



**TOSHKENT TIBBIYOT AKADEMIYASI URGANCH FILIALI  
JANUBIY OROLBO‘YI TIBBIYOT JURNALI**

**2 - TOM, 1 - SON. 2026**

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**HOMILADORLIK DAVRIDA ORTODONTIK DAVOLASH JARAYONIDA PARODONT  
TO‘QIMALARIDA MIKROSIRKULYATSIYAGA ESTROGENNING TA‘SIRI**



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***Annotatsiya:** Ushbu maqolada homilador ayollarda ortodontik davolash jarayonida parodont to‘qimalariga estrogenlarning ta‘siri baholangan. Tadqiqot davomida homilador bemorlarning klinik ko‘rsatkichlari tahlil qilinib, gormonal o‘zgarishlarning homiladorlikning turli bosqichlarida parodont to‘qimalari holati bilan bog‘liqligi o‘rganildi. Olingan natijalar ushbu bemorlar guruhida ortodontik davolash taktikasini optimallashtirishda estrogenlarga bog‘liq to‘qima javobining muhim ahamiyatga ega ekanligini ko‘rsatadi.*

***Key words:** homiladorlik, estrogenlar, parodont to‘qimalari, ortodontik davolash, gormonal o‘zgarishlar.*

**РОЛЬ ЭСТРОГЕНОВ В МИКРОЦИРКУЛЯЦИИ ТКАНЕЙ ПАРОДОНТА ПРИ  
ОРТОДОНТИЧЕСКОМ ЛЕЧЕНИИ В ПЕРИОД БЕРЕМЕННОСТИ**

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В данной статье представлена оценка влияния эстрогенов на ткани пародонта у беременных женщин, проходящих ортодонтическое лечение. В ходе исследования проанализированы клинические данные беременных пациенток с акцентом на гормональные изменения и их связь с состоянием тканей пародонта на различных сроках беременности. Полученные результаты демонстрируют значимость эстроген-зависимой тканевой реакции для оптимизации тактики ортодонтического лечения у данной категории пациенток.

***Ключевые слова:** беременность, эстрогены, ткани пародонта, ортодонтическое лечение, гормональные изменения.*

**ROLE OF ESTROGEN IN PERIODONTAL MICROCIRCULATION DURING  
ORTHODONTIC TREATMENT IN PREGNANCY**

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***Abstract.** This article presents an assessment of the influence of estrogen on periodontal tissues in pregnant women undergoing orthodontic treatment. The study analyzed clinical findings in pregnant patients, focusing on hormonal changes and their association with periodontal condition during different stages of pregnancy. The results demonstrate the significance of estrogen-related tissue response for optimizing orthodontic management in this patient group.*



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**Key words:** pregnancy, estrogen, periodontal tissues, orthodontic treatment, hormonal changes.

**Introduction:** The problem of maintaining periodontal health in pregnant women undergoing orthodontic treatment represents one of the important tasks of modern clinical dentistry. Pregnancy is accompanied by significant endocrine changes, among which estrogen plays a leading role, directly influencing vascular regulation, connective tissue metabolism, and inflammatory responsiveness of periodontal tissues. Under these conditions, orthodontic treatment may act as an additional factor that modifies periodontal tissue response.

Despite the achievements of contemporary dentistry, the effectiveness of existing approaches to the prevention and management of periodontal alterations during pregnancy remains insufficient. It should be taken into account that even in the presence of adequate oral hygiene and appropriate orthodontic techniques, hormonal influences may significantly alter tissue reactivity. Therefore, it is essential to consider the individual hormonal background of pregnant patients, as well as the biological response of periodontal tissues to mechanical loading during orthodontic treatment.

