Health Care for Pregnant and Postpartum Women

Notes on oral health

Organizers

Ana Emilia Figueiredo de Oliveira

Ana Estela Haddad

São Luís

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PREFACE

Oral health has become more acknowledged as an essential element in people's general health. This comprehension has brought to light that many times the complex relation health-disease shows evident traces in oral cavity, which, by its turn, highlights the importance of the prevention and treatment of oral diseases.

Among the many aspects that made the oral health of pregnant women become a crucial element in the prenatal care of postpartum women, the studies that related an elevated risk of premature labor and low weight at birth in children whose mothers were affected by periodontal disease should be highlighted. However, many other aspects corroborate the need for oral health care for pregnant women. Beyond the biological aspects, numerous debates mention pregnant women and their potential for implementing and increasing oral health preventive behaviors, which solely justifies the opportunity of dental care for pregnant women.

There is more to it, an ingrained widespread belief: that the gestational state even if filled by manifestations of oral care needs would prevent dental treatment, an idea we certainly try to demystify here.

This e-book, idealized by a cooperation between UNA-SUS and the University of São Paulo School of Dentistry, has the merit of systematizing a great deal of the knowledge available upon the oral health of pregnant women. It is intended to be didactically useful to those who commit themselves to promote oral health and life quality. The reader shall find in the author's carefully written text a companion to treading this path, one that can only be explored by those who believe that scientific knowledge only makes sense if available for all.

Have a good reading!

Ph.D Prof. Maria Celeste Morita

President of the Brazilian Association of Dentistry Teaching, 2018.

PRESENTATION

The gestation period is a very peculiar moment in women's life. It is characterized by intense physiological, psychological and emotional changes. Besides the physical and hormonal alterations prompted by the new being in development inside the woman's body, there are also the typical frights and anxiety that surround this moment. Those aspects make this phase a moment of great transformations in a mother's life, also affecting her entire family. The alterations that women undergo during pregnancy are so significant that exceptional care for physical and mental health are required.

Among the changes women experience in the gestational period, the ones caused by hormones can notably cause oral alterations that deserve the attention of dental surgeons. These alterations mainly appear at the periodontium and are related to elevated levels of hormones such as estrogen and progesterone. They can also be linked to nutritional deficiencies and to the immunodepression transitory state[1].

It should be considered that the alterations in the nourishment standard are common in terms of quality and quantity. Morning sickness may persist throughout the entire pregnancy, making it harder to brush the teeth in the morning. The characteristic vomit episodes bring acidity to the oral environment with consequences to the demineralization of the tooth enamel, and particularly to the palatine surface of the superior teeth[2]. We can also mention the oral flora alteration in the composition and buffer capacity of saliva, the selection of cariogenic bacteria and the greater accumulation of biofilm presence. The great amount of changes is easily noted. Consequently, the chances of caries in pregnant women when compared to general women is three times

higher[3] and the periodontal alterations are also common occurances[4].

Despite the identification of those factors which culminates in the need for dental care, many dental surgeons do feel unsafe and refuse to treat pregnant women. These professionals fear being accounted responsible for any fatalities that may occur to the baby. Such insecurity is partially given to flaws in the graduate background of the professional[5].

As we will see along these chapters, protocols based on scientific evidences guarantee the safety of oral health care for pregnant women – at any point of the gestation – and for postpartum women. Dentistry professionals are supported to treat those special patients and clarify the many doubts that usually appear during this peculiar stage, assuring that patients will adhere to treatment.

It should be mentioned that women usually tend to change habits during gestation or postpartum, which facilitates the absorption of information that can benefit the health of both mother and baby. Thus, the guidance of health professionals such as dental surgeons heavily contribute to the propagation of preventive behaviors contributing to health promotion. We should seize this higher proximity between women and health services to create a bond and to implement a virtuous circle of education and health promotion, both individually and collectively.

On the other hand, the professional's denial or reluctance in treating pregnant and postpartum women, a common case of low prepare and little knowledge, corroborates to the perpetuation of myths and beliefs about the safety of oral health care directed to pregnant women. An example of this case is the Brazilian common saying that pleads that it is normal to lose a tooth for each daughter/son a woman has. The absence of qualified assistance may also stimulate self-medication, a risky habit for any patients, that can have drastically consequences for pregnant and postpartum women[7]. It should be highlighted that medical

treatment for odontogenic infection has a supporting role and does not resolve the problem by itself[8].

The aggravation of the patient's oral health, caused by the lack of necessary care and assistance, is the actual cause of serious risks and injuries for mothers and their babies. It is important to point out that a persistent stage of pain and infection is more harmful for the mother-baby binomial than any treatment to be done by the dental surgeon[3,9, 10,11].

Could a periodontal disease increase the risks of obstetric complications? Which obstetric complications are we talking about? What is the safe medical prescription? When to request oral x-rays? What kind of anesthetic can be used? Which preventive and healing interventions can be done? What are the orientations on diet and oral hygiene? What about the use of fluoride on pregnant women: topical or systemic? How to evaluate gestational risks?

This book complies the most recent scientific evidences and recommendations from the Brazilian Ministry of Health and the World Health Organization by bringing the best evidence to these questions. Among other things, readers will see in the following pages that every patient's need should be treated in the most adequate stage of gestation; caries is a multifactorial and controllable disease; deleterious habits must be avoided; breast feeding is also crucial for the correct development of the anatomic structures of the stomatognathic system and to stimulate the normal development of oral functions, such as nasal breathing and swallowing[12, 13.]

Integral assistance at prenatal care must consider the biological aspects inherent to the gestation and the different scenarios – involving family, social or economic settings – that can be experienced by pregnant and postpartum women[14], assuring them with an integral, humanized and quality assistance.

For that to occur, prenatal care must also include dental care since the pregnancy discovery. Dental prenatal care was the term created to specify the importance of pregnant women consultations with dental surgeons either for their selfcare or to be oriented on the baby's oral health. This set of actions is part of the Women's Health Care Program according to the guidelines of the National Oral Health Policy - PNSB[15].

A recent publication by the Brazilian Ministry of Health highlights that all pregnant women must attend at least one dental appointment during prenatal care[16]. Preferably, these appointments should happen at least once per trimester focusing on the mother's and the baby's oral health. The consultations should include the discussion of topics like diet, oral hygiene, professional prophylaxis, topical application of fluorides[17]. Also, it is already possible to insert data about the oral health care performed during prenatal care at the Pregnancy Notebook[16]. The recommendation for prenatal dental health not only means a valuable achievement to oral health but also a greater advance to pregnant women, an accomplishment that should be praised.

Professional cooperation between dental-surgeons and other health professionals is crucial[18, 19, 20], especially among doctors, nurses and community health agents (ACS), since their work is central to the disclosure of information on oral health during pregnancy and to solidify the importance of dental health care of the soon-to-be moms. It is also imperative to understand the importance of the networked health care organization to the effectiveness of integral assistance to pregnant and postpartum women[21].

Thus, we have the Women's Health Care Network as a thematic health priority network in Brazil that includes oral health care. The Primary Care Team has its role recognized at the care of pregnant and postpartum women, the follow-up of low and high risk prenatal care,

besides from health care actions for women at postpartum[22].

In Brazil, only a few dentistry graduate courses offer the possibility of specific treatment to pregnant women. There are gaps in the teaching and formation of professionals caused by the absence of a multiprofessional approach, which increases the uncertainty in the treatment of this audience, reinforcing myths and taboos about their care. Many debates suggest a curricular reform intending the approximation of dental surgeons and the national reality in terms of public health. Curricular Guidelines to the Dentistry course were suggested as an essential strategy for the changes in the graduate courses aiming to instruct professionals who can be prepared to answer the needs of public health both in the private range and in the country's current health system, the Brazilian National Health Care System – SUS[23].

Given the arguments initially presented, this book gathers the most current results of what dentistry science has produced to the guidance and knowledge of dental surgeons in the oral health care for pregnant and postpartum women. Here will be presented the main protocol measures highlighted in literature and the guidelines from the Brazilian Ministry of Health and the Brazilian National Health Care System. We wish you all a fruitful reading, hoping that it can influence the care for such special audience along with all the attention and consideration pregnant and postpartum women are entitled to.

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1 INTRODUCTION

Physical and psychological alterations typical of the gestational and postpartum period may have reflexes in the oral health conditions of pregnant women and their babies. In this context, oral health care for pregnant women must guarantee a decent, humanized and safe network care and integral care in which oral health professionals can work along other health professionals responsible for the care of pregnant women, provided with the necessary exchange of awareness among the different areas of knowledge and broad approach of the mother-baby binomial's health.

In such manner, dental surgeons must know the oral alterations that may surface during pregnancy along with the proper orientations of oral health promotion and most indicated dental care for each pregnancy trimester.

After birth, the health team should work in the necessary orientations to the health of the new-born and in the adaptation of postpartum women to this new stage. Exclusive breastfeeding and oral hygiene of the baby are subjects that should be a part of these information and guidelines.

Hence, we will first approach some questions regarding the work process in pregnant women's health care in order for you to understand how dental care composes integral care and the devices and work strategies that facilitate the assistance. Next, we will present the main protocols of dental assistance for the care of pregnant women and oral health education in prenatal and postpartum care.

2 INTEGRAL FOLLOW-UP OF PREGNANT AND POSTPARTUM WOMEN HEALTH CARE

Pregnant and postpartum women health care should be offered by a multiprofessional team in order to guarantee integral, humanized and necessary assistance to the well-being of the women, the baby and their family.

For that to happen it is indispensable that health professionals can identify the health care network scenario for the health assistance of pregnant and postpartum women.

Below, you will understand more about the Health Care Network and then about the Women's Health Care Network.

2.1 Health Care Network (RAS)

Health Care Network (RAS) can be identified as organizational arrangements for actions and health services of different technologic densities that are integrated by technical, logistical and management support systems and have the objective of guaranteeing the integrality of care[24].

The main goals of the Health Care Network (RAS) is to promote the systemic integration of health actions and services equipped with continuous, integral, responsible, humanized and quality care; and to increase the performance of the health system by means of access, equity, clinic and sanitary efficiency and economic effectiveness[25].

A health care design based mainly upon curative procedures centered in medical care and structured with health actions and services dimensioned from supply has shown itself uncapable of handling current and unsustainable sanitary challenges for future challenges[24, 26].

2.2 Maternal and Child Health Care Network

Maternal and Child Health Care Network consists of structure that aims to assure women of their right to reproductive planning ad humanized care during pregnancy, labor and postpartum period. It also intends to guarantee the rights of safe birth, safe growth and health development to children.

In Brazil, the Maternal and Child Health Care Network has been prioritized since 2011 along with other (four) thematic networks in the range of the Brazilian National Health System (SUS), the Brazilian public system of universal access.

Figure 1 - Maternal and Child Health Care Network and other thematic networks.

Maternal and Child Health Care Network (Stork Network):
it has a care profile intended to pregnant women and children up to 24 months.

Urgencies and Emergencies Care Network:
aims to amplify and qualify the humanized and integral access to users in status of urgency/emergency.

Psychosocial Care Network:
prioritizes coping with alcohol, crack and other drugs.

Chronic Conditions and Diseases Care Network:
beginning by cancer (from the intensification of breast and cervix cancer prevention and control).

