Yonie Younes Aziz

Pregnancy and its relation with oral cavity diseases – Narrative review

Universidade Fernando Pessoa
Faculdade de Ciências de Saúde

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I certify the originality of the work,

(Yonie Younes Aziz)

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ABSTRACT

Pregnancy leads to hormonal and physiological changes that have aggravating effects on different diseases of the oral cavity. In addition, other aggravating factors come into play, preventing a return to a physiologically stable situation, such as acidification of the oral environment, vomiting and alterations in eating behavior. Studies in this area have shown that some preconceived ideas have proven to be false, such as the famous expression one baby, one tooth. The repercussions of oral diseases on the health of the mother and the fetus are also highlighted. For the control of these diseases, prophylaxis plays an essential role and treatment is paramount. The pregnant woman must be treated according to a certain protocol with respect to her unborn baby. This narrative review will describe the actual knowledge regarding the relation between pregnancy and oral cavity diseases. Only articles written in French or English and in open access were included.

Keywords: Pregnancy; Oral cavity; Diseases

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INDEX

LIST OF ABBREVIATIONS

FDA: Food and Drug Administration

GBS: Group B streptococcal

IL-1: Interleukin-1

IL-6: Interleukin-6

IL-8: Interleukin-8

NSAIDs: Non-steroidal anti-inflammatory drugs

PG: Prostaglandin

PGE2: Prostaglandin-E2

PGF2: Prostaglandin-F2

pKa: Acid dissociation constant

TNF: Tumor necrosis factor

TNFα: Tumor necrosis factor α

WHO: World Health Organization

I. INTRODUCTION

During pregnancy, most believe that poor oral health status is normal, and that dental treatment could be harmful to the fetus. Pregnant women are unaware that oral health problems that occur during pregnancy can increase and that there can be systemic consequences for the fetus and the woman herself (Radha & Sood, 2013).

Gingivitis and periodontitis are conditions that can be linked to the changes that take place in the oral cavity during pregnancy. The increase of pregnancy hormones in the plasma has been related with the aggravation of periodontal disease. Gingivitis affects between 60 and 75% of pregnant women (Hartnett et al., 2016).

Periodontal infections were studied to highlight their relations with various diseases such as cardiovascular, respiratory diseases as well as diabetes. Periodontal disease can also cause various complications in the pregnant woman and the fetus during pregnancy. Despite preventive measures and treatments to reduce periodontal disease, there is still a high prevalence of caries and periodontal infections in these patients. It has been proven that oral and general health are interdependent and can have consequences for the fetus as well, which is why good dental health should be every woman's goal (Boggess, 2008).

To ensure the safety of the baby, the pregnant woman may require dental care for certain oral complications. Dental surgeons are responsible for advising pregnant women on their oral health care (Fagoni et al., 2014).

The goal of this thesis is to evaluate the relations between the pregnancy and different oral cavity diseases and give special attention to the several treatment options that can be considered as harmful for those patients with specific demands.

I.1 Materials and methods

Scientific papers were indexed in databases such as PubMed, Google Scholar, Science Direct to perform a narrative review. Used keywords were "pregnancy", "oral cavity", "diseases". Inclusion criteria were papers written in French or English and in open access. The exclusion criteria were papers with less relevant approaches to the work. In the end, 42 papers, books and websites containing information considered relevant to the development of the thesis were selected.

II. DEVELOPMENT

II.1 Oral pathologies during pregnancy

II.1.1 Physiological impacts

II.1.1.1 Hormonal changes

In a woman's life, the major physiological and hormonal changes occur during pregnancy. The concentrations of progesterone and estrogens (estrone, estradiol and estriol) gradually increase during the whole gestation period until the 8th month of pregnancy. During the last month, progesterone concentration remains constant, but estrogens concentration continues to rise (Laine, 2002).

The progesterone and estrogens levels are increased due to the placenta secretions, that rise about 10 times for progesterone and 30 times for estradiol (El Merini et al., 2003).

These increased levels lead to vasodilatation and permeabilization of blood capillaries of the oral cavity (Doucède et al., 2019).

