

Oral health in pregnancy Salud bucal en el embarazo

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Abstract:

Changes during pregnancy are of vital importance to maintain an optimal state of health in the mother and a proper development for the fetus, however, some of these physiological, hormonal and dietary changes present at this stage, have an influence on the oral condition and in turn can alter and increase the risk of developing any disease or accelerate their evolution. Currently, scientific literature mentions a possible association between diseases and inflammatory conditions present in the oral cavity and the physiological state in gestation. Specifically, periodontal diseases such as pregnancy gingivitis that can have a prevalence ranging from 35 to 100 %, periodontitis that occurs in a lower percentage, but is considerable and ranges from 30 to 40 % and granuloma pregnancy occupying a prevalence of 1 to 5 %, which have the ability to influence conditions associated with pregnancy, such as eclampsia, preeclampsia, diabetes and gestational diabetes. The purpose of this article is to provide information on the complexity of maintaining oral health during this crucial stage, the gestation period, and how they can influence both positively and negatively one with the other, as well as the most common diseases in this period, sharing this information on the importance of maintaining a proper oral health during pregnancy.

Keywords:

Pregnancy, Oral health, Oral diseases, Biofilm, Prevention

Resumen:

Los cambios durante el embarazo son de vital importancia para mantener un estado de salud óptimo en la madre y un desarrollo adecuado para el feto, sin embargo, algunos de estos cambios tanto fisiológicos, hormonales y dietéticos presentes en esta etapa, tienen una influencia sobre el estado bucal y a su vez pueden alterar y aumentar el riesgo para desarrollar alguna enfermedad, o acelerar la evolución de ellas. En la actualidad la literatura científica menciona una posible asociación entre las enfermedades y condiciones inflamatorias presentes a nivel bucodental y el estado fisiológico en la gestación. En específico, las enfermedades periodontales como gingivitis del embarazo que puede tener una prevalencia que va del 35 al 100 %, la periodontitis que llega a presentarse en un porcentaje menor, pero es considerable y va de 30 a 40 % y el granuloma del embarazo ocupando una prevalencia del 1 al 5 %, las cuales tienen la capacidad de influenciar condiciones que se asocian al estado de gravidez, como la eclampsia, preclampsia, diabetes y diabetes gestacional. El objetivo de este artículo es brindar la información sobre la complejidad que representa mantener una salud bucal durante esta etapa tan crucial como lo es el periodo de gestación y como pueden influenciar tanto de forma positiva como negativa una con la otra, así como las enfermedades más frecuentes en este periodo y con esto se pueda compartir esta información sobre la importancia de mantener una salud bucal de forma adecuada en el periodo de gravidez.

Palabras Clave:

Embarazo, Salud bucal, Enfermedades bucales, Biopelícula, Prevención

INTRODUCTION

According to the World Health Organization (WHO), pregnancy begins once the implantation process is completed, when the blastocyst adheres to the uterine wall, lasting approximately 5 to 6 days after fertilization, in which it will cross the endometrium in order to occupy the stroma. The implantation process culminates as of the closure of the defect present on the surface

of the epithelium and concludes the nidation process, thus initiating the pregnancy between 12 to 16 days after fertilization.¹ In Mexico the National Survey of Demographic Dynamics (ENADID) 2018 estimates that 90.3% of all pregnancies (8.8 million) in women aged 15-49 years in the period between January 2013 and October 2018, delivered a living daughter or son; that is, they were mothers.² Pregnancy is characterized as a unique and dynamic physiological state during

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which there will be a transient set of changes in the woman's physical structure, hormone levels, metabolism and immune system. These can affect the patient's health, perceptions and interactions with others in the environment. Alterations in hormone levels induced in pregnancy generate changes in the organism of the mother and the oral cavity is no exception. The increase in the secretion of female hormones is 10 times higher for estrogens, as well as 30 times higher for progesterone, which is vital for the pregnancy development (Figure 1).³

Some of the changes present in pregnancy generate a modification in saliva, a fluid composed of water, proteins, inorganic compounds, epithelial cells, lipids, carbohydrates, microorganisms, food debris and cells, which fulfills the function of oral cleaning, lubrication, conservation and repair of tissues, as well as maintaining and buffering the pH, eliminating bacteria. However, during pregnancy it is modified in such a way that it can favor the presence of oral pathologies due to the pH modification, due to the diet modification, and the presence of vomiting, which decreases its buffering capacity, in addition to the modification in the hygiene habits, the presence of hormones such as estrogens and progesterone is also found.⁴