Disability Care Network:
care dedicated to the physically, intellectually, visually disabled; individuals with ostomy or multiple disabilities.

This design of the Maternal and Child Health Care Network can be structured by four components: prenatal care; labor and birth; postpartum, children's integral health care and logistic system; sanitary transportation and regulation. It should be noted that each one of these components must contain oral health actions that guarantee health care[27]. In the course of this e-book, we shall understand how the insertion of oral health assistance works in the Maternal and Child Health Care Network.

The Network presents the following guidelines[28]:

I — Guarantee of reception with evaluation and classification of risks and vulnerability, access ampliation and prenatal care quality improvement.

II — Guarantee of pregnant women's link to the reference unity and to safe transportation.

III — Guarantee of good practices and safety in labor and birth assistance.

IV — Guarantee of health care for children up to 24 months with quality and resoluteness.

V — Guarantee of access to Reproductive Planning actions.

The objectives of the design adopted by the Brazilian Ministry of Health are:

a) To foment the implementation of a new design for women's and children's health care focusing on the care of labor, birth, growth and development of the child up to 24 months;

b) To organize the Maternal and Child Health Care Network by assuring access, reception and resoluteness;

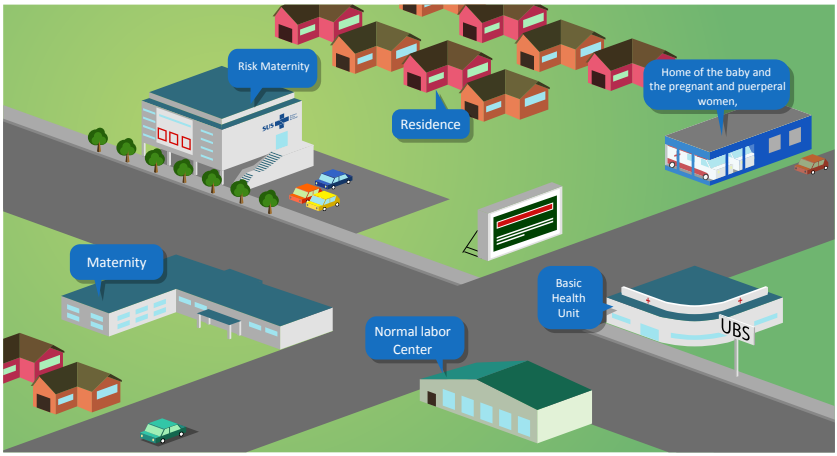
c) To reduce maternal and child mortality with emphasis in the neonatal component[28].

Hence, the structuration of health network services enables the overcoming of elevated segmentation levels and fragmentation of women's and children's health care network systems. It also enables the reduction of maternal and child mortality by increasing and qualifying health service actions, fighting against obstetric violence, offering good practices e reducing the medicalization and commodification of labor.

2.3 The importance of Oral Health Assistance in Prenatal Care

While observing the guidelines of the Maternal and Child Health Care Network in the model presented here one can easily understand that oral health actions can and should be present in this context. It is important to note that during this moment of the life cycle, the various health professionals, including the dental surgeon, must articulate themselves in prenatal care services, ensuring a integral, humanized and quality care[29]. In this model, starting from Figure 2, you can see that the attention points of the Maternal and Child Health Care Network are varied, among them the Center for Dental Specialties (CEO) and the Oral Health Team (ESB).

Figure 2 - Attention points of the Maternal and Child Health Care Network in the territory.



Source: Marques CPC [27].

This network's operation should contemplate integral assistance to pregnant and postpartum women and children. In that matter, there is a need for good structuring of services. This is reflected, for example, in the provision of resources for the increase of prenatal exams, fast pregnancy testing, prevention and treatment of sexually transmitted infections (STI)/HIV/AIDS and hepatitis; in the sufficiency of obstetrical and neonatal beds (Intensive Care Unit, Intermediate Care Unit and Kangaroo method), regular and high risk prenatal exams and fast access to results; the adaptation of the maternity wards environment, access to safe transportation for pregnant and postpartum women and high-risk newborns through the Emergency Mobile Care System - SAMU Stork; among other actions, according to the components of the Maternal and Child Health Care Network[28].

Considering the context, seeing integrality as a necessary element to the assistance of children and pregnant and postpartum women, dental assistance for the pregnant woman should be integrated among the various levels of care, including the **educational, preventive**

and curative dimensions. Thus, regardless of the priority search for curative care and ensuring the principle of integrality, it is imperative that there is a continuity of care, offering services along the diverse levels of complexity.

Besides, it is essential to consider that dental care can act as an agent that enhances the quality of life of pregnant women through the subjective perception of well-being and as an agent promoting healthier lifestyles for the mother, her children and her family. In that matter, dental actions integrated into health services can have repercussions on the quality of life of pregnant women and her whole family[6, 30].

Considering the above, let's take a look at the items determined by Godoi, Melo and Caetano[31] as essential matters for the operational structure of oral health insertion in this context[31].

Frame 1 - Characterization of the element Operational Structure for insertion of oral health in the Care Networks.

Operational structure	Ideal situation
Human resources	Number of dental surgeons compatible with ministerial guidelines, being preferably one dental surgeon for every 3,000 inhabitants (maximum 4,000 inhabitants), working in Primary Care and attending 40 hours per week, with a stable employment contract. Presence of dental surgeon working in the minimum required specialties for maintenance of the Reference Center for Secondary Care. Dental surgeon working in emergency services: assistance to oral health acute affections in the urgency/ emergency network. Presence of dental surgeon in services of high complexity, in hospital level, guaranteeing the integrality of the attention. Equivalence between the amount of dental surgeon and oral health auxiliaries.

Primary Care	Oral health care available in all Basic Health Units, guaranteeing the population's access to this service. Expansion and qualification of Primary Care in oral health through the offer of rehabilitation procedures.
Secondary Care	Secondary Care specialized Dental services offer in Dental Specialties Centers according to the needs of the population, fulfilling the minimum requirements for the maintenance of the Center, in accordance to the population size and regionalization plan. Municipalities must also meet the health needs of their regions.
Tertiary Care	To be a reference for highly complex dental services in hospital units.
Support Systems	Offer of diagnostic and therapeutic support services through laboratories from the own system or insured laboratories of oral pathology, dental radiology and dental prosthesis, articulated with the Network. Existence of pharmaceutical support that contemplates pharmaceutical care, according to the need in oral health.
Logistics Systems	Integration of all levels of care through a regulation system that guides the flows determined by protocols or guidelines that orientate services and actions in oral health. Use of electronic medical records to optimize the articulation between the points. Availability of transportation to users, allowing access to all points of attention.
Governance Systems	Counting on Governance Systems by aspiring the creation of consensus for the organization of the Oral Health Care Network.

Source: Adaptaded from: Godoi H, Mello ALSF, Caetano JC[31].

3 NETWORK SERVICES AND GESTACIONAL RISK CLASSIFICATION

Integrated services imply the availability and good structure of services on the various levels of complexity. That includes low and high prenatal risk, being of extreme importance that the dental surgeon recognizes the gestational alert signs.

See in Frame 2 how to interpret these services and how to proceed with them:

Frame 2 - Main gestational alert signs.

ALERT SIGNS	INTERPRETATION	HOW TO PROCEED
• **Vaginal bleeding**	Abnormal in any stage of the pregnancy.	Immediate medical evaluation
• **Headache** • **VIsual scotomas** • **Epigastralgia** • **Excessive edema**	These symptoms, especially towards the end of the gestation, may suggest preeclampsia	Immediate medical and Blood Pressure evaluation
• **Regular contractions** • **Fluid loss**	Symptoms that indicate the beginning of the labor	Immediate medical evaluation and referral to reference maternity
• **Loss fetal movements**	May suggest fetal suffering	Medical evaluation at the same day, evaluation of the Fetal Heart Rate and orientation on mobilogram. Consider the possibility of referral to reference service
• **Fever**	May suggest infection	Medical evaluation at the same day e referral to emergency, if necessary

Source: Brazilian Ministry of Health[16].

Pregnant women care foresees monitoring by Primary Care, even on high risk cases and along with reference/specialized services. For that to be possible it is essential that patients can rely on an efficient system of reference and counter-reference[32, 33].

In this context, you must have realized the need to evaluate gestational risk with the low and high prenatal risk classification, right? For now, let's take a look at risk factors that indicate low prenatal risks.

Frame 3 - Risk factors that indicate the conduction of Low Prenatal Risk.

FACTORS RELATED TO THE PRIOR REPRODUCTIVE HISTORY
• Newborns with growth restriction; preterm or malformed • Fetal macrosomia • Hemorrhagic or hypertensive syndromes • Interpregnancy interval of less than two years or more than five years • Nulliparity and multiparity (five or more labors) • Prior uterine surgery • Three or more cesareans
FACTORS RELATED TO CURRENT PREGNANCY
• Inadequate weight gain • Urinary infection • Anemia

Source: Brazilian Ministry of Health[16].

In addition, in the production line of care for pregnant women, along with their proper risk stratification, risk factors indicative of high prenatal risk referral should also be recognized, as indicated in Frame 4.

Frame 4 - Risk factors indicative of High Prenatal Risk referral.

FACTORS RELATED TO PREVIOUS CONDITIONS
• Cardiopathies • Severe pneumopathies (including not controlled bronchial asthma) • Severe nephropathies (such as chronic renal failure and transplanted cases) • Endocrinopathies (especially diabetes mellitus, hypothyroidism and hyperthyroidism) • Hematological diseases (including sickle cell disease and thalassemia). • Neurological diseases (like epilepsia). • Psychiatric diseases that demand monitoring (psychosis, severe depression, etc.). • Autoimmune diseases (systemic lupus erythematosus, other collagenouses) • Maternal genetic alterations • History of deep venous thrombosis or pulmonary embolism) • Gynecopathies (uterine malformation, adnexal tumors and others) • Carriers of infectious diseases like hepatitis, toxoplasmosis, HIV infection, tertiary syphilis (ultrasound with fetal malformation) and other STIs (condyloma) • Hansen's disease • Tuberculosis • Severe anemia (hemoglobin < 8 g/dL) • Isoimmunization Rh • Any clinical pathology that needs specialized monitoring
FACTORS RELATED TO PRIOR REPRODUCTIVE HISTORY
• Intrauterine or perinatal death in previous gestation, especially in case of unknown cause • Usual abortion (two or more consecutive early losses) • Sterility/infertility • Previous history of hypertensive disease in gestation with bad obstetric outcome and/or perinatal (premature interruption of gestation, intrauterine fetal death, HELLP syndrome, eclampsia, hospitalization of the mother in the ICU)

FACTORS RELATED TO CURRENT PREGNANCY
• Intrauterine growth restriction • Polyhydramnios or oligohydramnios • Twin pregnancy • Fetal malformation or fetal arrhythmia • Laboratory evidence of proteinuria • Gestational diabetes mellitus • Severe maternal malnutrition • Morbid obesity or low weight (in those cases, the pregnant woman should be referred to nutritional evaluation • Cervical intraepithelial neoplasia grade III • High clinical suspicion of breast cancer or mammography with Bi-RADS III or more • Hypertensive disorders in gestation (preexistent chronic hypertension, gestational or transitory hypertension) • Repeated urinary infection or two or more episodes of pyelonephritis (every pregnant woman with pyelonephritis must be initially referred to the reference hospital for evaluation) • Severe or non-responsive anemia of 30-60 days of treatment with ferrous sulphate • Carriers of infectious diseases such as hepatitis, toxoplasmosis, HIV infection, tertiary syphilis (ultrasound with fetal malformation) and other STIs (sexually transmitted infections like condyloma), when there is no support in the basic unit • Infections like rubella and cytomegalovirus acquired in the current gestation • Teenagers with psychosocial risk factors

Source: Brazilian Ministry of Health[16].

