

## Dental treatment for the pregnant patient

Atendimento odontológico à paciente gestante

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### ABSTRACT

Dental treatment of pregnant women should be accomplished with safety. Consequently, the dental professional should evaluate its real need and risks for the mother and child. This paper reports through a literature review, the caution with the clinical dental procedures commonly performed and possible risks of the therapeutic agents used, allowing the dentist to evaluate the treatment and the drug to be administered to the pregnant women.

### KEYWORDS

Pregnant women; Dental treatment; Medicaments.

### RESUMO

O tratamento odontológico da gestante deve ser realizado com segurança, e para isto deve-se avaliar a real necessidade de sua execução e os riscos que o mesmo poderá trazer para a mãe e para o bebê. Este artigo relata, com base em uma revisão de literatura, os cuidados com os procedimentos clínicos comumente realizados no consultório odontológico e os possíveis riscos dos agentes terapêuticos utilizados, permitindo ao clínico avaliar o tratamento e a droga a serem administrados às gestantes.

### PALAVRAS-CHAVE

Gravidez; Tratamento odontológico; Medicamentos

### INTRODUCTION

Over the last decades, Dentistry has undergone many changes especially regarding to prevention practice. Aiming to promote health many dental professionals early provide dental prevention to pregnant women. This is so-called Intrauterine Dentistry, which has commonly comprised a multidisciplinary team of dentists, obstetricians and pediatricians.

The obstetrician provides additional information on the health state of the patient, but the dentist is legally responsible by any dental therapeutic interventions or omissions [1]. Dental treatment should not be postponed or interrupted after pregnancy confirmation, but caution and attention should be given during the treatment for pregnant women. At pregnancy, the dentist ought to begin the prevention aiming to promote the comprehensive health of both mother and child.

Notwithstanding, many professional still are afraid of treating and many women fear about the negative consequences of the treatment to the baby [2].

The American Congress of Obstetricians and Gynecologists and the American Academy of Pediatrics advise the pregnant women to continue “dental treatment during pregnancy”, including toothbrushing and flossing, programmed preventive prophylaxis and any dental treatment requirement [3].

During pregnancy, dental procedures can be performed; however, additionally to the obstetrician following-up, precautions ought to be made to assure the safe of both the pregnant woman and baby because the former may show complications and alterations requiring special needs [4]. Dentists should encourage that all women of reproductive age to seek guidance on oral health as soon as they discover pregnancy. The large amount of hormones induced by pregnancy provokes alterations in the mother's body, and the oral cavity is not an exception [5].

This literature review reports the caution with the clinical dental procedures commonly performed and possible risks of the therapeutic agents used, allowing the dentist to evaluate the treatment and the drug to be administered to the pregnant women.

## LITERATURE REVIEW

### *Pregnancy x Dentistry*

Surely, dental professional must be aware of the special needs of pregnant women. Anesthesia, radiographs and use of drugs will always be well indicated by evaluating the benefit-cost ratio, so that borderline situations ought to be discussed with the obstetrician. Notwithstanding, regardless of either the pregnancy period or the health state of the pregnant woman, it is important that they seek prevention of possible oral problems, at least every three months.

Despite of the potential benefits of dental care, relatively few women received dental treatment during pregnancy [3]. Some women affirmed that it is normal to show poor oral health during pregnancy and believed some dental treatments are harmful to the baby [6].

In Brazil, despite of lack of nationwide studies, regional researches demonstrated that untreated oral problems are evident in pregnant women with low level of education and income. Additionally to its high cost, the access difficulties and cultural beliefs that dental treatment is harmful to the baby, jeopardize the search for dental care [1]. Dental care during pregnancy should be encouraged as public health measure aiming to the multidisciplinary approach among obstetricians, dentists and nurses [1].

### *Dental treatment*

Whether dental treatment should or should not be performed during pregnancy, it is fair to say that it can be performed at any pregnancy period, although the second and third trimesters are ideal because of the greater stability, thus whenever possible choosing the former due to the small risk of miscarriage or premature delivery and great disposition of the woman [7].