Although changes in saliva during pregnancy and lactation may temporarily predispose to dental erosion and caries. However, there is not enough data to prove an increase in the presence of caries.⁵

PHYSIOLOGY OF PREGNANCY

The physiology of the female metabolism in pregnancy is a unique and singular moment in a woman's life. This set of changes is a way in which some adjustments occur in the normal physiology to better accommodate fetal growth, blood supply, nutrition and oxygen intake. These changes prepare the woman's body for pregnancy, childbirth and lactation.⁶

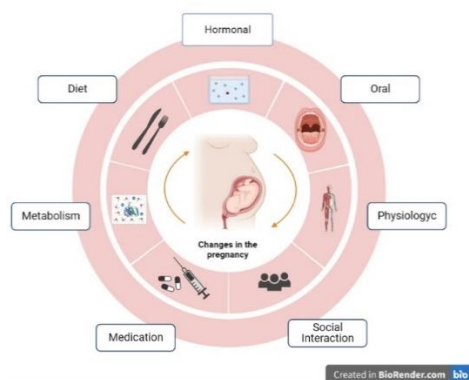


Figure 1. Areas influenced by changes during pregnancy.³

The changes occurring during pregnancy involve the cardiovascular, respiratory, renal, gastrointestinal and hematological systems. Plasma volume and blood cell mass increase to provide a greater proportion of oxygen required by maternal and placental tissues. The heart rate must increase to meet fetal requirements. At the beginning of the second trimester, there will be a blood pressure decrease, which can

lead to hypotensive supine decubitus syndrome or vena cava syndrome observed in the final stage of pregnancy in approximately 8%, this condition manifests itself as a drop in blood pressure, with nausea, dizziness and fainting. The modification present in the plasma levels of coagulation factors such as VII, VIII, IX, X and XI, the increase of fibrinogen, the number of leukocytes and erythrocytes generates the risk in pregnant women of suffering thromboembolic phenomena, such as deep vein thrombosis and pulmonary embolism.⁷⁻¹¹ Breathing turns more complicated due to the difficulty generated by the push generated by the uterus towards the diaphragm. The lungs residual functional capacity suffers a decrease of up to 20% and the possibility of a dyspnea episode is more frequent during the third trimester in up to 75% of pregnant women.¹²

The gestational period is divided into:

- 1) The early gestational period, that is considered as an anabolic phase where the female structure stores certain nutrients, improves insulin sensitivity in order to meet the demands required on both maternal and feto-placental parts in late gestation and lactation.⁶
- 2) The late gestational period is regarded as a catabolic phase with the development of reduced insulin sensitivity. The placenta has a fundamental role as it will act as a sensor between the physiology of the mother and the fetus adapted to the requirements of the product for optimal growth and development. During pregnancy, the physiological and homeostatic mechanisms/functions change to meet fetal needs.⁶

However, if there is an alteration in the maternal metabolic physiology, it can lead to hormonal instability, fat storage, decreased insulin sensitivity and even the development of gestational diabetes observed in 45% of pregnant women.⁶

The modification actions during pregnancy are of vital importance to maintain an optimal health condition in the mother and fetus, however, some of these physiological, hormonal and dietary changes present in this period, in turn can alter the risk of suffering from oral diseases, such as gingivitis, benign gingival lesions "pyogenic granuloma", dental mobility, dental erosion, dental caries and periodontitis.¹³⁻¹⁴

ORAL DISEASES

PERIODONTAL DISEASE

Periodontal disease is a multifactorial disease where balance is altered and includes a series of inflammatory conditions, usually caused by oral bacteria, progressing from the reversible accumulation of biofilm (architectural colony of microorganisms, which is inside a self-produced matrix of extracellular substances) and inflammation of the gingival tissue (gingivitis) to irreversible breakdown of the supporting tissues that can lead to tooth loss (periodontitis) (Figure 2). Some

systemic conditions may contribute to the onset and progression of periodontal disease.¹⁵⁻¹⁷

Besides of causing damage to the supporting tissues of the teeth, periodontal pathogens can also cause adverse pregnancy outcomes, including premature delivery, low birth weight, and fetal growth restriction.¹⁸

Among these microorganisms present in periodontal pathology there are three main species: *Tannerella forsythia*, *Treponema denticola* and *Porphyromona gingivalis*, which have anaerobic characteristics and live at a basic pH of 6.75 to 7.25.¹⁹⁻²¹

GINGIVITIS

Gingivitis is the most common oral pathology and can affect 35 to 100% of pregnant women and can be caused in two different ways: a) Non-biofilm induced and b) biofilm-induced. Gingivitis usually appears between the third and eighth month of gestation and gradually decreases after birth.²²⁻²⁴