In this context, considering the multiprofessional monitoring of pregnant women with the participation of the dental surgeon, the patient's medical record must gather information in one unique document, so that all professionals can fully monitor the patient knowing the already identified problematic[32].

It is very important that the dental surgeon knows the health

condition of the pregnant patient since the classification of gestational risk will directly involve dental care and, from this knowledge, pregnant women whose pregnancy has normal course, good prognosis and whose treatment involves only prevention, prophylaxis and simple restorations, should be treated in the Basic Health Unit (UBS), once the treatment presents no risks for her or the baby[32].

On the other hand, the identification of pregnant women with uncontrolled systemic alterations, such as diabetes or other conditions that imply a greater risk, requires referral to Specialized Dentistry Care Centers for the necessary and adequate care according to their gestational phase. In this situation, the dental surgeon will continue to monitor this pregnant woman in routine prenatal visits.

4 THE WORK OF PRIMARY CARE TEAMS IN THE INTEGRAL ASSISTANCE OF PREGNANT AND POSTPARTUM WOMEN

Access to prenatal care in the first trimester of gestation has been incorporated as a quality evaluation indicator of Primary Care, being fundamental the involvement of the entire team to provide integral assistance to pregnant women.

The different health professionals should be integrated, identifying the problems and its approaches in a cohesive manner, promoting changes in the team work process and establishing interdisciplinary and benefits to users, whenever necessary[34].

The perspective of interdisciplinarity functions as a potential instrument in articulating the different knowledges necessary for a broad and comprehensive vision of health needs and problematic, providing more qualified, competent and humanized interventions[35, 36].

Following this reasoning, the conduct of professionals in integrated and humanized means can acquire even more importance as soon as prenatal follow-up begins. Such conduct is essential for the **early diagnosis** of alterations and for **appropriate interventions** on conditions that make vulnerable the health of both mother and child.

In the specific case of these women's oral health care, for example, there are several studies that indicate that periodontal disease during pregnancy is associated with an increased risk of

preterm birth and low birth weight at the time of birth[37, 38, 39 40, 41]. In addition to aspects such as these, the professional integrating the oral health team should also address the life history of this woman, considering her backgrounds (Figure 3)[16]:

Figure 3 - Considerations on the woman's life history.

Source: UNA-SUS/UFMA, 2018.

Apart from the specific modifications of the gestational biological aspects, it is necessary for the teams to be aware of changes in the patterns of the family cycle. These patterns, in the face of changes in birth rates, life expectancy, women's roles, marriages, divorces, are capable of building not only the biological bond, but also the affective bond, through which values are maintained[14].

Dental consultations conducted during the gestational period are not restricted to reducing the effects of caries or periodontal diseases, but they can also provide a significant opportunity for actions

to promote the health of pregnant women and their families.

It is, therefore, a good opportunity for health professionals to invest in health education and care strategies, aiming at the well-being of women and children, making possible the inclusion of the father and/or partner (when existent) and the family, respecting the woman's wishes[16].

4.1 Prenatal and pospartum assistance flows

The World Health Organization recently presented a new set of recommendations to improve the quality of prenatal care and reduce risks during pregnancy. Among the recommendations are the more frequent contacts and better communication of pregnant women with their health providers[42]. In a recent publication, the Brazilian Ministry of Health makes it clear that all pregnant women should perform at least **one dental consultation** during prenatal care[16]. Thus, in the attention to the pregnant woman in low-risk prenatal care, we have the **reception with qualified listening, the overall evaluation** and **the care plan**. Among the practices inherent to the care plan, there is the general and specific physical examination, in which the oral exam is inserted.

See below, in Frame 5, how this test should be done.

Frame 5 - General and Specific Physical Examination in Low Risk Prenatal Care.

WHEN TO EVALUATE?	WHAT TO EVALUATE/HOW TO EVALUATE?		WHAT TO DO?
First consultation **2nd trimester** **3rd trimester**	**Skin and mucous membranes** •Color • Injuries • Hydration	• Turgor • Chloasma • Tumors • Stains	•Conduct specific orientations • Medical evaluation in the occurence of abnormal findings

First consultation	**Oral exam** Verify color alterations of the mucous membranes, hydration, tooth enamel, caries, presence of injuries, bleeding, inflammation and infection	• Teeth • Tongue • Gum • Palate	• Refer all pregnant women to dental evaluation at least once during pregnancy

Source: Brazilian Ministry of Health[16].

In addition, the Brazilian Ministry of Health recommends that in the dental care of pregnant women, the following aspects and procedures must be observed[16]:

Low weight: Check the patient's food history, if there are cases of hyperemesis gravidarum, infections, parasitosis, anemias and debilitating diseases.

Nutrition: Give her nutritional guidance, aiming at the promotion of proper weight and healthy eating habits.

Scheduling: Reschedule the consultations at a shorter interval than the one set in the usual calendar.

See what should be considered in dental consultations during the gestational period:

Less suitable period for dental treatment (due to the main embryological changes). During this period, radiographic measurements should be specially avoided.

Best suited period for performing clinical interventions and essential dental procedures, always in accordance with the indications.

Time of greater risk of syncope, hypertension and anemia. Discomfort in the dental chair is frequent, and postural hypotension and compression of the vena cava may occur. Measures such as keeping the woman tilted to her left side, frequently switching the positions of the pregnant woman in the chair and conducting brief consultations can reduce problems.

Therefore, the model of integral care to pregnant women here proposed defines as the dental surgeon's functions, in prenatal and postpartum care, the following items[16]:

- Guide women and their families on the importance of prenatal care, breastfeeding and vaccination.
- Perform low risk gestational prenatal dental consultation.
- Request complementary tests and guide treatment if necessary.
- Guide pregnant woman on the rapid tests for syphilis and HIV.
- Guide the vaccination of pregnant women against tetanus and hepatitis B.
- Perform general evaluation of the pregnant woman, observing the period of pregnancy.

- Evaluate the pregnant woman's oral health, the need and the possibility of treatment, observing the care indicated in each period of pregnancy.
- Adjust the oral environment and perform biofilm control, whose practices establish good preventive dental conducts and can be indicated, guaranteeing comfort to the pregnant woman and continuity of treatment after pregnancy.
- Identify risk factors that may prevent the normal course of pregnancy.
- Assist dental complications/urgencies, observing the care indicated in each period of pregnancy and referring the pregnant woman to reference levels of greater complexity, if necessary.
- Favor understanding and adaptation to the new experiences of pregnant women, their partners and family members, as well as educating them about the care in this period.
- Guide pregnant women and their staff about risk factors and vulnerability to oral health.
- Identify high risk pregnant women and refer them to the referral service.
- Develop educational and support activities for pregnant women and their families.
- Guide pregnant women on the periodicity of the dental consultations and the gestational trimesters indicated for performing dental treatment.
- Guide the woman and her partner on healthy eating habits and oral hygiene.

4.2 Access of pregnant and postpartum women to oral health services

Ideally, it is estimated that the pregnant woman is assisted at least **once every trimester**, focusing on the oral health of the pregnant woman and her baby. At this point, we suggest the approach of issues that deal with diet, oral hygiene, professional prophylaxis, topical application of fluorides and other related matters[17,43].

5 ORAL HEALTH ASSISTENCE FOR PREGNANT AND POSPARTUM WOMEN

Individual and collective care of pregnant women, including prenatal dentistry care, should be performed in at least (as shown in Figure 4):

Figure 4 - Procedures that assemble dental care for pregnant women.

a) Guidance on the possibility of care during pregnancy.

b) Soft tissue examination and identification of oral health risk.

c) Diagnosis of caries lesions and need for curative treatment.

d) Diagnosis of gingivitis or chronic periodontal disease and need for treatment.

e) Guidance on eating habits (ingestion of sugars) and oral hygiene.

Source: Brazilian Ministry of Health[44].

It should be emphasized that, in no case, the assistance should be compulsory, but always respect the will of the pregnant woman, under penalty of very serious ethical infraction.

Next, we will discuss the main alterations that occur in the pregnancy cycle to which the dental surgeon must always be aware.

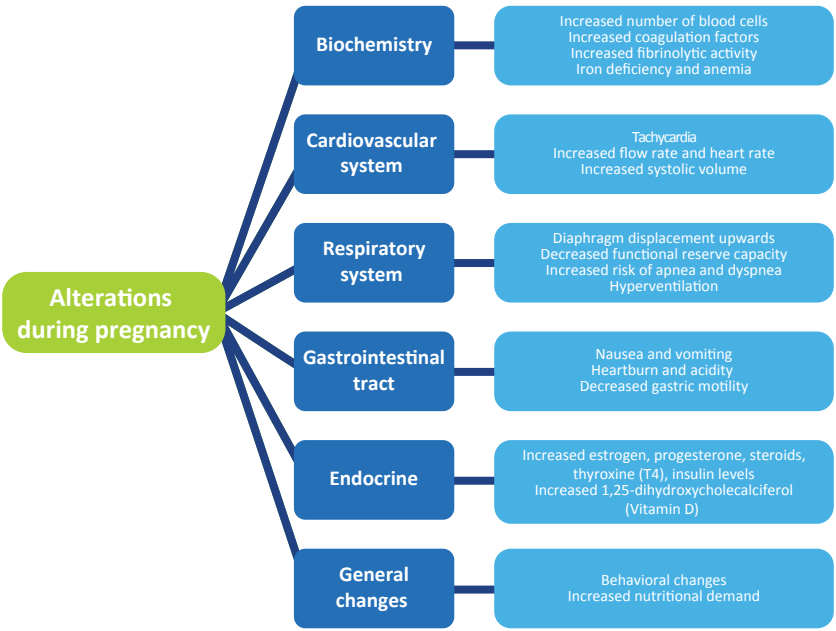
5.1 Physiological and emotional changes during pregnancy

Pregnancy is a physiological phenomenon that evolves into the creation of a new being and provides the mother with physical and psychological changes, preparing her for childbirth and breastfeeding[7].

These transformations may be subtle or striking, but they are

certainly the most pronounced by which the human body undergoes, providing a psychic and social repercussion on the lives of these women and their families. According to a study by Costa[45], pregnant women reported the greatest alterations in the second and third trimester of gestation, related to weight gain, and breast and abdomen enlargement. However, there are many changes that take place, as shown in Figure 5:

Figure 5 - Main physiological alterations observed in various body systems during pregnancy.