The increased amount of progesterone in the oral mucosa can be used as nutrient, promoting the proliferation of microorganisms (*Prevotella intermedia* and *Treponema denticola*) in the oral cavity (Usin et al., 2013).

II.1.1.2 Ptyalism

Ptyalism is an excess of the secretion of saliva, also known as sialorrhea. It is quite common in women with deglutition issues and nausea. This condition usually starts after 2-3 weeks of pregnancy and stops after delivery. Women with ptyalism have issues with saliva such as expectorations and difficulties to talk. Their tongue can be enlarged, red and coated, leading to speech difficulties. The salivary flow for non-pregnant individuals is about 22,0 ± 2,2 mL/h. Pregnant women do not suffer from an excess of saliva production but from difficulties to swallow the saliva due to nausea, which makes them feel like they produce more saliva (Dinter, 1991).

II.1.1.3 Acidification of oral pH

Normally, the oral pH is neutral. Due to the hormonal changes occurring during pregnancy, the balance is affected, and the pH becomes acidic (decrease of Ca^{2+} and

HCO_3^-). This slight drop leads to a decrease in the buffering capacity of the saliva that can lead to an increase of the dental erosion and a quicker evolution of pre-existing cavities (Doucède et al., 2019).

Progesterone and estradiol can be present in saliva and be used as nutrient for the microorganisms of the oral cavity allowing their proliferation, and therefore lead to changes in the composition of the bacterial plaque. The contribution of those factors leads to an acidification of the medium, dropping the pH from 6.7 to 6.2. This leads to a decrease in the efficacity of the salivary buffering power (El Merini et al., 2003).

II.1.1.4 Vomiting

Vomiting and nauseas, also known as "morning sickness", is a condition that affects 80% of pregnant women. It starts between the 4th and 7th week after the last menstrual period. The exact causes of this condition have not been exactly defined and remain unclear. Progesterone has consequences in the gastrointestinal tract dysfunction. Human chorionic gonadotropin and estrogens have controversial roles. Chronic infections with *helicobacter pylori* may have a role as well. This condition is resolved by itself in 90% of women after the 20th week of gestation.

A more severe form of nausea and vomiting called hyperemesis gravidarum affects one in 200 pregnant women. This condition has other clinical features including persistent vomiting, dehydration, ketosis, electrolytes disturbances and weight loss (5% of body weight) (Doucède et al., 2019).

II.1.1.5 Dietary modifications

Gaining weight during pregnancy leads to pregnancy complications and future health problems in the child. Gestational weight gain is associated with birth weight, and babies with a weight exceeding 4 kg have more chances to end up being obese later in life. For mothers, miscarriage, diabetes, and preeclampsia are possible consequences of excess intake of calories. For children, the consequences are obesity and type 2 diabetes mellitus. On the other hand, opposite effects were observed with nutritional insufficiency like low birth weight or fetus being too small for gestational age, leading to glucose intolerance, diabetes mellitus, hypertension and coronary disease that can occur later in life (Danielewicz et al., 2017).

II.1.2 Diseases

II.1.2.1 Gingivitis and periodontal diseases

Periodontal disease is mainly caused by the bacterial film which contains a mix of several hundred species of bacteria. The bacterial plaque also known as dental plaque extends from the supragengival area to the subgingival area. Several components of the saliva play a role in the adherence of the biofilm such as glycoproteins, proline-rich proteins, statherin and fibronectin. The primary colonization of the bacterial film is made with Gram+ bacteria that proliferate and form micro-colonies. Few days after the initiation of the dental plaque growth, filamentous bacteria coaggregate the primary colonizers leading to a matrix composed of exopolysaccharides of bacterial origin and salivary components. The result after 2-3 weeks without the removal of this bacteria plaque, is the establishment of a gingivitis. The composition of this bacteria film changes and becomes more complex with the appearance of Gram- anaerobic bacteria such as spirochetes, flagellated bacteria, rods, cocci, fusiforms and filaments that even become the predominant species. These Gram- anaerobic bacteria take their nutrients from the saliva and from the crevicular fluid, but also some bacteria produce what other bacteria need for their metabolism. These bacteria live together and are interdependents. This plaque is localized around the gingival margin and the gingival sulcus. Some bacteria products have the capability of passing through the epithelial and reach the subepithelial tissues. The consequence of this mechanism is the production and release of inflammatory mediators that lead to an increased vascularity and diapedesis, loss of connective tissues, increased production of crevicular fluid and tissue swelling. The local inflammation promotes the subgingival evolution of the plaque where Gram- bacteria are predominant. Some Gram- bacteria are known to be pathogenic for the dental supportive tissue (*Trannerella forsythensis, Prophyromonas gingivalis and Treponema denticola*). Supra and subgingival plaque can be mineralized and form a hard and tenacious mass called calculus. These deposits exacerbate the inflammation due to the presence of more pathogenic bacteria (*Prevotella intermedia, Actinobacillus actinomycetemcomitans, Eikenella corrodons*). Since the subgingival calculus serve as attachment for more and more bacteria, it has a contribution in the development of pockets and the progression of the periodontal disease (Bernimoulin, 2003).

