Orthodontics and Pregnancy: Planning and Timing of Orthodontic Procedures by Gestational Age

Riccardo Favero *, Sadaf Suleman *, Andrea Volpato *, Vittorio Favero *

Posted Date: 8 January 2026

doi: 10.20944/preprints202601.0644.v1

Keywords: pregnancy; orthodontics; trimester

 doi:10.20944/preprints202601.0644.v1

Article

Orthodontics and Pregnancy: Planning and Timing of Orthodontic Procedures by Gestational Age

Riccardo Favero [1] *, Sadaf Suleman [1] *, Andrea Volpato [2] * and Vittorio Favero [3] *

[1] University of Padua
[2] Unit of Maxillofacial Surgery, Department of Neurosciences, University of Padua, Via Giustiniani 2, 35121 Padua Italy
[2] Università degli Studi di Padova, Padua, Italy
* Correspondence: riccardo.favero@unipd.it; sadaf.suleman@studenti.unipd.it; andrea.volpato.1@unipd.it; vittorio.favero@unipd.it

Abstract

Orthodontic treatment can be safely performed during pregnancy when tailored to the patient's hormonal, physiological, psychological, and oral health changes. The study aims to establish a safe, trimester – specific orthodontic protocol that minimizes maternal – foetal risks while ensuring effective treatment. A systematic PubMed search using combined keywords and subtopic – specific queries was performed to identify relevant literature on orthodontics during pregnancy. Most studies were literature reviews, followed by various observational, survey – based, clinical, and case report designs. Orthodontic care during pregnancy must be adapted to trimester – related risks, with minimal interventions in the first trimester, elective procedures in the second, comfort focused management in the third, and treatment of complex care postpartum. This protocol requires individual adaptation, highlighting the need for personalized medicine and coordinated input from multiple specialists to address orthodontic, obstetric, and psychological factors during pregnancy.

Keywords: pregnancy; orthodontics; trimester

1. Introduction

Orthodontic treatment can also be undertaken during pregnancy, a period when some patients choose to prioritize their dental care. Pregnancy, in fact, does not represent a contraindication to orthodontic treatment, provided that certain clinical and safety criteria are respected.

Pregnancy is characterized by transient changes affecting various systems. These include cardiovascular, respiratory, hematological, gastrointestinal, renal, endocrine, and immune systems.

Changes also occur in the stomatognathic system. [1]. The etiology of these alterations lies in the hormonal profile, which fluctuates throughout pregnancy. The hormones responsible for changes in the oral cavity are estrogen and progesterone. [2]. Estrogen is a steroid hormone secreted by the ovaries and the placenta, and its most bioavailable form, estradiol, increases progressively, reaching peak levels of 7,192 pg/ml in the third trimester, while progesterone ranges between 100 and 200 ng/ml [3]. Estrogen increases tenfold and progesterone thirtyfold during pregnancy. The levels of these hormones influence systemic inflammatory responses and bone metabolism [3].

The most observed adverse effects in the oral cavity caused by the hormonal profile typical of pregnancy include:

1.1. Gingival Hyperplasia and Gingivitis

Elevated estrogen levels increase capillary permeability, which leads to gingival hyperplasia and gingivitis [4]. The interdental papilla and marginal gingiva are the areas most frequently affected by pregnancy gingivitis, which is often associated with pre-existing gingivitis. The absence of plaque and good oral hygiene can reduce its severity [5]. If left untreated, gingivitis may progress to

 doi:10.20944/preprints202601.0644.v1

periodontitis. Although pregnancy is not a direct cause of periodontitis, it can worsen pre-existing conditions [6] for the reasons mentioned above.

1.2. Pyogenic Granuloma

Increased angiogenesis caused by hormonal changes, combined with inflammatory factors such as plaque, may lead to a pyogenic granuloma [7]. It appears in 1–5% of pregnancies and commonly develops on the labial aspect of the interdental papilla [5].

1.3. Caries Risk

Another common aspect of pregnancy is nausea and vomiting (hyperemesis gravidarum), caused by elevated gonadotropins during the first trimester [8].