At the first trimester of pregnancy, drugs and radiographs should be avoided because of fast embryo development [8]. At this period, the nerve cells of the embryo increase and multiply being sensitive to

aggression; a greater number of miscarriages occur; and the pregnant woman is more prone to nausea. Morning sickness has been attributed to increase in chorionic gonadotropin and hypoglycemia [9]. If dental treatment is required, especially due to pain, it ought to be performed regardless of the pregnancy trimester, because anxiety associated with acute pain may result in muscle contraction and possible bleeding [10].

Most of obstetricians (94%) affirmed that treatment can be performed at any period, preferably between the 16<sup>th</sup> and 32<sup>nd</sup> weeks of pregnancy [1]. Morning appointments should be avoided by pregnant women because of the higher chance of nausea [5]. Barriers to receiving dental care during pregnancy include lack of knowledge on the safeness and importance of dental treatment for the health of the mother and baby. Many women are unaware that severe periodontal infection may put the baby at risk. Many do not seek restorative or preventive care because of the same reason and they do not know about the transmissible nature of dental caries [6].

### *Dental treatment at first trimester*

Since the pregnancy onset, the patient should be instructed to seek the dentist aiming at prevention. The dentist must begin the first appointment with a comprehensive anamnesis. Routine preventive procedures such as supragingival and subgingival scaling followed by prophylaxis can be normally performed; however, elective treatment ought to be avoided but not contraindicated. Still, it is important to instruct the patient on the importance of diet and oral hygiene to keep oral health and consequently general health of both the mother and the baby.

Notwithstanding, there is a concern on performing treatment during the first trimester. First of all, the developing fetus is at higher risk of teratogens during embryogenesis. Secondly, during the first trimester, it is known that one at every five pregnancies may result in spontaneous miscarriage. Dental procedures executed just before a spontaneous miscarriage can be considered as its cause, worrying both the patient and the dentist whether the miscarriage could have been avoided [5].

### *Dental treatment at the second trimester*

The dentist should follow-up the possible alterations in oral cavity and executes routine

preventive procedures. Whenever necessary, dental treatment may be performed relatively safely [8,11,12]. Diagnosis radiographs, periodontal treatment, restorations and extractions are safer and better accomplished during the second trimester [10].

### **Dental treatment at the third trimester**

At this period, the following routine procedures can be executed: prophylaxis, scaling, tooth polishing, and fluoride application. Curative dental treatments must be postponed because at this phase, the pregnant woman is very anxious due to the proximity of the delivery and is very uncomfortable due to the belly volume. Commonly, the pregnant woman experiences shortness of breath and dizziness when she seats at dental chair because the uterus compress large vessels as inferior vena cava and aorta, leading to hypotension syndrome. Supine hypotension syndrome or inferior vena cava syndrome is observed in approximately 8% of pregnant women as a result of insufficient venous return to the heart due to inferior vena cava compression by the pregnant uterus. This condition manifests as a sudden blood pressure fall, with nausea, dizziness and fainting when patient is at supine position. To avoid this problem, pregnant women should keep their right hip slightly raised (10 - 12 cm) or inclined towards left, while seat at dental chair. Mistakenly, patients believe this discomfort is consequence of anesthesia [5,8,11-13].

Thus, it is necessary to pay special attention on the treatment of the pregnant woman, and mainly, to use preventive and instruction measures, such as:

- Dietary guidance aiming at improving oral health;
- Fluoride applications according to individual requirements;
- Oral decontamination with antimicrobial substances;
- Clinical interventions whenever necessary (allowed by the obstetrician).

### **Emergencies**

Emergency situations require immediate treatment aiming to solve the problem [3,8]. Some situations cannot be postponed, such as pulpitis and pericementitis, acute abscess, pericoronaritis, pulpal exposures due to trauma, periodontitis, and even TMJ dysfunctions, demanding immediate

treatment [8,9,11]. In these cases, it is necessary to promote pain relief, because whenever present, it favors the releasing of adrenalin and corticosteroids, increasing the metabolism and decreasing energy. With the metabolism increasing, higher doses of anesthetic drugs are required. In these situations, the minimum dose required for effective pain control is obviously advisable, thus 2% lidocaine with epinephrine 1:100,000 (two cartridges- 3.6 ml) with slow injection, may be the ideal local anesthetic for a pregnant patient [9]. Intrapulpal anesthesia is required whether the aforementioned formula is not enough to relieve pain.