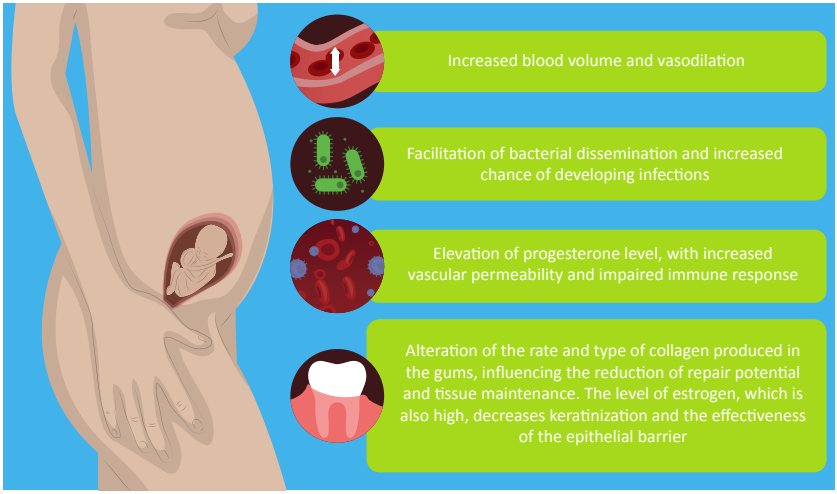
Source: Adapted from: Kurien S, Kattimani VS, Sriram RR, Sriram SK, Rao VKP, Bhupathi A, Bodduru RR, N Patil N.[46]; Naseem M, Khurshid Z, Khan HA, Niazi F, Zohaib S, Zafar MS[47].

Some of these systemic physiological changes have repercussions on the oral cavity, in which significant alterations can be noted.

Changes in the immune system, especially suppression of neutrophil function, may be associated with periodontal disease

and may be the probable cause of exacerbation of dental biofilm action in the induction of gingival inflammation[48]. See Figure 6 for a representation of these changes:

Figure 6 - Immunological alterations characteristic of gestation and its influence on the occurrence of periodontal disease.



Source: Adapted from: Oppermann RV, Rösing CK[49].

Gingival changes usually occur between the 3rd and 8th month of gestation and gradually decrease after delivery[48].

Sexual hormones may also affect the gums by facilitating the proliferation of anaerobic bacteria in the biofilm, increasing the concentration of Prevotella intermedia in pregnant women by up to 55 times compared to non-pregnant women[2, 50].

Changes in salivary composition, with variations in pH, buffer capacity, and peroxidase levels[49], increase the chances of pregnant women having caries compared to women in general[51]. In addition, increased intake frequency, caused by decreased physiological capacity of the stomach, increased appetite for sugars and poor biofilm control corroborate this event[52].

Nausea and vomiting, common up to the third month of pregnancy, affects between 70% and 85% of women and can be prolonged throughout pregnancy, with severe episodes of nausea and vomiting (hyperemesis gravidarum - 0.3% to 2.0%) which may lead to dental erosion[3].

Xerostomia is a frequent complaint among pregnant women and is physiological. It occurs mainly at night, during sleep, when the glands reduce the rate and amount of spontaneous salivary secretion[45]. Although sialorrhea may occur in the 2nd or 3rd week of gestation, it should not extend beyond the first trimester. This phenomenon is more related to the inability of the pregnant woman to swallow normal amounts of saliva due to nausea than with the increase in the quantity of saliva produced[2].

Gestation also brings psychological changes to the woman. Apart from the hormonal changes, there are still fears and anxiety surrounding this moment. It is a period of transformation of the routine of the mother and her whole family.

Socioeconomic changes may occur, such as teenage mothers dropping out of school or adult mothers dropping out of paid work activities, a situation that makes them socially vulnerable. It must be remembered that motherhood requires cognitive skills and financial availability[6].

These changes can negatively impact the mother's life quality, changing the way she sees herself within her cultural patterns, her expectations and concerns.

Dental surgeons must seize this life cycle of proximity between women and health services to establish a link and create a virtuous circle of education and individual and collective health promotion by empowering, legitimizing and helping to build an autonomous health

care for both the mother and baby[6].

On this matter, Vamos et al.[53] published a systematic review in which they reinforce the scarcity of well-designed studies, proving that the guidelines in this period are very effective and indicating factors that can directly influence the absorption of information by pregnant woman, such as the persuasion and didactic power of the guiding professional and the degree of interest and education of the pregnant women receiving the instructions.

5.2 Most frequent oral diseases in pregnant and postpartum women

Major changes in the oral cavity include periodontal diseases (gingivitis, gingival hyperplasia and pyogenic granuloma), salivary changes (flow and buffer capacity) and caries disease. Melasma may also occur on the patient's face[46].

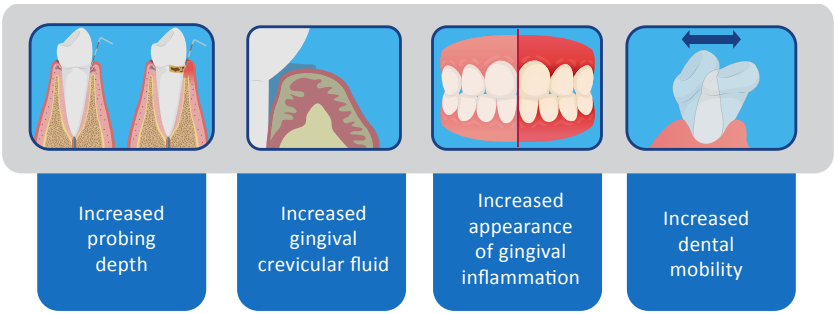
5.2.1 Periodontal Diseases

The elevation in estrogen levels that increases capillary permeability predisposes pregnant women to gingivitis and gingival hyperplasia. Although these factors do not lead to periodontitis, they may worsen preexisting conditions[46].

Gingival changes usually occur between the 3rd and 8th month of gestation and decrease gradually after labor[48]. They are results of the association of poor oral hygiene and local irritants from dental biofilm. The hormonal and vascular changes that follow gestation only exacerbate the inflammatory response of these local irritants[48,3].

Pathological agents most frequently associated with the occurrence of periodontal diseases are: *Porphyromonas gingivalis, Tannerella forsythensis* and *Treponema denticola.* Among the most frequent inflammatory changes are (Figure 7):

Figure 7 - Most frequent inflammatory clinical changes associated with periodontal diseases.



Source: Adapted from: Gonçalves, KF[3].

Gingivitis is the most frequent periodontal disease in pregnant women, with estimates ranging from 30% to 100%[3, 49].

Gestational gingivitis usually begins at the 3rd month of gestation and is characterized by a dark red (hyperemic), swollen, bleeding, and sensitive gum[45], as shown in Figure 8:

Figure 8 - Clinical aspect of gingivitis.

Source: Silk H, Douglass AB, Douglass JM, Silk L. Oral health during pregnancy [54].

Supragingival and/or subgingival periodontal therapy should be immediately instituted and the education in oral hygiene initiated[48], since periodontal disease may raise plasma levels of prostaglandin, which is a mediator of inflammation also responsible for labor induction.

Regarding the potential of periodontal disease in increasing the risk of obstetric complications, the assumptions fall on the association between periodontal disease and outcomes, such as: preterm birth, low weight at birth and pre-eclampsia. See Figure 9 for each of these outcomes.

Figure 9 - Characteristics of Prematurity, Low Weight at Birth and Pre-eclampsia.

Pre-term birth: Refers to the birth of a baby before completing 37 weeks of gestation.

Low Weight at Birth: It is determined by a birth weight of less than 2500g.

Pre-eclampsia: Refers to pregnant women with blood pressure levels greater than 140/90 mmHg, with proteinuria and gestational age above 20 weeks of gestation.

Source: Adapted from: Corbella S, Taschieri S, Francetti L, De Siena F, Del Fabbro M[38]. Chambrone L, Guglielmetti MR, Pannuti CM, Chambrone LA[37].

Regarding the association between periodontal disease and prematurity/low weight, it can be affirmed that there is a positive correlation[37, 38]. Concerning the association between periodontal disease and preeclampsia, the meta-analysis, by Sgolastra et al.[55], shows that periodontitis is a possible risk factor for pre-eclampsia. According to Huang et al.[56], women with periodontal disease before 32 weeks of gestation are 369 times more likely to develop pre-eclampsia when compared to women without periodontal disease.

IMPORTANT!

The fact that there is a positive association between periodontal disease and obstetric risk of complications does not imply that periodontal disease treatment during pregnancy, decreases this risk[57].

This information does not rule out the need for periodontal treatment in gestation when diagnosed periodontal disease. It should be understood that periodontal disease is a chronic infection that must be treated in any individual, and that this conduct should not be different among pregnant women.

Periodontal disease is common in women in childbearing age and the disease tends to worsen during pregnancy, when untreated.

The American Academy of Periodontology (2017) and the European Federation of Periodontology indicate that women with periodontal disease may be at risk for adverse pregnancy outcomes, such as going through preterm birth or having a baby with restricted intrauterine growth, probably through systemic inflammatory pathways.

Research indicates that there is no consensus between the causal relationship with preterm birth/low weight at birth. The results of these studies are heterogeneous, making it difficult to interpret the findings and transpose them into clinical practice[49].

It is still unclear whether periodontal treatment during pregnancy has an impact on preterm birth and there is little evidence that periodontal treatment can reduce low weight at birth[57].

In some pregnant women, approximately 1% to 5%[48], gingivitis will progress locally, developing to a **pyogenic granuloma**, or rather, **granuloma gravidarum** or **pregnancy tumor**[59]. See Figure 10 for the main clinical features of granuloma gravidarum:

Figure 10 - Clinical features of Gravidoma granuloma.

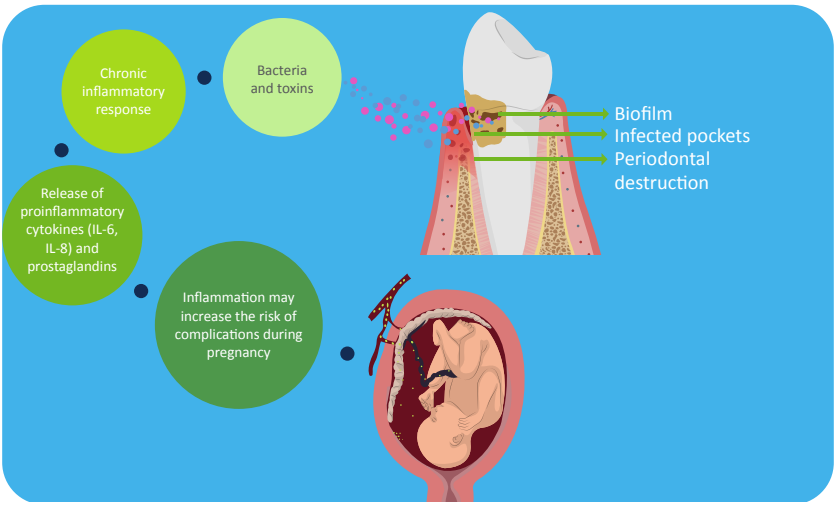
- Injury typically erythematous, pedunculated lobular or flat.
- Located predominantly in the gums, the buccal surface, and may also involve tongue and palate.
- It usually develops between the first and second trimester of pregnancy and regresses after childbirth (GIGLIO, 2009; SILK et al., 2008; ANDRADE, 2014).

Source: Silk H, Douglass AB, Douglass JM, Silk L [54].

Depending on the functional and aesthetic consequences of the injury and the needs of the patient, an intervention can be done. Small lesions respond well to debridement associated with chlorhexidine gel while larger injuries require surgical excision involving the associated connective tissue and any other etiological factors present. Due to the difficulty in controlling bleeding, this procedure should only be performed by an experienced professional[7, 54, 59]. Injuries removed during pregnancy frequently recur[54].