II.1.2.2 Pregnant epulis

The pregnant epulis also known as pyogenic granuloma or epulis gravidarum is a benign vascular tumor of the mucosa found in pregnant women. This lobular lesion consists of loose granulation tissue with a proliferation of endothelial cells and capillary vessels with also presence of inflammatory mediators and fibrous tissue. The epulis is usually solitary but can also be composed of multi satellite lesions. The size varies from various millimeters to few centimeters. The localization of the epulis is most common in the gingiva but can also occur on the tong or lips. Generally, the lesion appears between the 2nd and the 3rd month of pregnancy, but it can take place anytime during gestation and even after the postpartum period. This condition is present in about 0.2% to 5% of all pregnancies (Rader et al., 2008).

Trauma or irritation such as gingivitis can be the cause for the initiation of a lesion accentuated by the hormonal changes in the oral cavity during pregnancy. The lesion has a bright red color which may bleed when stimulated. This condition can affect adjacent teeth leading to migration or increased mobility. Normally the lesion regress and disappears by itself after delivery but can also be persistent and need surgical excision after delivery (Hunter & Hunter, 1997).

II.1.2.3 Tooth erosion

Erosion is an alteration of the dental surface by chemical agents, especially acids, that leads to loss of material. It is related to dietary conditions, occupation and repetitive vomiting, which is frequent in pregnant women. The most severely affected teeth are the palatal surface of the superior incisors, cuspids and bicuspids. The damage caused by this erosion is a high thermal change sensitivity due to exposed dentin (Hunter & Hunter, 1997).

Prevention is the key for this condition. The regular use of fluoride mouth rinse, especially for women who suffer from frequent vomiting is recommended. Another recommended measure is to avoid brushing teeth immediately after vomiting or after any acid exposure on teeth since the erosion effect can be exacerbated by brushing a demineralized tooth surface (Pirie et al., 2007).

II.1.2.4 Dental mobility

Normally, teeth mobility varies in a range of physiological measures but can be influenced by local and systemic changes. The most important local factors are occlusal habits, body position, mastication, and deglutition. The systemic factors such as hormonal changes during pregnancy are more difficult to elucidate. Mobility is mainly increased due to enhanced initial free intra socket movement of the roots and not related to an increasing elastic distortion of the bone. Initial mobility depends on the degree of the vascularization and the vascularization volume of the periodontal site. Female sex hormones may have a hyperemic action and increase vascular permeability of the periodontal tissues which may lead to an edema and tooth extruding effect that can be the cause of an increased horizontal mobility (Rateitschak, 1967).

Dental mobility changes have been recorded on studies with pregnant women during their pregnancy even with periodontal healthy subjects. The most affected teeth seem to be the upper anterior teeth which had their mobility increasing the most during the last month of pregnancy. This condition appears to be caused by the mineral shift of the lamina dura, being not linked with any modification of the alveolar bone. The presence or not of periodontal disease and disturbance of the supporting attachment tissue may also contribute to the increased teeth mobility during pregnancy. After delivery and during the postpartum period, teeth mobility is supposed to decrease and come back to the normal physiological mobility (Pirie et al., 2007).