### **Oral hygiene**

All pregnant women should be instructed regarding to a proper oral hygiene, comprising proper toothbrushing and flossing instructions (after meals). Failure to perform this care would not be harmful for non-pregnant women, but very harmful to pregnant ones. If adequate plaque control habits are not present before pregnancy, the hormonal and behavioral changes occurring together with pregnancy may exacerbate the condition because in pregnancy, an increase of estrogen metabolism by gingival tissue and a greater prostaglandin production is seen, increasing the sensitivity to irritating factors [8].

Recent studies suggest a positive correlation between pregnancy and periodontal disease and the risk of premature delivery of low-weight babies at birth. It has been demonstrated that the induction of high prostaglandin levels due to periodontal infection disturbs the hormonal homeostasis [1]. The periodontal treatment of pregnant women is safe but does not significantly alters the preterm birth rates, low weight at birth, and fetal growth restriction [14].

Infants of mothers with high caries risk are more prone to caries [10]. Women with oral health problems have high amounts of *Streptococcus mutans* in saliva that can be readily transmitted to their babies through ordinary behaviors such as the sharing of a spoon or pacifier and biting of food. The bacteria of the mother increase the chance for child colonization, and consequently, dental caries process. The infection occurs just after birth and the babies' teeth are colonized at their eruption during the first and second years of life. The dental treatment during pregnancy may benefit both the mother and the baby

by eliminating this transmission source of *S. mutans* and providing the early instruction on child oral health and on the prevention of early childhood caries [3]. Xylitol and chlorhexidine may be used as adjunctive therapy for high-risk mothers at postpartum period to reduce the transmission of cariogenic bacteria to the babies. Both topical substances are safe (class B) during pregnancy and during breastfeeding [10].

### Fluoride

Fluoride is an important tool for caries prevention [11]. However, fluoride benefit during pregnancy has been much questioned [15]. According to the Food and Drugs Administration (FDA), an agency that regulates and supervises drug market in the United States of America, the evidence for supporting the prescription of fluoride supplements during pregnancy is weak [9].

Fluoride supplementation (drops or tablets) during pregnancy is not recommended mainly where water fluoridation is supplied. The literature lacks of scientific evidence of the further benefit to the babies' teeth, especially as generally recommended by obstetricians, that is, associated with multivitamins in which calcium and other minerals are present and inactivated the fluoride action [1,9,11].

### Stress

Pregnancy is characterized by an altered emotional state. Stress, emotional distress or even a shock causes a reflex that excites the adrenal glands leading to a greater discharge of adrenalin and corticosteroids inside the bloodstream. If uncontrolled stress continues acting on the pregnant woman's body, the amount of corticosteroids influences the baby's development and it can be the cause of cleft lip and palate or miscarriage at the second month of pregnancy [8,12,16]. Drug administration to relieve stress is contraindicated. Providing security to pregnant women is the most effective procedure to decrease stress.

### Use of dental anesthetics

In Dentistry, the choice for the local anesthetic drug should be based on its efficacy for the mother and safe for the baby [9,17]. The type of anesthetic drug should be selected during anamnesis and can include those with vasoconstrictors aiming to slow the absorption of the anesthetic salt from the bloodstream – which decreases its toxicity and

increases the time period of local anesthesia. The obstetrician's evaluation on the health state of pregnant women with problems may help the dentist to select the best drug (Chart 1 and 2).