Periodontitis is present in 30% of women in childbearing age. In Figure 11, you will be able to see a representation of the events that characterize periodontitis and its consequences for gestation.

Figure 11 - Characteristic events of Periodontitis and its implication in pregnancy.



Source: Adapted from: Silk H, Douglass AB, Douglass JM, Silk L[54].

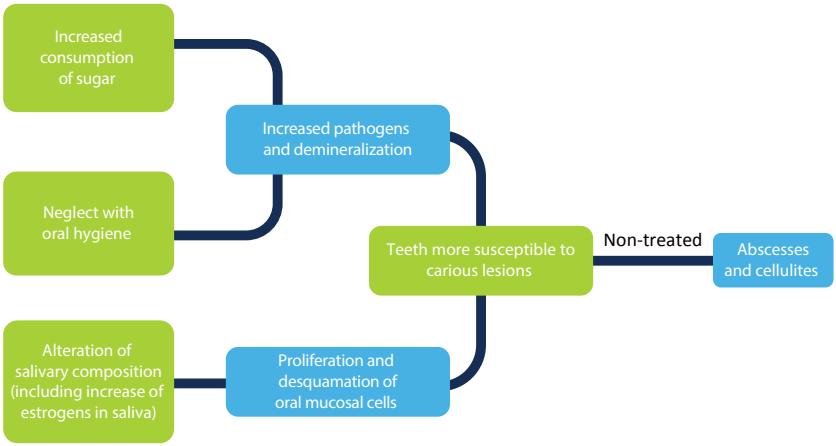
In turn, **dental mobility** is a characteristic of periodontal disease, caused by mineral changes in the lamina dura and disturbances in the periodontal ligament. Vitamin C deficiency may contribute to this condition, which should be treated with the removal of local irritants and therapeutic doses of vitamin C[47, 59].

5.2.2 Caries Disease

Studies indicate a higher incidence of caries during pregnancy[51, 60], issue that may be related to behavioral factors such as difficulties in good oral hygiene and increased sugar consumption, leading to greater accumulation of dental biofilm[51, 61] and to systemic factors such as hormonal, immunological and metabolic changes[62].

Hence, some factors may make teeth more susceptible to carious lesions, as shown in Figure 12.

Figure 12 - Characteristics of Gestation that influence the susceptibility to carious lesions.



Source: Adapted from: Grilo MGP 2. Naseem M, Khurshid Z, Khan HA, Niazi F, Zohaib S, Zafar MS [47]. Silk H, Douglass AB, Douglass JM, Silk L[54].

In view of these factors, carious lesions can progress in pregnant women, as can be observed in Figure 13.

Figure 13 - Clinical appearance of carious lesions in pregnant women.

Source: Silk H, Douglass AB, Douglass JM, Silk L[54].

The oral hygiene practice with fluorosis dentifrices for the control of caries disease in pregnant women should receive special

attention, so as the possibility of using professional topical fluoride[2, 47, 54]. The reinforcement of hygiene habits will reduce the accumulation of dental biofilm, an essential measure not only for the control of caries disease, but also for gingivitis and periodontal disease.

5.2.3 Dental Erosion

Episodes of nausea and vomiting, frequent among 70% and 85% of pregnant women, make the mouth more acidic, increasing the probability of tooth enamel demineralization by erosion.

Hyperemesis may lead to dental erosion, manifesting itself mainly in the lingual and palatine surfaces and possibly causing dental hypersensitivity.

Pregnant women should be instructed to, after vomiting, use a mouthwash with fluoride and rinse with water mixed with sodium bicarbonate, in order to neutralize the acids. They should also be advised not to brush their teeth immediately after vomiting. It is recommended to use brushes with soft bristles to avoid further enamel damage. Antacids, such as aluminum hydroxide or even proton pump inhibitors and antiemetic drugs may also be prescribed[2].

5.3 Prescription medication for pregnant and postpartum women

One of the dental surgeon's main concerns regarding the dental treatment of pregnant women refers to the safety related to the use of anesthetic drugs, analgesics, antibiotics, among others.

These professional's main fear is related to the transfer of the drugs to the fetal compartment through the placenta. Indeed, this concern is relevant and professionals caring for pregnant women should know the action mechanisms of these drugs in order to conduct a review of the risks and benefits of using drugs in this period[63].

Pregnancy causes physiological changes in pharmacokinetics that can considerably influence the distribution and metabolism of the drug on the mother and the fetus. It is a phase in which there is a high volume of drug distribution, a decline in maximal plasma concentration, a shorter half-life and an increase in lipid solubility and in the clearance rate of the drug[47].

Self-medication should be thoroughly discouraged, especially during pregnancy, a practice considered the second leading cause of fetal teratogenesis, surpassed only by genetic defects[7].

IMPORTANT!

When prescribing a drug to pregnant women, what may have a therapeutic effect for them may cause a side or toxic effect for the fetus. According to the World Health Organization, 90% of pregnant women take some type of medication, prescribed or not by their doctor. Drugs account for 2% to 3% of all congenital anomalies.

Organogenesis occurs between the 4th and 8th week of intrauterine life, when the major organs and systems are being formed. Many drugs can pass through the placental membrane by passive diffusion (dissolution in the lipid membrane).

During the period of organogenesis, which includes the first trimester of gestation, spontaneous miscarriages may occur, mainly due to fetal developmental defects. In this case, the woman's own organism expels the fetus, considering it unfeasible. Statistics show that 50% of spontaneous abortions occur in this period[7, 47].

For Andrade[7], the placental barrier is in fact a "selective sieve" and the common dental care drugs, such as anesthetics, anxiolytics, analgesics, anti-inflammatories and antibiotics, pass easily from mother to fetus, since they are liposoluble molecules of low molecular weight.

Therefore, it is important to know the drugs for their correct prescription. With that purpose, the FDA (Food and Drug Administration), a body that supervises and establishes rules for the safe use of medicines in the United States, proposed a classification in 5 categories: A, B, C, D and X, considering the risks and their effects on gestation. In Frame 6, we summarize the main information on the use of drugs in pregnancy, considering the potential risk category of drugs for the fetus and its definitions.

Frame 6 - Use of medicines during pregnancy: the potential risk categories of drugs for the fetus and its definitions.

Category	Risk factor	Antibiotics	Analgesics and Anti-inflammatories	Anxiolytics	Local anesthetics
A	Controlled studies in humans indicate no apparent risk to the fetus				
B	Studies in animals indicate no risks to the fetus, but there are still no reliable studies in pregnant women	Amoxicillin Cephalexin Chlorhexidine Clindamycin Erythromycin Metronidazole Penicillin	Ibuprofen * (1st and 2nd trimester) Paracetamol **		Lidocaine Prilocaine
C	Studies in animals have shown adverse effects but there are no studies in humans	Ciprofloxacin	Codeine and acetaminophen Hydrocodone + acetaminophen Propoxyphene Sodium dipyrone** Corticosteroids ** Aspirin		Mepivacaine Bupivacaine Articaine
D	Positive evidence of human fetal risk, whose benefits may justify the use	Doxycycline Tetracycline	Ibuprofen * (3rd trimester) Aspirin (3rd trimester)	Barbiturates Benzodiazepines	
X	Positive evidence of fetal abnormalities with contraindications both in pregnant women and in those who want to become pregnant since the risks outweigh the benefits				

Source: Adapted from: Naseem et al[47]; Vasconcelos; Vasconcelos; Mafra[63]. *(GIGLIO59);** (ANDRADE7).

5.3.1 Anesthetics

Local anesthetics are liposoluble and easily cross the placental membrane. They are classified in categories B and C of the FDA. The anesthetic should be chosen to provide greater comfort to the pregnant woman. Therefore, whenever possible, anesthetic solutions should contain a vasoconstrictor.

The use of vasoconstrictors delays the absorption of anesthetic salt into the bloodstream, increasing the duration of anesthesia, reducing the risk of toxicity to the mother and the baby also having hemostatic action[6, 63].

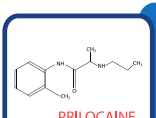
The administration of the local anesthetic should be done through a slow injection of the solution, with prior aspiration, to avoid intravascular injection and with the appropriate anesthetic technique, to avoid the need of repetitions, not exceeding 2 tubes (3.6 ml) per service session[63].

Figures 14 and 15 provide important information about local anesthetic solutions and their indications for the care of pregnant women.

Figure 14 - Characteristics of local anesthetic solutions and their indications for the care of pregnant women.

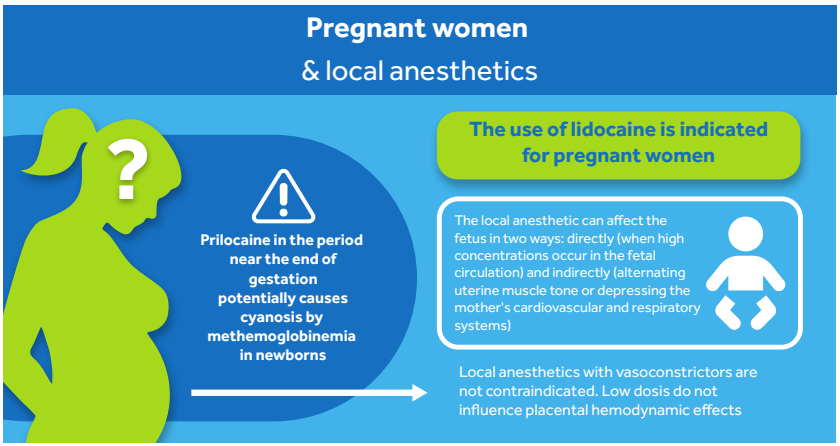
The anesthetic solution most used in the practice of dentistry is lidocaine 2% with epinephrine at a concentration of 1: 100,000

Although articaine has excellent pharmacokinetic characteristics, like low liposolubility, high protein binding and rapid metabolism and renal elimination, there are still no clinical evidence to justify its use (ANDRADE, 2014)



Prilocaine should be viewed with caution, since it has the ability to cross the placenta at a higher rate than other anesthetic salts available in the Brazilian market and the capacity to cause maternal and/or fetal methemoglobinemia when taken in high doses. In addition to being associated with a vasoconstrictor derived from vasopressin (felypressin), which, due to its structural similarity to oxytocin, in very high doses, could act on the uterine smooth muscle causing contractions (ANDRADE, 2006 apud GONÇALVES, 2016)

Figure 15 - Pregnant women and local anesthetics.



Source: OLIVEIRA PJ[64].

5.3.2 Analgesics

From the moment we consider oral medication necessary, we assume that the benefit of its use can overcome its risks. However, we must remember that the drug treatment of odontogenic infections is coadjuvant and does not solve the problem by itself. For this reason, the indication for any toothache is local treatment, assisted, if necessary, by drug therapy[8].

All dental surgical intervention causes tissue destruction, generating an acute inflammatory response, characterized by the presence of pain, accompanied or not by edema and limitation of the masticatory function. In cases of non-invasive procedures, the inflammatory response is simple and self-limited, and a peripheral analgesic may be prescribed. In cases of more complex interventions, drugs with anti-inflammatory properties will be necessary to prevent hyperalgesia and to control postsurgical edema[6].