Reduced salivary flow during pregnancy can cause xerostomia (increasing caries risk) and diminish the buffering capacity needed to counteract the acidity produced by reflux and vomiting [9]. Reflux, along with frequent vomiting, can negatively affect enamel mineralization, increasing the risk of dental erosion and carious lesions. Gingival irritation may also make brushing and plaque removal uncomfortable or painful, accelerating caries development [5].

Hormonal changes affect not only salivary quantity but also its quality: levels of potassium ions, proteins, and salivary estrogen increase, while sodium ions and pH decrease [10].

1.4. Periodontitis

Periodontitis during pregnancy may negatively affect pregnancy outcomes, including pre-eclampsia, preterm birth, intrauterine growth restriction, and low birth weight [11]. Chronic inflammation associated with periodontitis leads to the release of inflammatory markers such as IL-6, IL-8, and PGE2, which may be found in amniotic fluid and are associated with low birth weight and preterm delivery [12]. For this reason, patients should be encouraged to maintain good oral health and attend regular dental check-ups.

Ideally, in planned pregnancies, gingival inflammation and carious lesions should be treated beforehand, plaque-retentive factors eliminated, and dental check-ups scheduled throughout pregnancy [10,13]. In unplanned pregnancies, the ideal period for treating caries and performing endodontic procedures is the second trimester [10].

Changes in salivary composition and neutrophil responses to inflammation during pregnancy are additional factors that may increase the risk of caries and demineralization.

1.5. Essential Assessments Before Orthodontic Treatment in Pregnancy

To determine whether a pregnant patient is suitable for orthodontic treatment, the dentist must begin with a thorough medical, dental, and obstetric history. The obstetric history should include questions about previous pregnancies and the current pregnancy. For previous pregnancies (if any), information on dates, outcomes, and complications is required, whereas for the current pregnancy, it is necessary to know the gestational age and whether any complications are present. By contacting the obstetrician, the clinician must ensure that the pregnancy is not considered high-risk. [14].

2. Materials and Methods

A systematic search was conducted on PubMed using the advanced search function. Initially, articles related to ‘dentistry AND pregnancy’ were searched. Then, still using the advanced search function, keywords, and the Boolean operators ‘AND’ and ‘OR’ were combined to filter the search results. Subsequently, a second search was conducted focusing on ‘orthodontics AND pregnancy’. After reviewing the articles by reading the title and abstract, the main subtopics were identified. For each subtopic, a targeted search was performed using the terms ‘pregnancy AND [specific subtopic]’ to find additional relevant studies.

3. Results

 doi:10.20944/preprints202601.0644.v1

Among the studies included in this article, the majority were literature reviews, followed in decreasing order by cross-sectional observational studies, questionnaire – based studies, systematic, systematic reviews with meta – analyses, observational studies, randomized controlled clinical trials, prospective observational studies, narrative reviews, qualitative studies (GCM – group concept mapping), cross – sectional surveys, case series, and reviews combined with a case report.

4. Discussion

4.1. Patient Evaluation in Terms of Treatment Eligibility

The patient should begin treatment with a satisfactory level of oral and dental health, free from plaque and calculus. There must be no active carious lesions, soft tissue inflammation, ongoing dental infections, plaque-retentive factors, and similar issues. The ideal candidate values her oral health, understands the importance of maintaining proper hygiene, is willing to attend the frequent appointments required in an orthodontic treatment plan, and has realistic expectations.

The patient's motivation and attitude toward treatment must be assessed before planning therapy and monitored throughout the course of treatment, as they may fluctuate in response to the physical and psychological changes typical of pregnancy. A patient who might be very motivated at the beginning may experience changes in attitude as pregnancy progresses. It is also likely that this type of patient already understands the importance of achieving and maintaining healthy dentition.

It is also the responsibility of the orthodontist, along with the dental hygienist, to provide targeted instructions on additional home care measures such as the use of interdental floss and interdental brushes, given that the presence of orthodontic appliances can hinder optimal oral hygiene [15].