**Chart 1** - American classification of pregnancy risk (Food and Drug Administration - FDA)

Pregnancy risk (American Classification)	
<b>A</b>	Lack of evidence of risk in women
<b>B</b>	Lack of adequate studies in women. Animal studies failed to demonstrate risk.
<b>C</b>	Lack of adequate studies in women. Potential benefits may warrant use of the drug in pregnant women despite potential risks
<b>D</b>	There is positive evidence of human fetal risk. Only use if potential benefits justifies the potential risks
<b>X</b>	Studies demonstrated positive evidence of human fetal risk. The risks clearly outweigh potential benefits. Do not use under any circumstances.

**Chart 2** - Anesthetics used in Dentistry

ANESTHETICS	RISK
Prilocaine	B
Lidocaine	B
Mepivacaine	C
Bupivacaine	C
Etidocaine	B
Tetracaine	C

The use of local anesthetics such as lidocaine, prilocaine and etidocaine is safe. Notwithstanding, prilocaine crosses the placenta faster than lidocaine, mepivacaine, and bupivacaine due to its smaller molecule. Excessive doses of prilocaine can cause methemoglobinemia. This is a potential side effect of the administration of large doses of prilocaine and articaine, result in respiratory damages and even death. Lidocaine with adrenalin is the adequate association for local anesthesia in pregnant women. The use of 1.8 ml of 2% lidocaine with adrenalin was safe and effective for restorative procedure in pregnant women with rheumatic valvular heart disease [17]. Bupivacaine, mepivacaine and tetracaine are contraindicated because they can put the baby at risk of fetal bradycardia [8,15,16]. Nitrous oxide is not recommended at the first trimester because it can induce miscarriage [8,16].

The use of local anesthetics with vasoconstrictors is safe during pregnancy. However, the salt, the type and concentration of the vasoconstrictor must be observed. Felypressin and bupivacaine should be avoided due to the potential risk of uterine contraction and long period of action, respectively. Mepivacaine is not well metabolized by the fetus liver. The pregnancy itself does not contraindicate the use of local anesthetics with vasoconstrictors. However, its use should be avoided in special situations, such as untreated hypertension, diabetes, severe heart disease, hyperthyroidism, patients taking drugs with potentially adverse side effects (tricyclic antidepressants, nonselective  $\beta$ -blockers, and cocaine) and patients allergic to sulfites [1].

#### **Dental radiographs during pregnancy**

According to Lee et al. (1999) [13], radiographs should be taken only when necessary for diagnosis and emergence dental treatment. Whenever indicated, caution should be taken with limited number of exposures and the amounts strictly necessary. However, possibility of damage to the baby and mother is low because the amount of radiation and the exposure time are small and short. Notwithstanding, at the first trimester (embryogenesis period), radiographs must be avoided [8,11,13]. The teratogenic risk of exposure to radiation of oral radiographic films is 1,000 times smaller than that of spontaneous miscarriage or malformation [10]. The American Congress of Obstetricians and Gynecologists also recognized that the limited exposure to medical x-ray for diagnosis purposes does not put the fetus at risk: "The exposure to less than 5 rad have not been associated with the increase of fetal anomalies or miscarriage", and diagnosis x-ray procedure at the beginning of the pregnancy does not damage the pre-embryo or developing embryo [3,5]. According to Timins (2001) [18], the mother exposure to x-ray is considered as low and does not increase the malformation incidence; however, the risks from higher radiation doses may be associated with damages to central nervous system of the developing fetus.

Some precautions assure the safe of both the mother and baby, at any pregnancy stage, not only for pregnant women but also for all patients [9]:

- To direct the x-ray beam to the mouth, far from the belly;

- To use lead apron and thyroid shield to neutralize the radiation effects;

- To choose high-speed films that allow a short exposure time (0.2 to 0.3 s);

- To use x-ray beam collimator.

#### **Drugs**

Whenever possible, the patient's obstetrician should be contacted to obtain information aiming to evaluate the risk/benefit ratio regarding to the use of drugs. According to Lee et al. (1999) [13], an oral infection has great potential to provoke bacteremia or septicemia, resulting in serious fetal complications, therefore prophylactic antibacterial treatment is important in pregnant woman.