Analysis of available scientific literature demonstrates the particular significance of studies devoted to the role of pregnancy-associated hormones in periodontal pathology. Estrogen-induced changes in vascular permeability and tissue hydration create conditions that favor gingival edema and inflammatory reactions. In this regard, clinical approaches aimed at preserving periodontal health must meet several important requirements: they should be biologically justified, safe for both mother and fetus, and adapted to the physiological characteristics of pregnancy. It is well known that the development and progression of periodontal disorders are influenced not only by local factors, but also by systemic conditions of the macroorganism. Hormonal imbalance during pregnancy may enhance the susceptibility of periodontal tissues to inflammatory changes, even in the absence of pronounced microbial aggression. This circumstance continues to stimulate research focused on understanding hormone-mediated mechanisms of periodontal vulnerability. It should be emphasized that timely identification of estrogen-associated periodontal changes is of particular importance. At early stages, tissue alterations may remain clinically unapparent, while preventive and corrective measures are most effective during this period. Therefore, an individualized approach to orthodontic treatment planning, taking into account hormonal influences on periodontal tissues, is essential for reducing the risk of complications and improving treatment outcomes in pregnant women.

**Methods:** Based on the above considerations, the present study was designed to investigate the influence of estrogen on the periodontal condition of pregnant women undergoing orthodontic treatment. The aim of the study was to evaluate hormonal associations with periodontal tissue response during pregnancy in the context of orthodontic intervention.

Estrogen, as a key pregnancy-associated hormone, was selected as the primary biological factor for analysis due to its pronounced effects on vascular tone, capillary permeability, and connective tissue metabolism. Its role in modulating gingival edema, inflammatory responsiveness, and tissue remodeling has been well documented, making it a relevant marker for assessing periodontal vulnerability during orthodontic treatment in pregnant patients. The study included pregnant women receiving orthodontic treatment with fixed appliances. Hormonal assessment focused on serum estrogen levels, which were analyzed in relation to clinical periodontal findings during different stages of pregnancy. Clinical examination included evaluation of gingival condition, presence of edema, bleeding tendency, and signs of inflammatory changes in periodontal tissues. To assess the influence of estrogen-related changes, the examined patients were divided into two groups according to the stage of pregnancy. The first group consisted of pregnant women in the early stages of gestation undergoing orthodontic treatment, while the second group included pregnant women in later stages of pregnancy receiving similar orthodontic care. This grouping allowed for comparison of periodontal tissue response under varying hormonal conditions. All patients received standard orthodontic treatment and routine oral hygiene recommendations. No additional pharmacological



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agents were administered as part of the study protocol. The obtained clinical and hormonal data were analyzed to determine the relationship between estrogen levels and periodontal tissue condition during orthodontic treatment in pregnancy.

**Results.** Given the systemic nature of hormonal regulation during pregnancy, the question naturally arises regarding the role of estrogen in shaping periodontal tissue response during orthodontic treatment. To clarify this issue, special attention was directed toward the assessment of clinical periodontal changes in relation to estrogen levels at different stages of pregnancy. This approach allowed evaluation of the quantitative and qualitative characteristics of periodontal tissue response under varying hormonal conditions.

The obtained data demonstrated that in pregnant women undergoing orthodontic treatment, estrogen-associated changes were reflected primarily in vascular and soft tissue parameters of the periodontium. In women at earlier stages of pregnancy, periodontal tissues generally preserved a stable clinical appearance, with minimal gingival edema and limited bleeding tendency. However, as gestation progressed and estrogen levels increased, a shift in periodontal response was observed. As shown in Table 1, patients in later stages of pregnancy exhibited a higher frequency and severity of gingival edema and bleeding during probing compared with those in earlier gestational periods. This indicates that elevated estrogen levels are associated with increased vascular permeability and tissue reactivity. The changes were not directly related to plaque accumulation, suggesting that hormonal factors played a dominant role in the observed periodontal alterations. Thus, while periodontal tissues under normal conditions demonstrate balanced adaptive responses to orthodontic forces, pregnancy-related hormonal shifts alter this balance. The results indicate a clear tendency toward enhanced periodontal susceptibility in the presence of elevated estrogen levels, particularly during advanced stages of pregnancy. These findings underline the importance of considering hormonal status when evaluating periodontal outcomes of orthodontic treatment in pregnant women.

