancy*

First Trimester	Second Trimester	Third Trimester
Plaque control	Plaque control	Plaque control
Oral hygiene instruction	Oral hygiene instruction	Oral hygiene instruction
Scaling, polishing, curettage	Scaling, polishing, curettage	Scaling, polishing, curettage
Avoid elective treatment; urgent care only	Routine dental care	Routine dental care

Breast feeding

A significant fact is that the amount of drug excreted in the breast milk usually is not more than about 1% to 2% of the maternal dose.

Therefore, most drugs are of little pharmacologic significance for the infant.

take the drug just after breast feeding and avoid nursing for ***4 hours*** or longer if possible

Should be avoided: lithium, anticancer drugs, radioactive pharmaceuticals, and phenindione

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بورد تخصصی بیماری های دهان،فک و صورت
فلوشیپ لیزر
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فارغ التحصیل از دانشگاه شهید بهشتی
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