See below (Figure 16) the main analgesics used in the postsurgical period, their characteristics and indications for pain control in pregnant women.

Figure 16 - Main analgesics used in the postsurgical period, their characteristics and indications for pain control in pregnant women.

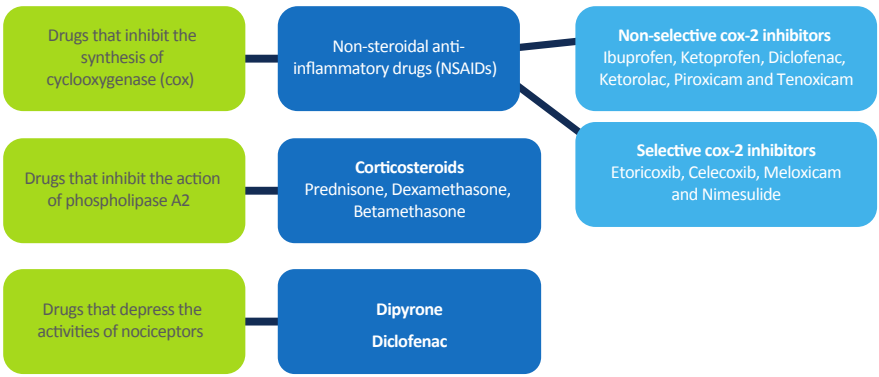
Paracetamol	• Analgesic for mild and moderate pain. • Drug of choice at any stage of gestation. • It should be prescribed at the concentration of 500 mg - 750 mg every 6 hours.
Sodium Dipyrone	• It is the second drug of choice. • The pharmaceutical industry does not recommend its use in the 1st or last trimester. • Risk of causing premature closure of the arterial duct and of perinatal complications due to the impairment of the platelet aggregation of the mother-baby binomial.
Opioid analgesics (tramadol and codeine)	• Classified in categories C and D. • They should be avoided since prolonged use or high doses are associated with congenital anomalies and respiratory depression.

Source: Adapted from: Andrade ED[7]. Armonia PL, Rocha, RG [65].

5.3.3 Anti-inflammatories

Anti-inflammatories, like analgesics, can be classified according to the mechanism of pharmacological action[6], as we can see in the figure below:

Figure 17 - Classification of analgesics and anti-inflammatory drugs according to the Mechanism of Pharmacological Action.



Source: Andrade ED[7].

Among the NSAIDs, the standard substance is the acetylsalicylic acid, which is contraindicated during pregnancy, as well as the other NSAIDs, especially in the last trimester of gestation, as they may

cause bleeding in the mother and fetus, uterine inertia (insufficient contraction of the uterus during or after delivery) and premature closure of the fetal artery channels. The use of NSAIDs in the last trimester of pregnancy is also associated with prolonged labor due to the inhibition of prostaglandin synthesis related to uterine contractions[63].

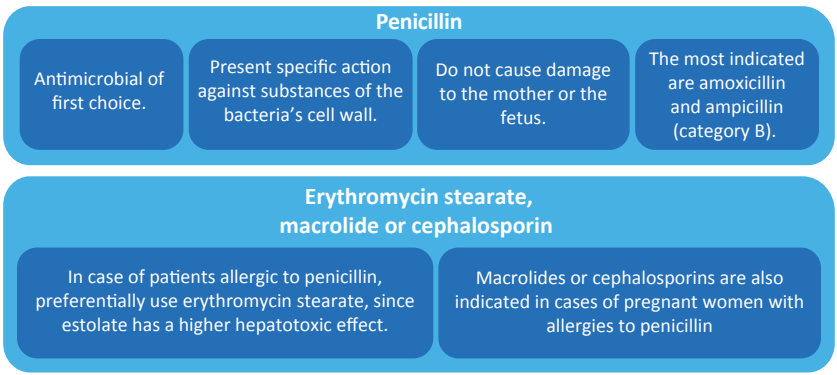
When an anti-inflammatory drug is required, dexamethasone or betamethasone should be used in a single dose of 2-4 mg, since there is evidence that corticoids present no risks of teratogenicity in humans[66].

5.3.4 Antibiotics

In cases of bacterial infections, the main treatment is the removal of the cause, such as the drainage of a periodontal or endodontic abscess. If infections present local signs of dissemination and systemic manifestations of the process (fever, general malaise), local decontamination should be complemented with the systemic use of antibiotics[7].

See below (Figure 18) the main antimicrobials used in pregnant women and their characteristic[3, 63].

Figure 18 - Main antimicrobials used in pregnant women and their characteristics.



In cases of more advanced infections, associate penicillin with metronidazole or potassium clavulanate. And, if the patient is allergic, opt for clindamycin[7].

Tetracyclines are contraindicated because they cross the placental membrane and are able to connect to hydroxyapatite, causing a coloration that ranges from light yellow to dark brown and can affect the deciduous teeth. The deciduous dentition becomes susceptible when tetracyclines are administered to the mothers between the 4th month of gestation until about nine months after the baby's birth. The permanent teeth, when tetracycline is administered in children from 3 months to 8 years of age[67, 68, 69]. These drugs may also be deposited in fetal bone tissue, causing growth retardation, and during the first weeks after delivery may induce hemolytic anemia or jaundice in the neonate[63].

The image below (Figure 19) shows clinical aspects of tetracycline dental pigmentation, consequences of the drug's administration in children.

Figure 19 - Effect of Tetracycline on permanent dentition.

Source: Wu S [70].

In summary, it can be affirmed that the dental surgeons have SAFE drugs within their reach to perform the dental treatment of pregnant women, at any time of the gestation. Some drugs used routinely by the dental surgeon may change classification according to the FDA from one trimester to another. It is only necessary that the professional is alert and consults the classification in case of doubt. Hence, he/she will be safely indicating a drug for the dental treatment of pregnant women.

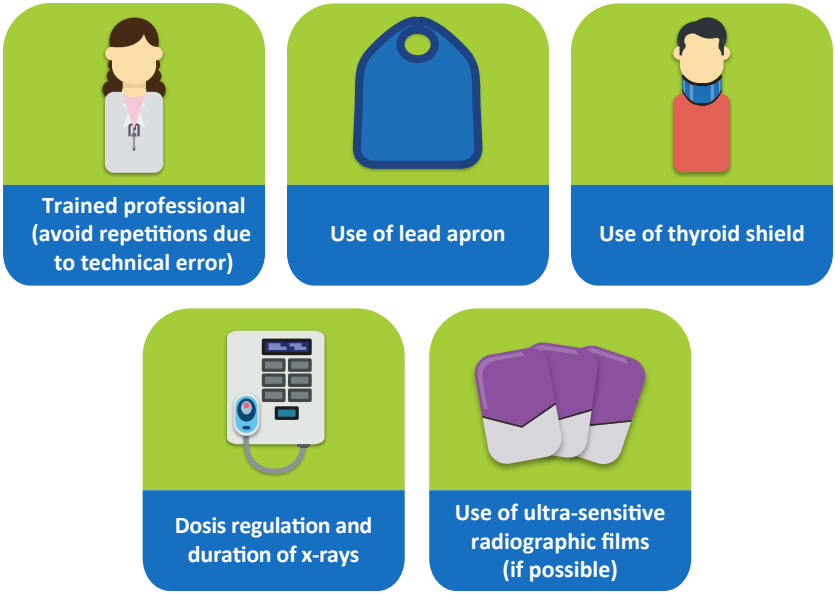
5.4 Oral radiographic examinations during pregnancy

Anamnesis and detailed physical examination are essential in the clinic. The first measure to avoid problems with radiographic is a well-performed anamnesis on the patient's sexual life, since few women are aware of pregnancy in the first eight weeks of gestation, coinciding with the critical period of organogenesis[63].

However, imaging tests are often essential in order to find the correct diagnosis and perform the treatment. In these cases, the dental surgeon should not be afraid to take the radiographic examination, even in pregnant women, with all the care needed. A study by Martins et al.[71] showed that almost all the professionals surveyed took x-rays for diagnosis in pregnant women and that in the cases of those who did not, the refusal happened much more by emotional considerations than by the legitimate concept of science[72].

See below some measures that reduce the exposure to x-rays and may protect pregnant women during radiographic examination (Figure 20).

Figure 20 - Radioprotection measures used during the Radiographic Examination of Pregnant Women.



Source: Adapted from: Gonçalves, KF[3].

Although D-sensitivity films are still on the market, E-sensitivity films are available, with an exposure time reduced by 52% compared to D-sensitivity and F-sensitivity (ultra-sensitive), which by its turn, requires 20% less exposure time than E-sensitivity films[73].

Therefore, pregnant women are exposed to a dose considerably lower than the dose necessary to cause malformation, after all, the fetus only receives 0.0001 milligray (mGy) even though it can receive up to 50 mGy without suffering any damage, according to the *National Council on Radiation Protection and Measurements*[7].

A periapical radiography exposes the patient to about 0.01 mrad of radiation, being this dose 40 times smaller than the dose of cosmic radiation received daily[2]

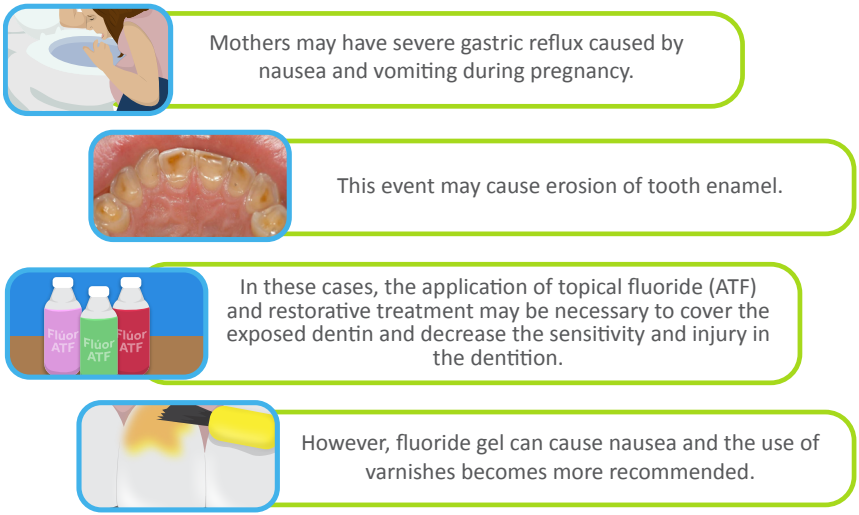
5.5 Fluorotherapy x Pregnancy

The greatest benefit of using fluoride is its local effect, acting in the processes of demineralization and remineralization of the tooth enamel. There is no scientific evidence to support the systemic effect of fluoride supplementation. Therefore, prenatal supplementation is contraindicated.

The association of fluoride with calcium-containing vitamin complexes reduces absorption of these two elements by 50%. The decrease in the fluoride absorption does not have any profound consequences, but the decrease of calcium absorption does, since it represents an extremely significant element for the pregnant woman and the baby[63].

See below the indications of fluoride treatment for pregnant women (Figure 21).

Figure 21 - Fluoride treatment for pregnant women and their indications.



Source: Adapted from: Giglio NW[59].

IMPORTANT!