II.1.2.5 Cavities

Today, people still think that pregnancy is a cause of tooth loss (“a tooth for every child”) or that the mother’s calcium is withdrawn to be transferred to the child. The relation between tooth decay and pregnancy is not well defined, but it seems that pregnancy is not responsible of tooth decay (Hunter & Hunter, 1997).

Usually, the development of caries takes several years so the possible relation with pregnancy is difficult to estimate. Chemical analysis has shown that the mineral content of a tooth from a pregnant and a non-pregnant woman is the same. However, the saliva components (calcium and phosphate) seem to be reduced during pregnancy, making the demineralization process increase and the remineralization process decrease. On the other hand, during late pregnancy and lactation, saliva contains increased levels of *Mutans*

streptococci that can increase the possible development of caries. The pulp response to dental caries during pregnancy is not well known and no evidence about the velocity of cavity evolution can be made. It seems that cavities and caries are more indirectly increased by various changes occurring during pregnancy (saliva composition and salivary gland function) than pregnancy itself (Laine, 2002).

II.2 Impact of oral pathologies on pregnancy

II.2.1 Pathophysiology

Preeclampsia is a significative and specific disorder that can occur in pregnancy. It can lead to severe mortality and morbidity for the mother and the child. It can occur in 5-10% of pregnancies and develops after 20 weeks of gestation. This condition is characterized by abnormal vascular response to placentation manifestation such as activation of coagulation system, generalized vasospasm, reduced organ perfusion that can affect the brain, the liver, and the kidney. Two conditions are necessary to preeclampsia: the first is a blood pressure exceeding 140/90 mmHg after the 20th week of pregnancy, and the second is a proteinuria above 300 mg in a 24-hour urine sample. Bacteria and their byproducts are the etiologic agents of periodontitis which is considered a chronic inflammatory oral infection. The immune-inflammatory response of the periodontal tissues activates cytokines such as interleukin (IL)-6, IL-1, and tumor necrosis factor (TNF), which activate prostaglandin (PG) production leading to bone loss and destruction of the connective tissue. These immune-inflammatory agents have also systemic consequences in vascular response that may lead to complications such as preeclampsia and low birth weight infants (Shetty et al., 2010).

Pregnant women with periodontal disease at delivery have a higher risk of developing a preeclampsia regardless of their age, smoking habits or race. It is thought that active periodontal disease in pregnant women may lead to a translocation of oral microorganisms to the uteroplacental area, which can initiate placental inflammation leading to placenta tissue damage and clinical manifestation of preeclampsia. Early treatment of periodontal disease may represent an approach to the prevention of preeclampsia (Boggess et al., 2003).

II.2.2 Complications during pregnancy

Periodontal disease, a chronic pathology of bacteria origin, is suspected to be an endogenous factor that may lead to higher risk of premature childbirth. Offenbacher and his team (Offenbacher et al., 2001) were the first to elaborate the possible connection between periodontal disease and premature childbirth. Prematurity refers to a child born before 37th week of pregnancy and represents the biggest cause of neonatal mortality and morbidity. An added distinction can be made to categorize the preterm pregnancy: premature between 35 and 36 weeks, very premature between 28 and 32 weeks and extremely premature if it is less than 28 weeks. About 6% of births are preterm in France and they are considered as a major problem in public health because preterm birth is the main cause of neonatal morbidity and mortality. The sequels for the premature child can be multiple such as respiratory, sensory, neurological and developmental defects. As the pregnancy is shorter, the issues and complications for the baby are bigger (Laine, 2002).
Preterm birth is a major obstetrical problem and a significant socio-economic public health issue. In the United States of America, 12% of newborns are premature where more than a third are born before the 34th week of pregnancy. This rate is continuously increasing (Goldenberg et al., 2008).
Several factors increase the risk of prematurity such as alcohol, smoking, age, race, low weight mother, stress, cervical length, low economic status, first pregnancy, inadequate perinatal follow-up, recreational drug use, poor nutrition, hypertension, genitourinary infections, diabetes, multiple pregnancies, and history of preterm delivery (Offenbacher et al., 2001).
Amniotic fluid infection is a known cause of preterm birth. Approximatively 25% of preterm births are detected in case of amniotic fluid infection (Romero et al., 2003).
Hypotheses have been proposed for the transmission of bacteria to the amniotic cavity. These hypotheses propose either ascending transmission via the genitourinary tract or hematogenous transmission through blood stream. The first option is the most accepted by the medical community. Urogenital infections could travel all the way from the vagina to the uterus and contaminate the amniotic fluid. Studies have made the light on the increased prevalence of preterm birth in pregnant women with genitourinary tract infections than without (Offenbacher et al., 2001).
A high concentration of inflammation mediators such as IL-1, IL-6, and IL-8, PGE2 and PGF2, as well as TNFα are recorded during a premature delivery, following an infection.