4.2. Safe and Appropriate Orthodontic Treatment During Pregnancy

Orthodontic treatment during pregnancy should prioritize the prevention of risks and the management of potential complications. The primary objective is to ensure the safety of both the mother and the fetus through preventive, well-planned, and targeted therapeutic strategies that consider the physiological and hormonal changes typical of pregnancy.

This can be ensured by implementing the following measures:

- Identifying the most appropriate timing for different orthodontic procedures across the gestational trimesters, to optimize the treatment course without delays or setbacks.
- Evaluating the relevance of pregnancy-related conditions for orthodontic practice, to adapt clinical decisions to the patient's needs.
- Analyzing the potential risks and complications associated with invasive procedures such as orthodontic extractions, TAD placement, and surgical-orthodontic exposure of impacted teeth, and proposing criteria for safe case selection and management.
- Considering the psychological aspects, motivation, and compliance of pregnant patients during the different trimesters, particularly in relation to invasive procedures.

Through this approach, this article aims to provide a linear and streamlined clinical pathway, centered on prevention, optimal timing, and personalized orthodontic care, to improve both the safety and the effectiveness of orthodontic treatment during pregnancy.

4.3. Proposed Orthodontic Treatment During Pregnancy

Three case scenarios are considered—one ideal (case I) and two exceptional (case II and case III)

CASE I: the ideal situation, in which a patient who, in the process of planning a pregnancy, requests an orthodontic evaluation and wishes to begin orthodontic treatment that will last throughout her gestation.

CASE II: an exceptional case in which the patient is already pregnant and wishes to start orthodontic treatment.

CASE III: an exceptional situation in which the patient becomes pregnant while orthodontic treatment is already underway.

 doi:10.20944/preprints202601.0644.v1

4.4. Informed Consent

Therapeutic objectives must be clearly outlined, which should be simple and realistic, prioritizing conservative and non-invasive procedures. Patient motivation is an essential requirement: she must understand the importance of maintaining meticulous oral hygiene and be willing to adhere to the appointment schedule defined in the treatment plan.

4.5. Physiological and Psychological Assessment Before Proceeding

In addition to standard medical and dental history collected for any patient, the orthodontist must obtain a thorough obstetric history for the current pregnancy, gathering essential information such as gestational age, any complications, the estimated due date, and the use of specific pharmacological drugs such as heparin, medications for gestational diabetes, drugs for pregnancy induced hypertension, or other treatments prescribed as part of the medical management of the pregnancy. This information is essential to safely plan the orthodontic treatment, considering the patient's pregnancy. A consultation with the patient's obstetrician is always required; only they can confirm whether the patient can tolerate local anesthesia and surgical stress. Any systemic conditions (hypertension, gestational diabetes, risk of preterm birth, etc.) must be evaluated.

Non-urgent procedures—such as canine exposure—are usually postponed until after delivery to avoid unnecessary risks. If the intervention is deemed necessary (e.g., to prevent damage to adjacent incisors or cyst formation), the second trimester is the preferred time window. Such a procedure should only be performed if the pregnant patient is adequately motivated. She must be informed that the intervention is deferrable if not considered urgent. If the patient insists, her understanding of the risks and benefits must be verified, and informed consent must be obtained after obstetric approval.

4.6. Orthodontic Treatment Across Trimester

4.6.1. CASE I

1. FIRST TRIMESTER

The patient may have already begun orthodontic treatment or may be starting it (bracket placement). The first trimester is the most critical period of pregnancy: organogenesis occurs, the fetus is susceptible to teratogenesis, and approximately 1 in 5 pregnancies ends in spontaneous miscarriage [16]. Elective procedures are deferred to the second trimester, while urgent conditions must be treated promptly, as their systemic risks outweigh fetal risks associated with necessary medications or anesthesia [17]. Urgent problems must be managed at any stage of pregnancy.

In non-urgent cases, all procedures involving radiographs, antibiotics/analgesics, or anesthesia—such as orthodontic extractions, TAD insertion, and surgical exposure—should be avoided to reduce teratogenic and miscarriage risks [16].