During gestation, the effects of estrogens and progesterone affect the gingival vascularization acting in favor which could explain the appearance of edema, erythema, increased crevicular fluid and bleeding.²⁵

PERIODONTITIS

Periodontitis is a chronic inflammatory disease, whose main characteristic is the progressive destruction of periodontal tissues and is regulated by the interaction generated between bacteria that may play a role in the evolution of this disease.²⁶

In addition, about 30 to 40% of pregnant women develop periodontal disease from untreated gingivitis that progresses to periodontitis. This is more frequent in African-American women and smokers. Smoking is noted for its ability to change the oral microbiome by decreasing the levels of beneficial microorganism species and promoting the development of pathogenic communities within 24 hours of biofilm formation, thus increasing the risk of periodontitis.^{22,27-33}

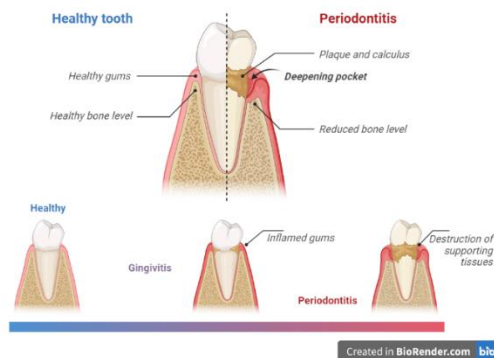


Figure 2. Characteristics of the main periodontal diseases (gingivitis and periodontitis) such as edema, erythema, presence of biofilm and destruction of supporting tissues.^{15,17}

Currently, scientific literature mentions a possible association between inflammatory diseases and conditions and the

physiological state in pregnancy, specifically, gingivitis and periodontitis, which have the ability to influence conditions associated with pregnancy, such as eclampsia, preeclampsia, diabetes and gestational diabetes, through the introduction into the bloodstream of inflammatory chemical mediators from the dental support tissues (remote or distant production), under the concept of "inflammatory infectious stress" (inflammatory-infectious burden) (Figure 3).³⁴

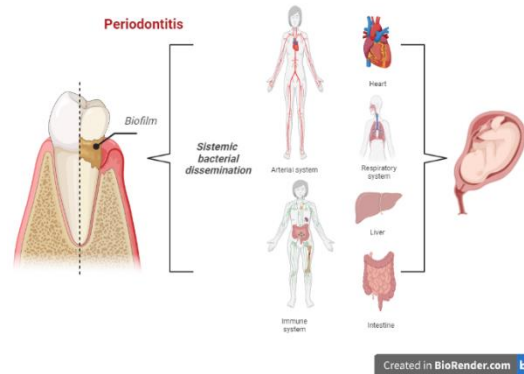


Figure 3. Pathways of dissemination of periodontal bacteria, systemically and access to the fetus.³⁴

PYOGENIC GRANULOMA

It is a benign tumor (1-5%) caused by hyperplasia of the gingival connective tissue. It is believed to be produced by the increase in the angiogenesis, which is a consequence of sex hormones, in addition to irritation at the gingival level triggered by local factors such as biofilm or dental tartar or chronic traumatic areas. It occurs most frequently on labial sides of the interdental papilla. Lesions are usually erythematous, smooth and lobulated, located mainly on the gums. They may appear less commonly on the tongue, palate or buccal mucosa. It is common in early pregnancies during the first and second trimester, although it is feasible for it to develop at any time during pregnancy. It remains under observation as it usually subsides after childbirth or it can be surgically removed.^{5, 11, 35, 36}

DENTAL EROSION

Between 70 and 85% of pregnant women experience nausea and vomiting associated with the increase of gonadotropin in the first trimester. The increase in progesterone slows down gastric emptying and together with the acidity originated in vomiting generate erosion of the dental enamel, in some women (0.3 to 2%) these symptoms do not remit. In addition, some women may suffer hyperemesis gravidarum, a severe form of nausea and vomiting that can cause loss of enamel.^{35,37}

DENTAL MOBILITY

Dental mobility is related to the degree of involvement of the periodontium and changes in the mineralization of the hard plate. Longitudinal studies report that probing depth increases due to inflammation.^{35, 38, 39}

Although dental mobility is also associated with the presence of a hormone called relaxin, which favors the passage during labor, generating a relaxation in the periodontal fibers, but this is more common in the final stage of pregnancy.⁴⁰