These substances regulate the process of labor and delivery in late pregnancy. Numerous enzymes (collagenases, elastases, and other proteases) are produced in response to these mediators. Studies have revealed the possibility of systemic vascular dissemination as well as the possibility for certain microorganisms to penetrate host cells. *Porphyromonas gingivalis*, a Gram-anerobic bacterium, can invade epithelial and endothelial cells. *Fusobacterium nucleatum* is present in periodontal sites and can be localized in epithelial cells. The spread of a periodontal infection at a distance without activating the immune system is quite possible thanks to the ability of bacteria to invade the intracellular zone as well as cellular translocation (Romero et al., 2008).

II.3 Oral treatments during pregnancy

Dental treatment should ideally be scheduled during the second trimester of pregnancy since the period of fetal organogenesis is normally complete. In the case of emergency situations, dental care can be provided regardless of the period of pregnancy. However, the third trimester imposes a new constraint, which is the discomfort of posture and the high risk of compression of the vena cava. Reclining the pregnant woman on her left side, repositioning her often in an ideal position and shortening the duration of the consultations helps to reduce this problem. Since mothers are too focused on their babies after delivery, it is best to treat patients during pregnancy to avoid problems that may arise from untimely treatment (Silk et al., 2008).

It is preferable to avoid any type of dental treatment during the first trimester of pregnancy, a period corresponding to the organogenesis of the fetus. This period is very sensitive and unnecessary procedures should be avoided as they may result in abortion. However, if the treatment is not at risk or in case of pain for the patient, the teeth must be treated urgently. In the case of pain, endodontic treatment or tooth extractions can be performed. Many treatments are delayed until the end of pregnancy. However, the second trimester is the ideal time for treatments that cannot wait until the end of the pregnancy. During this time, dental restorations, endodontic treatments, and dental extractions can be performed. Despite the hesitation of some women, recent studies have indicated that some dental treatments can be performed safely during pregnancy, such as scaling, extractions, local anesthesia, and endodontic treatments. In some situations, gum or tooth inflammation can lead to infections that are more harmful to the baby's health than the dental treatment that could cure the infection in question. Ideally, there should be two

consultations during the first trimester and one in each subsequent trimester (Yenen & Ataçağ, 2019).

II.3.1 Medication

Drugs administered to a pregnant woman may have teratogenic effects on the fetus and may be associated with the development of structural abnormalities in the fetus. The placental exchange of substrate between the mother and the fetus is established from the 5th week of embryonic life. Any substance administered to the mother has the capacity to cross the placental barrier unless it has a too large molecular size, is destroyed during its passage or is prevented from doing so by its low liposolubility. Under the effect of concentration, all substances of low molecular weight (below 600 Daltons) diffuse freely through the placental barrier. Practically all therapeutic substances can pass from the mother to the fetus, so the notion of a "placental barrier" is wrong. The most important question is whether the transfer is sufficient to allow significant concentrations in the fetus that could cause teratogenicity or fetotoxicity (Donaldson & Goodchild, 2012).

II.3.1.1 Analgesics

The stress caused by dental pain can trigger contractions in a pregnant woman. It is therefore preferable, following a consultation with the patient, to prescribe analgesics to stop the pain (Yenen & Ataçağ, 2019).