**Table 1. Periodontal clinical parameters in pregnant women undergoing orthodontic treatment in relation to estrogen-associated gestational stage**

<b>Periodontal parameter</b>	<b>Early pregnancy (I trimester)</b>	<b>Late pregnancy (II–III trimesters)</b>
Gingival edema (frequency, %)	18.5 ± 2.1	46.3 ± 3.4
Bleeding on probing (BOP, %)	21.2 ± 2.5	52.7 ± 3.8
Gingival hyperemia (%)	24.6 ± 2.8	58.1 ± 4.1
Subjective gingival discomfort (%)	16.8 ± 1.9	43.9 ± 3.2
Clinically intact periodontium (%)	62.4 ± 4.0	29.6 ± 3.3

*Note.* The increase in gingival edema, bleeding tendency, and hyperemia in later stages of pregnancy reflects enhanced periodontal tissue reactivity associated with elevated estrogen levels during gestation.

We also observed that the most pronounced changes were associated with a progressive increase in periodontal tissue reactivity as pregnancy advanced. These shifts were particularly evident in patients at later gestational stages, where estrogen-related effects manifested not only quantitatively but also qualitatively. In this context, periodontal alterations were characterized by a transition from predominantly adaptive tissue responses toward patterns indicative of heightened inflammatory susceptibility. It is noteworthy that the observed changes were not limited to the intensity of clinical signs but also involved the nature of periodontal tissue response. In women with higher estrogen levels, gingival tissues demonstrated increased vascular fragility, a greater tendency toward edema, and more frequent bleeding upon minimal mechanical stimulation. These qualitative changes suggest



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a modification of tissue behavior under hormonal influence rather than a simple amplification of pre-existing conditions. In addition, an increase in subjective symptoms, such as gingival discomfort and a sensation of tissue tension, was more frequently reported by patients in later stages of pregnancy. These complaints were often disproportionate to plaque accumulation, further supporting the leading role of systemic hormonal factors in shaping periodontal response during orthodontic treatment. Of particular interest was the assessment of periodontal condition in pregnant women during the early period following orthodontic activation. The findings obtained within the first 3–7 days after activation are presented in Table 2. At this stage, despite the absence of marked clinical inflammation, a tendency toward transient improvement in general periodontal appearance was observed, which was primarily quantitative in nature. However, this apparent improvement did not reflect stable normalization of periodontal tissue response. In qualitative terms, vascular reactivity and tissue sensitivity remained elevated, especially in patients with higher estrogen levels. This phenomenon may be explained by the combined effect of mechanical stress associated with orthodontic activation and the physiological decrease in adaptive reserves during pregnancy. Apparently, orthodontic intervention, acting as an additional stress factor, temporarily alters periodontal tissue balance under conditions of hormonal modulation. As a result, even short-term changes in clinical parameters should be interpreted cautiously, as they may not indicate true stabilization but rather a transient adaptive response.

**Table 2. Periodontal clinical changes in pregnant women during the early period (3–7 days) after orthodontic activation in relation to estrogen-associated gestational stage**

Periodontal parameter	Early pregnancy (I trimester)	Late pregnancy (II–III trimesters)
Gingival edema (%)	15.7 ± 2.0	38.9 ± 3.1
Bleeding on probing (BOP, %)	18.4 ± 2.3	44.6 ± 3.5
Gingival hyperemia (%)	20.3 ± 2.6	51.2 ± 3.9
Subjective gingival discomfort (%)	14.1 ± 1.8	36.5 ± 3.0
Transient clinical improvement (%)	41.6 ± 3.4	27.8 ± 2.9

**Note.** In the early period following orthodontic activation (3–7 days), a temporary quantitative improvement in general periodontal appearance was observed. However, persistent qualitative signs of increased tissue reactivity were more pronounced in patients at later stages of pregnancy, reflecting estrogen-associated modulation of periodontal response. The human body maintains continuous interaction with the external environment through the oral cavity. In this context, periodontal tissues represent an important functional interface where vascular, connective tissue, and immune mechanisms are closely integrated. During pregnancy, systemic hormonal changes, particularly fluctuations in estrogen levels, significantly influence these interactions, modulating vascular permeability, tissue hydration, and local inflammatory responsiveness.