DENTAL CARIES

Pregnant women are more susceptible to tooth decay, caused by *Streptococcus mutans*, other *streptococci* of the *non-mutans streptococcus* group, *Actinomyces* and *Lactobacillus* that play a key role in this process. This is due to special conditions experienced by pregnant women, for example, increased acidity in the oral cavity, cravings for sugary foods, inadequate oral health care and delayed treatment, coupled with behavioral changes, such as difficulty in performing proper oral hygiene, which lead to an increased presence of biofilm.⁴¹⁻⁴⁴ This is favored by changes in saliva such as flow, composition, pH and hormone levels. The change in salivary composition is manifested by a decrease in pH below 5.5 and sodium, as well as increased levels of potassium, protein and estrogen.⁴⁵ The pathogenesis of dental caries in pregnancy is not clear, whether the influence is due to environmental/behavioral factors (vomiting, increased consumption and frequency of sucrose, as well as a deficit in oral hygiene) or systemic factors (mineral deficiency "calcium, fluoride and phosphorus that remineralize dentin and enamel", metabolic and hormonal changes).⁴⁵⁻⁴⁷

Scientific evidence suggests that during pregnancy there is a reduction of micronutrients in women's health, favoring the hazard of dental caries. During pregnancy there is a great mobilization of minerals from maternal reserves for the requirements necessary for fetal development. This hypothesis is supported by the "maternal depletion syndrome", which refers to the presence of depletion in cases of very short intervals between births. Since there is no adequate time for the reserves to be restored, a nutritional collapse occurs, with detriment to the woman and to fetal growth and development.^{48,49}

XEROSTOMIA

It is the subjective sensation that the patient self-perceives when there is a decrease or absence of saliva in the mouth. In pregnancy, physiological xerostomia is common, mainly caused by hormonal changes, as well as by the intake of some medications (antispasmodics, antihistamines and antidepressants).⁵⁰

RECOMMENDATIONS AND PREVENTIVE ACTIONS DURING PREGNANCY

First trimester: preventive treatments, patient education and motivation, dental prophylaxis, invasive procedures are not recommended during this period unless it is an emergency, due to the risk of teratogenesis since organogenesis occurs in this trimester. There are data that show that one out of five pregnancies can present a spontaneous miscarriage.⁵

Second trimester: continue with preventive measures, scaling and root planning if necessary, treatment of any active oral pathology, if present. In this trimester organogenesis is complete and fetal risk is lower. The mother has had time to adapt to the pregnancy, although "supine hypotension" may occur, so it is advisable to make short appointments.⁵

Third trimester: preventive measures, avoidance of dental treatment in the second half of the third trimester.⁵

Dental emergencies, acute pain and infections require intervention by the dentist and treatment cannot be postponed. The American Academy of Periodontology advises the dental professional to treat acute periodontal infections or infectious foci regardless of the stage of pregnancy.³⁵

It is important to remember that emotions and anxiety are heightened during pregnancy, and this can intensify fear and the perception of pain in the dental chair. Hence the importance of controlling the positioning of the dental chair. Evaluate the potential risk of the medications if they are necessary in any treatment, based on the classification of the Food and Drug Administration (FDA) that divides the medications into 5 categories according to their reliability with respect to scientific evidence and the cost/benefit ratio. The use of local anesthetics is also considered safe, although it is important to evaluate the characteristics of each anesthetic according to the FDA in order to choose one according to the treatment to be performed.³⁵

It is advisable for the treating dentist to be in contact with the attending physician to manage the case as a whole, in case there is any suggestion regarding the safety of the procedure to be performed.⁵

Tarannum et al. in 2007 in 200 pregnant women assigned to a treatment group and a control group, performed periodontal examinations where the treatment group received non-surgical periodontal therapy during the gestational period and the control group received the treatment after delivery, where a significant effect of periodontal treatment on delivery outcomes was found: treatment group 53 preterm deliveries vs. 68 in the control group, 26 low birth weight infants in the treatment group vs. 48 in the control group.⁵¹

Some studies such as the one carried out by Hu W. et al. in 2022 where they provided information to a group of pregnant women, dividing them into two intervention groups and a control group, found an improvement in periodontal status ($p < 0.05$) and the number of active caries in the intervention group with a significant improvement ($p < 0.001$), concluding the importance of oral health management and promotion in pregnant women.⁵²

CONCLUSION

Taking into account the high complexity degree that corresponds to the pregnancy process and the influence it has to generate changes in the female structure and based on an adequate knowledge of the susceptibility of the oral cavity to develop or accelerate some oral conditions in pregnancy, the dentist and health personnel must generate promotion and prevention

strategies to achieve an optimal health condition, so essential at this stage, which can affect both the health of the mother and an adequate fetal development.

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