Caution should be taken for drug prescription to reproductive-age women because of pregnancy probability. During the first trimester, the most critical period of the fetal development, it is common that the woman does not know that she is pregnant, and therefore takes potentially harmful drugs. Drugs account for 2% to 3% of the malformation cases in babies and may result in the fetus death at the first days of pregnancy. The periods of greater risk for drug use are the first and last trimester [8,13,16]. Up to approximately 15 days after fertilization, the drug may cause the fetus death. After that period, the drugs may cause malformation for about 60 days after fertilization. From that moment on, at the growth period and ending of pregnancy, the manifestations occurring from the use of drugs may cause the functional deficiency of any baby's organ.

Around the sixth pregnancy week and fifth month of intrauterine life, respectively, the primary and permanent teeth of the baby are forming. Thus, unfavorable conditions during pregnancy, such as: drug use, infections, nutritional deficiencies, among others, may cause problems to forming teeth and tooth mineralization.

#### **Antibiotics**

The most important and first procedure consists in removing the infection cause. Whenever antibiotics are indicated (infections with systemic manifestation, for example, fever and presenting signs of dissemination), penicillin (penicillin V or amoxicillin) should be used. Penicillin, including amoxicillin and cephalosporin, has been generally considered as safe during pregnancy [8,9,15,16,19].



Penicillin G or V, erythromycin and ampicillin crosses the placental barrier but have low toxicity (Charts 3 and 4). If risk of allergies to penicillin is present, erythromycin should be the antibiotic of choice, preferentially stearate rather than estolate (hepatotoxic potential) [15,19].

*Chloramphenicol* and *Streptomycin* may injure the acoustic nerve of the fetus and inhibit different enzymatic systems, reflecting in the protein metabolism. Because they are toxic to the fetus, they alter and darken the enamel organ [15]. *Tetracyclines* (Tetrex, Terramicina, etc.) may lead to alterations in fetus, because they interfere in the development of the enamel, dentine during tooth formation, provoking alterations in their color from yellow to bluish gray. Tetracyclines early and markedly fix on teeth and bones, competing with calcium ions, resulting in chelation and hypoplasia. Because of these drawbacks, these antibiotics should be avoided during pregnancy and childhood [8,15,16]. Other antibiotics of macrolide class, such as *roxithromycin*, *azithromycin* and *clarithromycin*, have been recently introduced into pharmaceutical market and have not been studied in pregnant women [9]. Sulfa acts on bilirubin metabolism by impregnation on base nucleus thus leading to kernicterus in the fetus when taken by pregnant women [15].

According to Andrade (2002) [9], in cases of more severe infections, amoxicillin may be associated with clavulanate potassium (ex. Clavulin®);

**Chart 4** - Therapeutics indicated for pregnant women

THERAPEUTICS INDICATED FOR PREGNANT WOMEN		
Drugs	Posology	Care
Local anesthetics	2% lidocaine with adrenalin 1:100.000 (Alphacaine®) or 2% lidocaine with noradrenalin 1:50.000 (Xilocaina®).	Maximum limit of 2 cartridges (3.6 ml) per clinical appointment. Always execute previous aspiration and slow injection of the solution.
Analgesics	Paracetamol (500 a 750 mg) or Dipirona (500 mg).	Maximum limit of 3 daily dosages, at 4-hour intervals for determined time period.
Corticosteroid Anti-inflammatory drugs	Betamethasone or dexamethasone (4 mg).	Single dose
Antibiotics	Penicillin (penicillin V or amoxicillin). Pregnant women allergic to penicillin – Erythromycin Stearate.	Usual dosages.

**Chart 3** - Antibiotics of choice during pregnancy

ANTIBIOTICS	USE DURING PREGNANCY	RISK According to FDA
Doses and posology		
Penicillin, Amoxicillin, Cephalexin	Safe use	B
Erythromycin	Erythromycin stearate – Safe use – allergic to penicillin; however, ineffective against anaerobic bacteria.	B
	Erythromycin estolate – contraindicated. Hepatotoxic.	C
Tetracycline, Doxycycline	Contraindicated. They may alter the tooth color of the baby when taken at 2 <sup>nd</sup> half of pregnancy. Risk of inhibition of bone growth and congenital cataracts.	D
Amoxicillin U Clavulanic acid and Clindamycin	Whenever necessary, their use is indicated only at 2 <sup>nd</sup> and 3 <sup>th</sup> trimester	B
Metronidazole	Contraindicated. Mutagenic potential in bacteria and carcinogenic in rats.	C
Chloramphenicol	Contraindicated. Grey baby syndrome and fetal death.	C

patients allergic to penicillin, clindamycin should be prescribed (ex. Dalacin C®).