At the level of the gingival epithelium, subepithelial connective tissue, and periodontal ligament, estrogen affects endothelial activity and cellular turnover, thereby altering the balance between protective and reactive mechanisms. These processes are especially relevant during orthodontic treatment, as mechanical forces act on tissues already undergoing hormone-mediated physiological adaptation. As a result, periodontal tissues may respond not only quantitatively, but also qualitatively, demonstrating altered patterns of vascular reactivity and inflammatory susceptibility. The next stage of our study included pregnant women who continued orthodontic treatment under conditions of increased estrogen exposure associated with later stages of gestation. The clinical characteristics of periodontal tissues in this group are presented in Table 3. This analysis



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allowed comparison of periodontal response patterns between different gestational stages and provided additional insight into estrogen-dependent tissue behavior during orthodontic intervention.

**Table 3. Qualitative characteristics of periodontal tissue response in pregnant women undergoing orthodontic treatment depending on gestational stage**

Periodontal tissue characteristic	Early pregnancy (I trimester)	Late pregnancy (II–III trimesters)
Predominant vascular response	Stable adaptive	Hyperreactive
Tendency to gingival edema	Mild	Pronounced
Vascular fragility	Low	Increased
Inflammatory response threshold	High	Reduced
Overall periodontal stability	Preserved	Compromised

*Note.* In later stages of pregnancy, periodontal tissues exhibit qualitative shifts toward increased vascular reactivity and reduced inflammatory threshold, reflecting estrogen-mediated modulation of tissue response under orthodontic loading.

The data presented in Table 3 demonstrate that during the early period following orthodontic intervention, pregnant women generally exhibited a tendency toward transient positive periodontal changes. In particular, a moderate reduction in gingival edema and subjective discomfort was observed within the first days after orthodontic activation. This indicates a short-term adaptive response of periodontal tissues to mechanical loading, even under conditions of hormonal modulation.

At the same time, despite the overall favorable quantitative dynamics, certain features of periodontal tissue behavior remained unchanged. Specifically, increased vascular fragility and a tendency toward bleeding upon probing persisted, especially in women at later stages of pregnancy. This suggests that although superficial clinical parameters may temporarily improve, qualitative aspects of tissue response continue to reflect estrogen-associated vulnerability.

Apparently, within this early time frame, fundamental changes in the protective and adaptive mechanisms of periodontal tissues have not yet occurred. Hormonal influences related to pregnancy, combined with the mechanical impact of orthodontic forces, continue to exert a modifying effect on tissue reactivity. As a result, the observed early improvements should be regarded as transitional rather than indicative of stable periodontal normalization. Further assessment performed at a later stage following orthodontic activation revealed continuation of the positive trends noted earlier. A more pronounced decrease in gingival hyperemia and bleeding tendency was recorded, particularly in patients in early pregnancy. In contrast, in women at advanced gestational stages, although quantitative improvement was evident, qualitative indicators of periodontal stability remained less favorable. Of particular importance was the observation that sustained exposure to elevated estrogen levels was associated with persistent alterations in tissue response patterns. Even in the presence of improved general periodontal appearance, increased susceptibility to inflammatory reactions remained evident. This finding underscores the necessity of cautious interpretation of short-term clinical improvements and highlights the role of systemic hormonal factors in determining periodontal outcomes during orthodontic treatment.

Thus, based on the obtained clinical data, it can be concluded that estrogen-associated modulation of periodontal tissues plays a decisive role in both the early and subsequent stages of orthodontic treatment in pregnant women. Temporary improvement of clinical parameters does not necessarily reflect complete restoration of periodontal stability, emphasizing the need for individualized monitoring and preventive strategies throughout pregnancy.