"There is no reason for the prescription of prenatal fluoride and these products should be withdrawn from the market simply because they are not associated with any benefit, having a negative educational impact. Dentistry must be inserted in a health team to prepare the mother-to-be to control the disease, and not to believe in an innocuous medication"[74].

5.6 Care

Prenatal Dental Care was a term created to point out how important is for pregnant women to consult with a dental surgeon, either for their own care or to receive guidance on the baby's oral health.

In Brazil, this set of actions is part of the Women's Health Care Program, according to the Oral Health National Policy Guidelines (PNSB). However, some factors contribute to the weakening of this strategy, as those presented below in Figure 22[71, 75].

The baby's health begins by the mother's mouth – Prenatal Dental care is fundamental!

Figure 22 - Factors contributing to the weakening of the Women's Health Care Program, according to the Oral Health National Policy Guidelines (PNSB).

- Lack of dental practices in health units, which prevents prenatal care
- Fear that professionals have to be held accountable for any fatality that may occur with the baby
- Insecurity or lack of knowledge about the needed care and specificities that physiological changes during pregnancy require in the dental care of pregnant women.

These behaviors corroborate the perpetuation of beliefs and myths about the safety of the dental care of pregnant women's. It is important to strengthen the professional interaction with doctors and, especially, nurses, since those professionals are fundamental to assist in the transmission of information regarding oral health during pregnancy, as well as to solidify the importance of oral health care for the mothers-to-be[3].

The study by Santos Neto et al.[6], developed with postpartum women who performed prenatal care in public maternity hospitals in the Metropolitan Region of Grande Vitória (ES), brings us some worrying data about the frequency of care performed by the dental surgeons at educational, preventive and curative levels during prenatal care. See the mentioned data in the table below:

Table 1 - Evaluation of prenatal dental care according to Health Care levels.

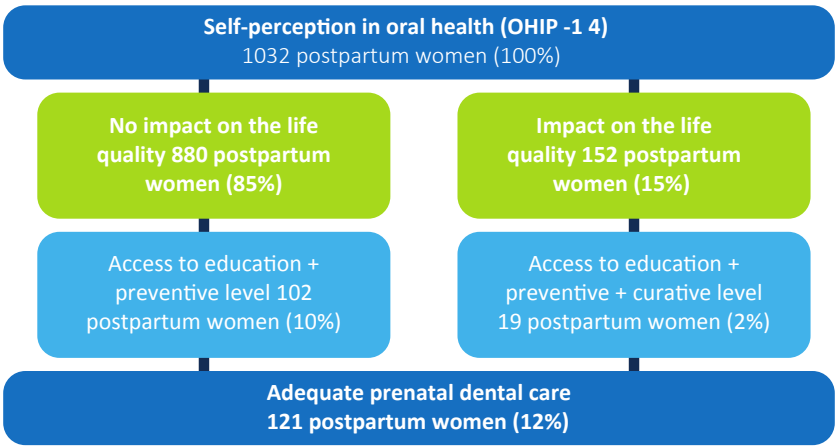
	Evaluation items	n		Confidence interval (95%)
Educational level	Exclusive breastfeeding for six months	525	50,7	47,7-53,8
	Breastfeeding for two years	412	39,8	36,8-42,8
	Damage to the use of the bottle-feeding	380	36,7	33,8-39,7
	Damage to the use of a pacifier	377	36,4	33,5-39,4
	Breastfeeding and craniofacial development	423	40,9	37,9-43,9
	Breastfeeding and prevention of respiratory diseases	402	38,8	35,9-41,8
	Maternal oral hygiene	377	36,4	33,5-39,4
	Postnatal oral hygiene	342	33,0	30,2-35,9
	Healthy eating	519	50,1	47,1-53,2
	Use of fluoride	191	18,5	16,1-20,8
	Evaluation			
	From zero to four information	585	56,5	53,5-59,5
	From five to ten information	427	41,3	38,3-44,3
Preventive level	Review consultation	112	10,8	8,9-12,7
	Supervised brushing	165	15,9	13,7-18,2
	Professional Prophylaxis	197	19,0	16,6-21,4
	Application of fluoride	136	13,1	11,1-15,2
	Evaluation			
	At least one type of preventive care	217	21,0	18,5-23,4
	Educational and Preventive Assistance	121	11,7	9,7-13,6
Curative level	Consultation due to pain	87	8,4	6,7-10,1
	Dental Extraction	30	2,9	1,9-3,9
	Dental Restoration	126	12,2	10,2-14,2
	Endodontic Treatment	20	1,9	1,1-2,8
	Gingival Treatment	19	1,8	1,0-2,7
	Dental drug administration	43	4,2	2,9-5,4
	Evaluation			
	At least one type of curative assistance	172	16,6	14,4-18,9
	Educational, Preventive and Curative Assistance	77	7,4	5,8-9,0

Source: Santos Neto ETS, Oliveira AE, Zandonade E, Leal MC[6].

We realized that only the information on exclusive breastfeeding up to six months and healthy eating exceeded the frequency of 50%. Just 20% of women received preventive care and only 17% received some kind of curative treatment.

The following figure, present in the same study, shows a diagram of dental assistance evaluation. See below:

Figure 23 - Diagram of dental assistance evaluation in prenatal care.



Source: Santos Neto ETS, Oliveira AE, Zandonade E, Leal MC[6].

The analysis of the above data shows that it is superlative that all health teams articulate their knowledge fields in order to enable the process of a humanized and quality prenatal care, based on evidence, to effectively and fully assist pregnant women. Dental treatment can and should be conducted at any time during pregnancy.

It is important to remember that the persistence of infection is harmful to the mother and the baby, even more harmful than any treatment that can be performed by the dental surgeon. So, it is worth mentioning that some care should be taken to provide safer assistance to the mother-baby binomial[3], considering the main characteristics of the gestational stages (Figure 24).

Figure 24 - Main characteristics of gestational stages and their impact on dental care.

1st trimester: The baby is going through major embryological transformations

2nd trimester: More stable period

3rd trimester: Increased risk of breast cancer for the mom. Increased urinary frequency and discomfort in the dorsal-dorsal position.

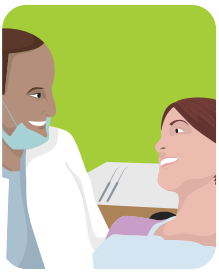
Source: Adapted from: Brazilian Ministry of Health (Brasil)[76].

The fact that the first trimester is the period of organogenesis, when the main embryological transformations happen, and that the third trimester requires some care from the dental professional, to ensure a dental treatment without complications, makes all trimesters compatible with dental treatment, which means that pregnant women can perform any type of dental treatment necessary to restore her oral health. Therefore, the dental treatment of pregnant women can be done in any gestational trimester.

However, it is important that some measures are taken so that the dental care of pregnant women occurs in the best viable way. See Figure 25 for two possible measures.

Figure 25 - Measures that must be taken to provide dental care to pregnant women.

Consultations in a warm environment



Pregnant women are more sensitive to taste, smell and environmental temperature. Unpleasant tastes and smells can cause severe nausea and vomiting; The heat can lead to fainting.

Nutrition and hydration before consultation

Hypoglycemia can also cause fainting, so the patient should be advised to eat properly before the consultation and not forget to hydrate. The consultations should be as brief as possible.

Source: Adapted from: Giglio NW [59].

In addition to these measures, it is important that some information are reinforced in all consultations, as we can see in the figure below:

Figure 26 - Information that should be reinforced in all consultations.

The attention with the quality and the frequency of ingestion, orienting on the importance in avoiding a cariogenic diet, since the buffer capacity of the saliva is altered, besides the reduction of the salivary flow.

Oral hygiene orientations, such as the use of fluoride dentifrice with at least 1,000 ppm F and the need to sanitize the mouth regularly.

Brushing is not indicated right after the vomiting episode. On this occasion, it is preferable to rinse the mouth with fluoride mouthwash or water with sodium bicarbonate.

The control of biofilm by means of a careful brushing and flossing technique. Mouthwash with fluoridated may also be used, but it is important to note that mouthwash is not a substitute for brushing.

Source: UNA-SUS/UFMA, 2018.

5.6.1 Care in the first trimester

In the first trimester, women are still adjusting to the pregnancy. They may experience nausea and vomiting and feel more scared since it is a delicate period of gestation. This is the moment when the baby's organs are forming, and the woman finds herself culturally surrounded by myths and beliefs. Therefore, it is not the most comfortable time for the mother-to-be to perform interventions, but it is a good time for the first dental prenatal consult. The dental surgeon must seize this moment to[47]:

- Inform about the changes that will occur in the pregnant woman's body and the repercussion of these alterations in the oral cavity.
- Give oral hygiene instructions, enhancing biofilm control.
- Perform clinical examination and prophylaxis.

5.6.2 Care in the second trimester

This period, when the organogenesis is already complete and the pregnant woman's belly is not yet so large, is a good moment for more invasive elective procedures, in case they are needed.

- It is safe to perform scaling and root planing, restorations, endodontic treatment, exodontia, x-rays.
- It is important to strengthen the orientations on dental biofilm control and to perform periodontal therapy.

5.6.3 Care in the third trimester

The procedures performed in the second trimester may also be carried out in the third trimester, but they should not exceed half

of that period. Major limitations are related to the discomfort of the mother, such as:

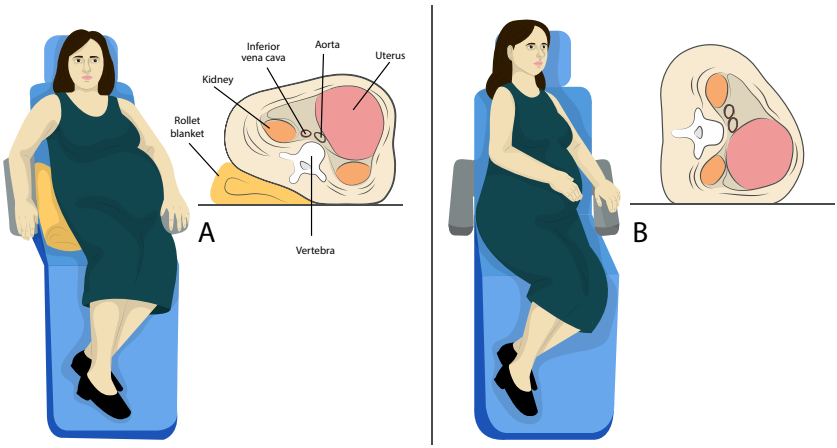
Figure 27 - Main limitations that are related to the discomfort of the mother, during dental care.

Source: UNA-SUS/UFMA, 2018.

Although not very frequent, some pregnant women may present supine hypotensive syndrome due to compression of the inferior vena cava and aorta by the gravid uterus. This syndrome, characterized by a decrease in cardiac output, may initially lead to an increase in heart rate and blood pressure, followed by hypotension, bradycardia and syncope, and can also be accompanied by dizziness and nausea. Decreased uteroplacental perfusion occurs too. In addition, the supine position may cause a decrease in oxygen blood pressure (PaO2) and increase the incidence of gastroesophageal reflux dyspepsia.

The ideal position is the left lateral decubitus, at an angle of approximately 15°. The dental surgeon should slightly raise the back of the chair and ask the patient to turn over her left arm. This can be done without tilting the backrest further into the supine position by supporting a back cushion on the right side of the pregnant woman, allowing the fetal weight to move left and not compress the vena cava (Figure 28)[2, 46].