### **Analgesics and Anti-inflammatory drugs**

Situations resulting in pain, prescription of analgesic drug are necessary, but firstly one should remove its cause. When analgesics are precisely indicated, *Paracetamol* is safe to be used in pregnancy and is the drug of choice for pain relief. Paracetamol should not be associated with other drugs, especially with codeine, because this latter may provoke fetal malformations [8,11,15-16]. Centrally acting analgesics should be carefully administrated only when extremely necessary.

Non-steroidal anti-inflammatory drugs (NSAIDs) should be carefully used during pregnancy. Many authors contraindicated Aspirin during pregnancy [8,11,15,16], because it inhibits the releasing of adenosine phosphate (ADP) and may cause energy deficiency and prolonged pregnancy. Moreover, due to its anticoagulant action, these analgesic drugs may provoke bleeding during dental surgeries and high doses may cause oral clefts and other fetal defects [9]. These drugs are classified as class D at third trimester because they have been associated with uterine inertia, childbirth complications and constriction of the fetal ductus arteriosus [1].

Acetaminophen at therapeutic doses has been classified as class B. It has been not associated with complications during pregnancy and it is the analgesic drug of first choice [1]. Ibuprofen is both an analgesic and non-steroidal anti-inflammatory drug, of peripheral action, which when indicated during pregnancy should be carefully used because may cause alterations on fetal and neonatal blood circulation. Aspirin and Ibuprofen inhibit prostaglandin synthesis and may provoke the premature closure of the fetal ductus arteriosus resulting in pulmonary hypertension and increasing of fetal mortality [8,15-16]. Corticosteroids (betamethasone or dexamethasone) can be prescribed to pregnant women in surgical or endodontic procedures which cannot be postponed until the ending of the pregnancy [9,15].

### **Anxiolytics**

Verbal reassurance method or other psychological conditioning methods should be opted in pregnant women extremely anxious to dental treatment, avoiding the use of pharmacologic

drugs. The use of benzodiazepines and other central nervous system depressants is questionable even with lack of concrete evidence that these drugs cause defects in human fetus. Notwithstanding, some studies have indicated a greater incidence of cleft lip and palate in children after use of diazepam by pregnant women at the 1st and 2nd trimester, therefore contraindicating its use during pregnancy [9,15]. Thalidomide (phthalic glutamic acid imide) is a sedative, sleep-inducing drug accounting for limb malformation. Thorazine and Doridem may induce miscarriage. Aminopterin, used in the treatment of leukemia, has high toxicity provoking thrombocytopenia and leukopenia [15,16]. Barbiturates should not be indicated because they cause placenta rupture and fetal damages [8]. If Anxiolytics are required, the obstetrician should be contacted to evaluate their use.

## **FINAL CONSIDERATIONS**

Dentists normally hesitate in treating pregnant women by fear of causing damage to both the mother and baby. Meanwhile, many pregnant women do not search dental treatment during pregnancy because they think this may be harmful to the baby. Patients and dentists should be educated that dental care during pregnancy is of great importance to maintain oral/general health of the mother. Dental care should include instructions on oral hygiene and diet, prophylaxis and non-invasive treatments whenever necessary. Notwithstanding, either elective treatment or drug prescription should be carefully executed after agreement between the dentist and obstetrician. The baby is not at risk whether the dentist is informed on the procedures that may or may not be performed and on the drugs that can be safely administered to the mother (Chart 4). Dental care of the mother and the contact with the obstetrician avoid problems when dental treatments are required and cannot be postponed.

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