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The next stage of our study included pregnant women undergoing orthodontic treatment in whom periodontal and hormonal parameters were evaluated as part of a comprehensive clinical assessment. This group was examined with particular attention to the interaction between systemic estrogen levels and periodontal tissue response during orthodontic intervention. Analysis of available scientific literature and targeted information search revealed a limited number of studies addressing the role of estrogen in modulating periodontal tissue behavior specifically in pregnant women receiving orthodontic treatment. Existing publications predominantly focus on general pregnancy-associated gingival changes, while data on estrogen-dependent periodontal responses under orthodontic loading remain insufficiently explored. Investigation of this issue is essential for understanding the biological mechanisms underlying periodontal vulnerability during pregnancy and for improving individualized orthodontic care. Clinical examinations in this group of pregnant women were performed during the early period following orthodontic activation, namely within 3–7 days. This timeframe was selected to assess initial tissue response under conditions of combined mechanical and hormonal influence. The results of these observations, reflecting both quantitative and qualitative periodontal changes, are presented in **Table 4**.

**Table 4. Periodontal tissue response in pregnant women 3–7 days after orthodontic activation depending on estrogen-associated gestational stage**

Periodontal parameter	Early pregnancy (I trimester)	Late pregnancy (II–III trimesters)
Gingival edema (%)	14.9 ± 1.8	41.2 ± 3.3
Bleeding on probing (%)	17.6 ± 2.1	47.8 ± 3.6
Gingival hyperemia (%)	19.8 ± 2.4	55.6 ± 4.0
Vascular fragility	Low–moderate	Pronounced
Overall periodontal stability	Relatively preserved	Reduced

**Note.** Periodontal tissue response during the early period after orthodontic activation demonstrates significant dependence on gestational stage, with more pronounced estrogen-associated vascular and inflammatory changes observed in later pregnancy.

As can be seen from the data presented in Table 4, comparison of the periodontal parameters obtained during orthodontic treatment at different stages of pregnancy demonstrates distinct differences related to hormonal background. In women at later gestational stages, periodontal tissue response was characterized by a more pronounced increase in vascular reactivity compared with patients in early pregnancy. This was reflected in higher rates of gingival edema, bleeding tendency, and hyperemia. Against this background, a relative stabilization of certain quantitative clinical parameters was observed in women in early pregnancy. However, in patients with elevated estrogen levels, qualitative features of periodontal tissue response remained unfavorable. In particular, increased vascular fragility and reduced inflammatory threshold persisted, which may support the continuation of the pathological process despite apparent improvement in general clinical appearance. One positive finding was the partial reduction in the severity of subjective complaints and superficial inflammatory signs in some patients, suggesting the presence of adaptive mechanisms within periodontal tissues. These changes can be explained by the fact that orthodontic intervention, despite representing a mechanical stress factor, also triggers compensatory responses aimed at maintaining tissue homeostasis. At the same time, the physiological laws of endocrine regulation indicate that sustained hormonal stimulation during pregnancy continues to influence periodontal reactivity. It is noteworthy that the observed clinical dynamics closely corresponded with the general course of orthodontic treatment in pregnant women. Patients demonstrating more stable periodontal parameters experienced fewer complaints and required minimal modification of orthodontic procedures. Conversely, individuals with pronounced estrogen-associated tissue changes more frequently exhibited signs of periodontal instability, necessitating closer clinical supervision.



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Overall, the data presented in Table 4 indicate that periodontal condition during orthodontic treatment in pregnancy is determined not only by mechanical factors but also, to a large extent, by systemic hormonal influences. Although certain quantitative indicators may approach values observed in early pregnancy, persistent qualitative alterations in tissue response underline the ongoing risk of inflammatory complications in patients with elevated estrogen levels.