Figure 28 - Supine Position



Source: UNA-SUS/UFMA, 2018.

5.7 Oral health education in prenatal and postpartum care

Gestation should be a moment to develop a concept of health education that focuses on the well-being of the mother-baby binomial[45]. In this sense, the World Health Organization (2012) and the Oral Health National Policy Guidelines in Brazil[15] emphasize that mothers play a fundamental role in the patterns of behavior perceived in early childhood, so it is important that educational-preventive actions are inserted in prenatal care.

In a qualitative study performed in Paraíba/Brazil, some pregnant women reported having remained with doubts throughout the gestation, reflecting the failures in the sharing of information between professional-patient[45] and professional-professional. In this sense, Costa et al.[45] emphasize that "any kind of action aimed at improving health care must focus on the qualification of health professionals in order to constantly seek the improvement of social relations developed during daily services; in a critical perspective of naturally visualizing the problems that arise from human coexistence,

in any situation in which they occur. "

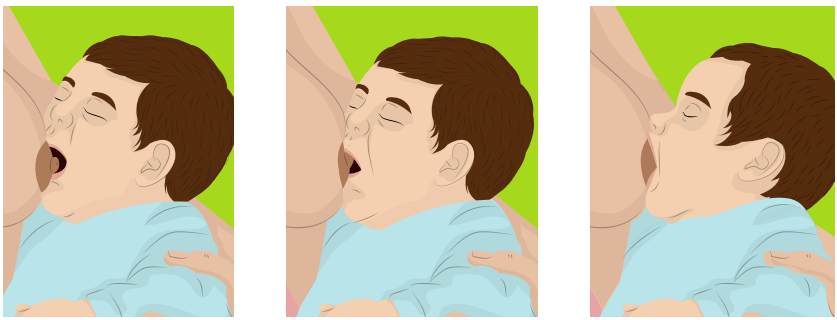
At a time when the mother is focused on the baby and willing to acquire new knowledge that can improve her health and the baby's, vital information for disease prevention and health promotion should be part of the dental consultation. The greater the mother's knowledge of good oral health habits is, the better the results for her children[77].

Mothers play a key role in the construction of a good behavior for their children's oral health. The greater their knowledge about positive attitudes towards oral habits, the better the oral condition of the children. It should be remembered that the whole family must be involved in this process.

Breastfeeding

The Brazilian Association of Pediatric Dentistry (2017) reinforces the importance of breast milk as the ideal food for the baby's emotional nourishment and comfort. See the figure below for the correct way to position the breast by the baby during breastfeeding.

Figure 29 - Correct way to position the breast



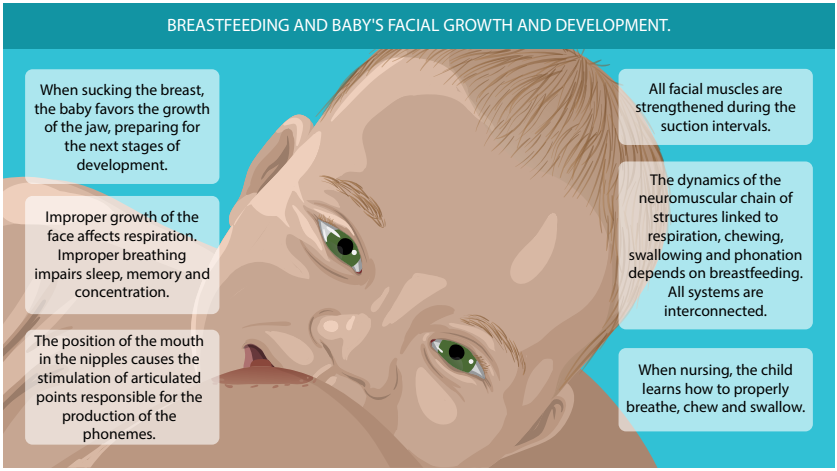
The baby should be as seated as possible and suckle the entire breast areola, so that there is a lip seal that promotes the necessary pressure for the milk to flow out and forces the baby to breathe through the nose.

Source: Da fertilidade à maternidade[78].

The movement of pressure and milking promotes the exercise of nasal breathing, correct positioning of the tongue and stimulus of growth for the correct position of the dental arches. During breastfeeding, the baby performs an oral physical exercise that stimulates the entire musculature of the mouth. So, it is very important that the baby carry out the suction effort.

The figure below shows the benefits of breastfeeding for the baby's facial development.

Figure 30 - Breastfeeding and baby's facial growth and development.



Source: UNA-SUS/UFMA, 2018.

Prevention of Caries Disease

An issue in need to be addressed at consultations referes to the knowledge of pregnant women about their oral health and the interference that this may have with the oral health of her child in the first years of life, and the relation with early childhood caries, in addition to its future implications, such as impairing the child's cognitive development and quality of life[3].

Maternal food practices are passed on to children, including the preference for sweets and sugary drinks[80]. Parental attitudes toward eating habits are crucial in preventing caries in early childhood. In this

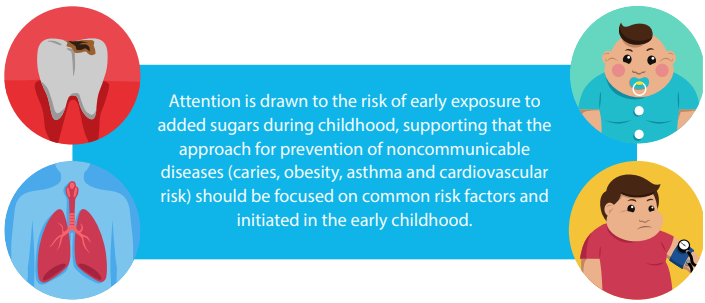
sense, we emphasize that:

• The consumption of added sugar should be avoided or at least reduced in order to prevent caries and obesity, and possibly other non-communicable diseases[81]; including cardiovascular risk[73];

• The consumption of beverages rich in added sugar is associated with asthma in children[82];

• Asthma is clearly associated with caries in children[83].

Figure 31 - Consumption of added sugars and the prevention of non-communicable diseases in early childhood



Source: UNA-SUS/UFMA, 2018.

These habits should be avoided since they favor the establishment of caries lesions in the baby. Hence, the relevance of identifying pregnant women with high risk of caries and early intervening, as well as motivating parents about the benefits of acquiring good oral hygiene habits[84].

The important thing is to guide the pregnant woman through the establishment of healthy habits within the family, in order to build a health compatible environment. Nowadays, the most relevant recommendation in this period is to orient parents to prevent the introduction of sugar into the lives of children under 2 years of age[85] and perform effective biofilm control from the eruption of the first tooth into the oral cavity.

IMPORTANT!

Breastfeeding has a clear protective effect against infections, and malocclusion, increases intelligence, in addition to reducing overweight and diabetes in children who have been breastfed for longer. Besides, there is a benefit of protection against breast and ovarian cancer and type 2 diabetes in breastfeeding women[86]. In this context of recognized benefits of longer breastfeeding for women and children's health, the recommendation must be to follow the World Health Organization guidelines that specify that children must be breastfed up to two years of age or older.

For disease control in specific cases of caries-dependent children, when verified prolonged and nocturnal breastfeeding practices, should be discouraged, and oral hygiene measures must be promptly established with fluoride dentifrices of at least 1000 ppm of fluoride (F), always analyzing the concomitant of sucrose consumption by these children.

Oral Hygiene of the Baby

The baby's oral hygiene should begin as soon as the first deciduous tooth erupts in the oral cavity. Some information about proper baby oral hygiene can be seen in Figure 32.

Figure 32 – Informations on the oral hygiene of the baby.

Hygiene should be carried out with children's toothbrush, compatible with the child's age, and soft bristles.

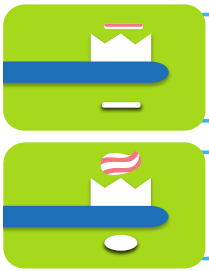
As soon as the eruption of the posterior teeth is detected, flossing should be done for cleaning between the teeth.

Regarding the dentifrice, fluoride is considered one of the most rational methods of preventing caries, since it combines the removal of biofilm to constant exposure to fluoride. Therefore, it should be introduced along with the eruption of the first teeth.

Source: UNA-SUS/UFMA, 2018.

Current studies recommend the use of fluoride dentifrice since the eruption of the first deciduous tooth, at a minimum concentration of 1000 ppm F. We should be aware of the amount of toothpaste in the brush[87, 88, 89], as shown in Figure 33:

Figure 33 - Amount of fluoride dentifrices in the brush.



While the child does not spit, using the corresponding amount to a grain of rice.

After this period, the amount can be increased to an equivalent of a pea.

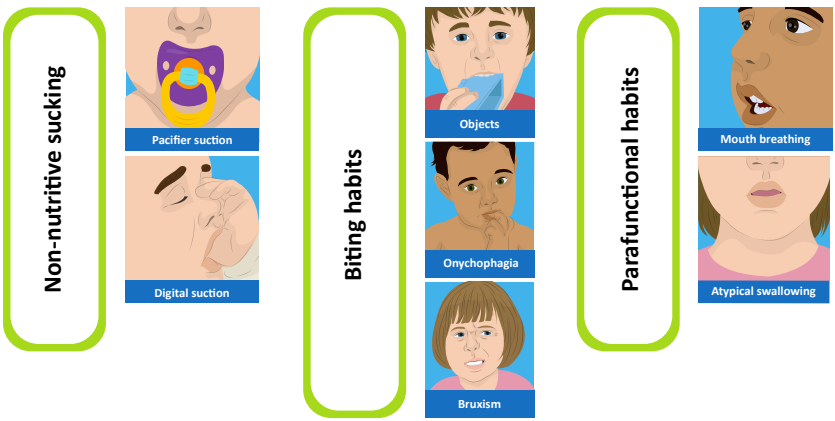
Source: Walsh T, Worthington HV, Glenny AM, Appelbe P, Marinho VC, Shi X [87].

Cleaning with fluoride dentifrice should be done at least twice a day, so that the child can benefit from the practice.

Prevention of Deleterious Habits

Deleterious oral habits can trigger malocclusions, altering the child's respiratory, swallowing and speech patterns. They can be divided according to Figure 34 below.

Figure 34 - Deleterious oral habits in children.



Source: UNA-SUS/UFMA, 2018.

Some theories try to explain the etiology of deleterious habits. The first theory is related to the need for sucking during the breastfeeding period. The second attributes emotional disturbances and the third associates the repetition of a learned behavior.

The influence of the family is very important to eliminate the habit. The most commonly used method for the child to quit such habits is counseling and awareness raising. Mechanical devices, such as the use of "reminder" orthodontic appliances, may also be effective in eradicating deleterious oral habits[90].

FINAL CONSIDERATIONS

The health care of pregnant women is the responsibility of the entire health care team. However, it is the role of the dental surgeon, as an actor capable of preventing diseases related to the oral cavity that may exacerbate during pregnancy and cause consequences for childbirth and for the health of the baby, to recognize the main physiological changes in gestation and identify situations when to indicate prescription drugs.

To promote and restore health, one must be updated and supported by scientific evidence, while always respecting the culture, beliefs and individuality of every mother who believes in the work of the dental surgeon. Those professionals are willing to establish partnership in the most important part of the mother's life: the generation of a new being.

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