A lot of peripherical acting analgesics should be avoided during pregnancy even if they are commonly used. Paracetamol (acetaminophen) is the best option to treat pain for pregnant women. Non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, naproxen and aspirin are involved in the inhibition of prostaglandin synthesis which is involved in the labor induction. The consequence of using them can make the pregnancy longer than normal by inhibiting the labor initiation. Prostaglandin inhibition can also cause constriction of the ductus arteriosus which may lead to infant's pulmonary hypertension. For those reasons, NSAIDs are preferably avoided during pregnancy, especially during the last trimester. Due to postpartum hemorrhage and delivery complications, aspirin should not be used (Moore, 1998).

Fetal dependence, preterm delivery, neonatal respiratory depression, and growth retardation are possible consequences of chronic opioid use in pregnant women. An

interprofessional approach is recommended in cases of severe chronic pain (Ouanounou & Haas, 2016).

II.3.1.2 Antibiotics

During pregnancy, antibiotics are among the most used medication by pregnant women. However, antibiotic prescription is avoided because of their teratogen and toxic effect during pregnancy (Moore, 1998).

The prescription of antibiotics to pregnant women is faced as a dilemma and suggestions have been made about it. The use of antibiotics for pregnant women should only be indicated in cases of confirmed infection, prevention of ascending infection or neonatal group B streptococcal (GBS) sepsis. It should be avoided the initiation of antibiotics medication during the first trimester because it constitutes a higher risk of teratogenicity. Among the several antibiotics in the market, it should be selected the safest ones like older ones with proven track records. The use of narrow-spectrum antibiotics is preferable over broad-spectrum. The recommended dose should be the lowest possible for the specific antibiotic depending on their lowest effective dose. Finally, it should be recommended to the pregnant women, to avoid using over-the-counter drugs which may interfere with the antibiotics effect or the metabolism (Norwitz & Greenberg, 2009).

II.3.1.3 Anesthetics

The dentist should always evaluate the benefits-risks balance before administering any medication to patients especially when pregnant. In cases of questions or concerns, it is always judicious to contact the obstetrician in charge or the gynecologist before any dental procedure (Steinberg et al., 2013).

The amount of anesthetic that crosses the placenta is determined by the volume of anesthetic delivered to the mother but also by the type of administration, the presence or not of vasoconstrictor, the half-life of the anesthetic in the mother, the metabolic rate, the acid dissociation constant (pKa) of the anesthetic as well as the rate of binding to maternal and fetal proteins. There are 2 types of anesthetics: ester and amide. The esters, via esterase, are hydrolyzed in the plasma and their duration of action is shorter than the amides. Esters have little effect on the fetus because they are rapidly hydrolyzed in the maternal plasma. They are more likely to cause allergic reactions while amides much less.

Amide anesthetics are widely used clinically, and their effects vary according to their type. The binding of the anesthetic to maternal proteins greatly affects the amount of anesthetic that is delivered to the fetus. Bupivacaine, being an amide, is known to have the lowest maternal-fetal diffusion ratio. For this reason, bupivacaine is widely used in pregnancy because it has few consequences for the fetus. However, at toxic doses, it can lead to inhibition of cardiac conductance and subsequent cardiac arrest with little chance of survival. Therefore high-concentration of bupivacaine is always avoided in classic dental treatment procedures (Lee & Shin, 2017).

During pregnancy, lidocaine, prilocaine and etidocaine can be administered to pregnant women with or without vasoconstrictors. The Food and Drug Administration (FDA) classification rank them in B category. The dosage for pregnant women is different than the general population decreasing the maximum dose to 500mg for lidocaine, 600 mg for prilocaine and 400 mg for etidocaine (Achtari et al., 2012).

II.3.2 Dental materials

Amalgam, although it has advantages over other restorative materials, can release mercury in different forms. The release of mercury from amalgam is about 10 µg/day while the maximum recommended dose by the World Health Organization (WHO) is 2 µg/kg/day. Hydrogen peroxide, a dental brightening agent, should be avoided during pregnancy because it increases the release of mercury from amalgam. During pregnancy, a conservative approach is recommended, and the placement or removal of amalgam restorations should be avoided despite the low toxicity. Several studies have shown no relationship between pregnancy complications and amalgam placement during pregnancy (Wrzosek & Einarson, 2009).