Depending on the type of orthodontic treatment (clear aligners or fixed appliances), it is possible to begin safely even in the first trimester, as anesthesia or analgesics are typically unnecessary in the initial phase. Light archwires and moderate forces are sufficient. Adjustment appointments are usually scheduled monthly.

Preventive care becomes essential, as pregnancy combined with fixed appliances significantly increases the risk of gingivitis and cavities. Communication plays a key role in maintaining compliance and reinforcing preventive habits, especially hygiene with orthodontic appliances.

2. **Psychological Aspects [18]**

During the first trimester, patients may experience nausea, vomiting, food aversions, fatigue, mood swings, and anxiety about the outcome of pregnancy. These factors may reduce compliance:

- Missed or cancelled appointments due to morning sickness.
- Hygiene maneuvers (brushing, flossing) may trigger gag reflexes.
- Orthodontic discomfort may be harder to tolerate when combined with nausea.

3. **Logistical and Technical Considerations [3]**

- Use light orthodontic forces to reduce discomfort.

 doi:10.20944/preprints202601.0644.v1

- offer flexible scheduling, avoiding early-morning appointments.
- keep visits short.
- reinforce hygiene instructions and suggest alternatives (soft-bristle brushes, mouth rinses)
- reassure the patient and provide clear information to reduce anxiety.
- create a comfortable, relaxing environment.

4. SECOND TRIMESTER

Weeks 13–24. Organogenesis is complete, and teratogenic risk is absent. Abdominal enlargement is not yet significant, allowing longer chair sessions.

This is the ideal period for elective procedures.

5. **Psychological Aspects and Cooperation**

Patients typically have higher energy, nausea resolves, and emotional stability increases. Compliance is usually optimal. The patient can attend visits regularly and tolerate longer sessions.

If the treatment plan includes orthodontic extractions, canine exposure, or TAD placement, this is the most appropriate phase for performing them.

The second trimester is the safest period for dental procedures requiring anesthesia because:

- Fetal organogenesis is complete.
- Patient positioning is still comfortable.
- Any complications can be pharmacologically managed.

Even simple procedures (e.g., extraction) may produce unexpected intraoperative complications (e.g., root fracture), potentially increasing patient anxiety. Therefore:

- treatment proceeds only after thorough informed consent, with the patient aware of all risks.
- Psychological stability is required; anxiety may cause hypertension and tachycardia.
- Obstetric approval is mandatory.
- The dentist must evaluate the patient's psychological state on the day of the procedure.

If the patient expresses anxiety or hesitation, the procedure should be postponed.

More complex interventions (e.g., difficult extractions, canine exposure) should:

- be performed by an oral surgeon.
- include anesthetic monitoring and vital sign assessment.
- Implement a surgical guide fabricated from a CBCT taken at the beginning of treatment to minimize risks and simplify the procedure.

6. THIRD TRIMESTER

Weeks 24–40.

7. **Effects on Orthodontic Compliance**

During this period, the patient may experience fatigue, back pain, breathing difficulty in the supine position, urinary frequency, sleep disturbances, and increased anxiety about the upcoming birth. These factors may reduce compliance:

- missed appointments due to discomfort.
- Orthodontic discomfort may be harder to tolerate.
- decreased use of removable orthodontic appliances.
- swollen, sensitive gums make hygiene more difficult.
- oral hygiene may worsen.
- Attention is often focused on childbirth.
- Some patients may request treatment suspension until after delivery.

8. **Strategies to Improve Compliance**

Ensuring patient comfort becomes essential:

- Avoid prolonged supine positioning to prevent vena cava compression.
- reposition the patient every 3–7 minutes.
- Place a cushion under the right side of the abdomen.

To optimize treatment during this trimester:

- schedule short, comfort-oriented appointments.
- Choose times of day when the patient feels more rested.

 doi:10.20944/preprints202601.0644.v1

- temporarily reduce orthodontic force intensity
- avoid painful or complex maneuvers (tight activations, new rigid wires, major tooth movements)
- postpone demanding phases (space closure, complex biomechanics) until postpartum.