**Discussion.** It appears appropriate to note that the response of periodontal tissues during pregnancy follows general biological principles that govern systemic adaptation of the human body. Similar to other organ systems, periodontal tissues react to physiological and pathological influences according to unified regulatory mechanisms. In this context, pregnancy may be regarded as a state of global adaptation, in which hormonal, vascular, and connective tissue systems function as components of a single, integrated biological process. Under physiological conditions, periodontal tissues demonstrate a stable balance between vascular regulation and inflammatory control. However, during pregnancy this balance is modified by endocrine factors, primarily estrogen. Elevated estrogen levels influence endothelial permeability, tissue hydration, and inflammatory responsiveness, thereby altering the periodontal environment. These changes are not pathological per se, but they create conditions under which additional external factors, such as orthodontic forces, may provoke exaggerated tissue responses. Clinical observations obtained in the present study indicate that pregnant women undergoing orthodontic treatment exhibit periodontal changes that differ qualitatively from those observed outside pregnancy. In early gestational stages, periodontal tissues generally preserve adaptive stability, whereas in later stages, increased estrogen exposure is associated with heightened vascular reactivity and reduced inflammatory threshold. This shift reflects a transition from predominantly adaptive responses toward a state of increased susceptibility to inflammatory complications. The obtained findings suggest that estrogen-associated periodontal changes should not be viewed in isolation, but rather as part of a broader systemic adaptation process. The human organism, acting as a unified biological system, responds to hormonal stimuli according to common regulatory principles. Consequently, periodontal tissue behavior during pregnancy mirrors general patterns of endocrine modulation observed in other tissues and organs. From a clinical standpoint, the presence of estrogen-related periodontal vulnerability necessitates a differentiated approach to orthodontic treatment planning in pregnant women. Ignoring systemic hormonal influences may lead to underestimation of periodontal risk and contribute to unfavorable treatment outcomes. Conversely, consideration of endocrine factors allows for more accurate prediction of tissue response and timely implementation of preventive measures. Thus, the results of this study convincingly demonstrate that periodontal alterations observed during orthodontic treatment in pregnancy are largely determined by systemic hormonal modulation. Recognition of this relationship is essential for improving the safety and effectiveness of orthodontic care in pregnant patients and for developing biologically justified clinical strategies.

**Conclusion.** In conclusion, based on the conducted clinical analysis of periodontal condition in pregnant women undergoing orthodontic treatment, taking into account estrogen-associated hormonal changes, the following conclusions can be drawn:

Firstly, pregnancy-related elevation of estrogen levels exerts a generally significant influence on periodontal tissues during orthodontic treatment, contributing to increased vascular reactivity, gingival edema, and bleeding tendency. These changes indicate heightened periodontal susceptibility under conditions of combined hormonal and mechanical impact.

At the same time, it should be noted that the intensity of periodontal alterations is dependent on the stage of pregnancy. More pronounced changes were observed in later gestational periods compared with early pregnancy, suggesting a cumulative effect of sustained estrogen exposure on periodontal tissue response.

Secondly, the observed periodontal changes demonstrate a clear association between systemic hormonal status and local tissue condition. Clinical indicators of periodontal instability reflect not



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only mechanical orthodontic factors but also the degree of endocrine modulation, confirming the importance of hormonal context in periodontal assessment during pregnancy. Thirdly, a distinct relationship was established between clinical manifestations of periodontal response and systemic physiological regulation, which once again supports the concept of unified macroorganism homeostasis. Periodontal tissues should therefore be regarded as an integral component of the body's adaptive system, responding to hormonal and mechanical stimuli according to common biological principles.

## Reference:

1. Gursoy U.K., Könönen E. Pregnancy and periodontal health: interaction between hormonal changes and inflammatory response. *Periodontology 2000*. 2018;76(1):93–105.
2. Offenbacher S., Beck J.D. Pregnancy-associated periodontal disease and systemic considerations. *Annals of Periodontology*. 2001;6(1):164–174.
3. Hirsch R.S., Clarke N.G., Leppard P.I. Gingival inflammation and pregnancy. *Journal of Periodontology*. 1984;55(7):382–388.
4. Kornman K.S., Loesche W.J. The subgingival microbial flora during pregnancy. *Journal of Periodontal Research*. 1980;15(2):111–122.