II.3.3 Radiography

Any exposure of the fetus to radiation above 10 rads is dangerous and can cause mutations, eye abnormalities and mental retardation. A dental X-ray that is directed at the mother results in a fetal radiation level of 0.01 millirads. Despite this, experts recommend waiting after the delivery before any radiation exposition. If the dentist requires the use of an X-ray machine, it must be done within safe limits and in compliance with all protective measures (thyroid collars and aprons) (Naseem et al., 2016).

III. DISCUSSION

The health of periodontal tissues is mainly threatened by the presence of bacteria in biofilms. However, some factors, such as pregnancy which causes hormonal changes, lead to modifications of the oral sphere with deleterious consequences for the periodontium (Thakur et al., 2020).

The action of sex steroid hormones leads to an increase in vascular permeability and thus contributes to gingival changes. The increase in vascular permeability is involved in the clinical features of gingivitis (Morelli et al., 2018).

About 70% of pregnant women are affected by certain disorders such as nausea and vomiting. Hyperemesis gravidarum is the most severe form and affects between 0.3 and 10.8% of pregnancies. This condition can lead to complications for the mother, the fetus and the unborn child (Fejzo et al., 2019).

The incidence of epulis is reduced when pregnant women receive prophylactic treatment. Particular attention is paid to the control of plaque and biofilm during pregnancy to avoid any possible complications that may arise. Prophylaxis is used for prevention while surgical resection is indicated for persistent cases of epulis (Omisaki et al., 2020).

During pregnancy, dental caries is an important disease of the oral cavity and must be treated to avoid any local or systemic complications. The role of prevention in pregnant women is therefore very important (Chawla et al., 2017).

Controlling plaque by brushing, flossing and prophylaxis (scaling, surfacing, and polishing) helps to maintain good oral hygiene and health. Dental treatments can be safely performed at any time during pregnancy. However, since the first trimester of pregnancy is the period of fetal organogenesis, there is a greater vulnerability of the fetus to teratogens. The latter part of the last trimester is associated with an increased risk of preterm delivery and supine hypertension, so it is best to avoid treatment during this period as well (Mills & Moses, 2002).

There is currently no literature suggesting a causal relationship between local anesthesia in pregnant women and adverse effects on the fetus. On the other hand, it is preferable to choose a substance with a high plasma protein binding ratio and the lowest possible adrenaline concentration. The American College of Radiology has declared that in the context of diagnostic radiology, radiation does not represent a risk to the pregnant woman or to the fetus. In fact, the risk that dental radiographs may cause malformations to the fetus is extremely low. The limit of admissible ionizing rays is 50 mGy while in the case

of a panoramic radiograph, the rays are 50,000 times lower and in the case of dental radiographs on standard film they are 50,000 times lower (Pertl et al., 2000).

IV. CONCLUSION

Pregnancy causes a hormonal imbalance that can exacerbate the reactions of the pregnant women's body. The sexual hormones, being secreted in an increased level, are responsible for a series of changes in the whole body and therefore in the oral cavity. The oral cavity undergoes certain physiological changes that prevent, in the case of certain diseases, a return to normal tissue through a process of regeneration or healing.

The acidification of the oral cavity in pregnant women is the consequence of several alterations, some of which are unavoidable, favoring the progression of several diseases such as periodontitis or caries. Pregnancy represents a risk factor for the pregnant woman but also for her fetus and her unborn baby. Indeed, there are certain diseases that can lead to catastrophic consequences for both the fetus and its mother.

The development of certain systemic infections can lead to premature birth, which plays a huge role in the morbidity and mortality of the newborn. In addition, the baby is at risk for certain respiratory or neurological sequels that may be unavoidable because of premature birth. Pregnant women can be treated throughout their pregnancy, especially in the case of emergency treatment. However, it is safer to plan to treat patients during the 2nd trimester of pregnancy, which is a suitable time. Indeed, it is preferable, in the case of non-urgent care, to avoid the 1st and 3rd trimester.

Dental care can be provided to pregnant women regardless of the type of care. It has been proven that the consequences of not performing dental work on a pregnant woman have a greater impact on the health of the fetus than the work itself.

Certain precautions should be taken into consideration during this period of pregnancy, such as choosing the right anesthetic, avoiding the prescription of certain analgesics, and following radiation protection measures for radiological imaging.

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