The primary objective is to maintain safe and tolerable continuity of treatment without increasing physical or psychological discomfort.

9. *IMMEDIATE POSTPARTUM AND BREASTFEEDING*

The postpartum period is ideal for performing deferred radiographic evaluations and completing orthodontic procedures that were contraindicated or postponed during pregnancy. Managing complications is easier pharmacologically and surgically than during pregnancy.

Orthodontic treatment may resume according to the original plan or a revised one if appointments were suspended.

10. **Motivation and Compliance After Delivery**

Patient motivation varies depending on the postpartum phase and maternal responsibilities.

- **First 3–6 months:** fatigue, newborn care, and lifestyle adjustments could lead to reduced motivation, leading to lower compliance, missed appointments, poor oral hygiene, and inconsistent orthodontic appliance use. Appointment scheduling must be flexible.
- **After 6 months:** routines stabilize, motivation increases, and orthodontics may be seen as part of self-care and identity recovery. At this stage, emphasizing aesthetic benefits and proposing clear aligners (if compatible with the treatment plan) can enhance motivation and improve self-esteem.

4.6.2. CASE II

11. **Treatment Plan**

In a patient with no particular orthodontic treatment demands other than alignment of the anterior teeth, and who has a panoramic radiograph taken within the last two years, orthodontic treatment may be initiated provided that the orthodontist performs an accurate case evaluation based on the analysis of intraoral and extraoral photographs, as well as the study of dental models. This approach allows safe and appropriate treatment planning, even in the absence of recent radiographic updates, while ensuring proper assessment of dental relationships and dentofacial morphology.

In the presence of a skeletal discrepancy requiring orthognathic surgery, there are two options:

- If the patient wishes to undergo orthodontic–surgical treatment, it is suitable to postpone starting the treatment plan until after pregnancy. This is because orthognathic surgery requires radiographic imaging such as lateral cephalometry, anteroposterior cephalometry (in cases of asymmetry), and CBCT in addition to a panoramic radiograph, as well as a multi–step treatment plan involving dental extractions, pre–surgical orthodontics, reassessments, and surgical preparation, which may itself require further radiographic investigations. -As this is not a condition that requires urgent treatment, radiation exposure during any trimester of pregnancy would not be justified.
- If the patient has a panoramic radiograph taken within the last two years, a limited orthodontic treatment aimed at aligning the teeth with orthodontic camouflage of the skeletal discrepancy may be considered. The informed must clearly state that the patient has been fully informed of these compromises and accepts them knowingly.

12. **Timing of treatment initiation by modality and trimester**

If treatment is carried out using aligners, it may be started in any trimester.

When treatment with a traditional fixed appliance is chosen, special attention must be paid during the third trimester – and possibly toward the end of the second trimester. The placement of orthodontic brackets can be lengthy, lasting 30 – 40 minutes. During this procedure, it is important to avoid keeping the patient in a supine position for extended periods; if maintaining this position is necessary, it is recommended to adjust her posture every 3 – 7 minutes and schedule breaks to ensure comfort and safety during pregnancy.

 doi:10.20944/preprints202601.0644.v1

4.6.3. CASE III

13. **Treatment Plan**

For a patient who becomes pregnant during orthodontic treatment, the same guidelines regarding the timing and planning are applicable as for a patient who begins treatment during a planned pregnancy since the treatment plan had already been established before the pregnancy started.

14. **Psychological Aspects**

Unlike the cases considered above, this situation requires special attention to the mother's psychological well–being, as her concerns and anxieties may impact treatment planning and compliance.

The patient may express concerns that orthodontic treatment could be contraindicated or pose a risk to her health of that of the fetus during pregnancy. In such a case, effective communication on the orthodontist's part is essential: it is their responsibility to provide clear and reassuring information, emphasizing that orthodontic treatment – when planned and executed with consideration for the patient's pregnancy and all clinical and ergonomic changes – is both feasible and safe during pregnancy.

5. Conclusions

Although not all case scenarios have been fully explored, this article offers general orthodontic guidelines that must be individually tailored, emphasizing the importance of personalized medicine and a multidisciplinary medical team capable of evaluating each case not only from an orthodontic standpoint but also the patient's obstetric status and psychological well – being during this delicate period.

References

1. Pecci-Lloret MP, Linares-Pérez C, Pecci-Lloret MR, Rodríguez-Lozano FJ, Oñate-Sánchez RE. Oral Manifestations in Pregnant Women: A Systematic Review. JCM. 2024 Jan 25;13[3]:707.
2. Favero V, Bacci C, Volpato A, Bandiera M, Favero L, Zanette G. Pregnancy and Dentistry: A Literature Review on Risk Management during Dental Surgical Procedures. Dentistry Journal. 2021 Apr 19;9[4]:46.
3. Zhao Y, Qian S, Zheng Z, Peng J, Liu J, Guan X, et al. Consideration of hormonal changes for orthodontic treatment during pregnancy and lactation - a review. Reprod Biol Endocrinol. 2024 Aug 20;22[1]:106.
4. Soory M. Hormonal factors in periodontal disease. Dental update. 2000;27[8]:380–3.
5. Vt H. Dental Considerations in Pregnancy-A Critical Review on the Oral Care. JCDR [Internet]. 2013 [cited 2025 Aug 22]; Available from: http://www.jcdr.net/article_fulltext.asp?issn=0973-709x&year=2013&volume=7&issue=5&page=948&issn=0973-709x&id=2986
6. Gajendra S, Kumar JV. Oral health and pregnancy: a review. New York State Dental Journal. 2004;70[1]:40.
7. Yuan K, Wing LYC, Lin MT. Pathogenetic roles of angiogenic factors in pyogenic granulornas in pregnancy are modulated by female sex hormones. Journal of periodontology. 2002;73[7]:701–8.
8. Sherman PW, Flaxman SM. Nausea and vomiting of pregnancy in an evolutionary perspective. American journal of obstetrics and gynecology. 2002;186[5]:S190–7.
9. Yousefi M, Parvaie P, Riahi SM. Salivary factors related to caries in pregnancy. The Journal of the American Dental Association. 2020 Aug;151[8]:576-588.e4.
10. Kurien S, Kattimani VS, Sriram RR, Sriram SK, Bhupathi A, Bodduru RR, et al. Management of Pregnant Patient in Dentistry.
11. Jeffcoat MK, Hauth JC, Geurs NC, Reddy MS, Cliver SP, Hodgkins PM, et al. Periodontal disease and preterm birth: results of a pilot intervention study. Journal of periodontology. 2003;74[8]:1214–8.
12. Trivedi S, Lal N, Singhal R. Periodontal diseases and pregnancy. Journal of Orofacial Sciences. 2015;7[1]:67–8.
13. Ninan D. Dentistry and the pregnant patient. Berlin Barcelona Chicago: Quintessence Publishing; 2018. 1 p.

 doi:10.20944/preprints202601.0644.v1

14. Patton LL, Glick M, American Dental Association, editors. The ADA practical guide to patients with medical conditions. Second edition. Hoboken, New Jersey: Wiley-Blackwell; 2016. 516 p.
15. Pender N. Aspects of oral health in orthodontic patients. British journal of orthodontics. 1986;13[2]:95–103.
16. Alves C, Jenkins SM, Rapp A. Early pregnancy loss (spontaneous abortion). In: StatPearls [Internet]. StatPearls Publishing; 2023.
17. Lee JM, Shin TJ. Use of local anesthetics for dental treatment during pregnancy; safety for parturient. J Dent Anesth Pain Med. 2017;17[2]:81.
18. Pownall M, Hutter RRC, Rockliffe L, Conner M. Memory and mood changes in pregnancy: a qualitative content analysis of women's first-hand accounts. Journal of Reproductive and Infant Psychology. 2023 Oct 20;41[5]:516–27.