

PERIODONTAL TREATMENT OUTCOMES IN POST MENOPAUSAL WOMEN RECEIVING HORMONE REPLACEMENT THERAPY

Hormon Replasman Tedavisi Alan Postmenopozal Dönemdeki Kadınlarda Periodontal Tedavinin Etkileri

Ali ÇEKİCİ¹, Ülkü BAŞER¹, Gül den İŞİK¹, Süleyman E. AKHAN², Halim İŞSEVER³, Utku ONAN¹

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ABSTRACT

Purpose: To evaluate the effect of hormone replacement therapy (HRT) on periodontal treatment outcomes in a group of postmenopausal women with periodontitis. **Materials and Methods:** 23 post-menopausal chronic periodontitis patients were included in this study. The test group (n=11) consisted of women who started HRT with this study and received conjugated estrogen and medroxyprogesteron. The control group (n=12) was women not taking any HRT or supplement therapy. Study groups received the same periodontal treatment. All subjects examined by recording the following: plaque index (PI), sulcus bleeding index (SBI), periodontal pocket depth (PD) and relative attachment level (RAL) from 6 sites in each tooth. Measurements were recorded at the baseline, 1 month, 3 months, and 6 months following periodontal treatment. Serum estrogen level and bone mineral density was recorded at baseline and 6 months following periodontal treatment. **Results:** The GI change was greater in the control group. There wasn't significant difference by means of PD, the attachment gain was significantly greater in the HRT receiving group. **Conclusion:** HRT seems to have a positive effect on periodontal treatment outcomes.

Keywords: Periodontitis; hormone replacement therapy; post menopausal; root planning

ÖZ

Amaç: Bu çalışmanın amacı periodontitisli postmenopozal kadınlarda postmenopozal hormon tedavisinin (PHT), periodontal başlangıç tedavisi sonuçları üzerindeki etkilerini incelemektir.

Gereç ve Yöntem: 23 kronik periodontitisli daha önce hormon tedavisi görmemiş olan postmenopozal kadın çalışmaya dâhil edilmiştir. Deney grubuna (n=11) konjuge östrojen ve medroxyprogesteron kullanılmış, kontrol grubuna (n=12) herhangi bir hormon tedavisi verilmemiştir. Çalışmadaki tüm bireyler bireylere aynı periodontal başlangıç tedavisi uygulanmıştır. Plak indeksi (PI), dişeti oluğu kanama indeksi (DOKİ), sondalanabilir cep derinliği (SD), rölatif ataşman düzeyi (RAD) ölçümleri başlangıçta, 1., 3., ve 6. aylarda, serum östrojen düzeyi, sistemik kemik yoğunluğu ölçümleri başlangıçta ve 6. ayda gerçekleştirilmiştir.

Bulgular: DOKİ, kontrol grubunda daha fazla değişim göstermiştir. SD açısından gruplar arasında fark yoktur. PHT kullanmakta olan kadınlarda klinik ataşman kazancı daha fazla bulunmuştur.

Sonuç: PHT kullanımının periodontal tedavi sonuçlarına olumlu katkı sağladığı söylenebilir.

Anahtar kelimeler: Periodontitis; hormon replasman tedavisi; post menopozal; kök yüzeyi düzleştirme

¹ Department of Periodontology Faculty of Dentistry Istanbul University

² Department of Gynecology and Obstetrics Faculty of Medicine Istanbul University

³ Department of Public Health Faculty of Medicine Istanbul University



Introduction

Periodontitis is a plaque induced disease, the progression of which is influenced by modifying factors such as systemic disease conditions, age, and sociodemographical conditions (1). Systemic conditions should be carefully evaluated for the prevalence, severity and progression of periodontitis (2, 3). It is known that periodontal status is effected by the sex hormone levels (2, 4). Recently, estrogen deficiency has received increasing attention in relation to susceptibility to chronic periodontitis in postmenopausal women (5, 6). Menopause is a special period in a woman's life. The production of estrogens changes drastically at menopause, that can lead to osteoporosis in skeletal bones, characterized by the loss of bone mass and reduction of bone density, and with a consequent increase in bone fragility and susceptibility to fracture (7, 8). In the past decade, HRT was recognized as an effective treatment of menopausal signs and symptoms (9-11). This therapy leads to a reduction of bone mass loss, and therefore hormone replacement therapy (HRT) has a significant role in the primary and secondary prevention of postmenopausal osteoporosis (12-15).

There are conflicting results on the effects of HRT on periodontal status in postmenopausal women. While former research suggests that it has beneficial effects on periodontal status (16, 17), a recent report challenges these findings (18). There are several studies examining the correlation between postmenopausal estrogen levels, osteoporosis and periodontal status (4, 7, 12, 16, 18-36). However, periodontal treatment and periodontal tissue response to treatment in postmenopausal women taking HRT has been addressed only in a limited number of studies (16, 37-39). The aim of this study was to assess the clinical outcomes of periodontal treatment in a group of post menopausal chronic periodontitis patients receiving HRT.

Material and Methods*Patient Selection*

A total of 23 post-menopausal chronic periodontitis patients who were referred to Istanbul University Dental Faculty Periodontology Department and Istanbul University Medical Faculty Obstetrics and Gynecology Department clinics were included in the study. Subjects were divided into two groups. The patients in the test group began receiving HRT with the initiation of the study (n=12). The hormone therapy was

conjugate estrogene and medroxyprogesterone acetate combination (Premelle, Wyeth Drugs, Istanbul, Turkey) which was taken 2.5 grams daily. The patients who were not eligible for HRT were included in the control group (n=11). These patients did not receive any HRT and/or supplement medication during the study. The inclusion criteria were; signed informed consent, being in menopause for one year or more, having at least 10 teeth, having 2 or more PD greater than 5mm sites in each quadrant, being systemically healthy, not smoking, did not receive post-menopausal hormone therapy before, not taking non-steroid anti-inflammatory drugs, antibiotics and/or anti-microbial agents in the past 6 months, and did not receive periodontal treatment in the past 6 months. The exclusion criteria were; taking non-steroid anti-inflammatory drugs, antibiotics and/or anti-microbial agents during the study, not taking HRT as advised (if in the test group), taking HRT or supplemental therapy for menopause (if in the control group). The demographics of the study population was recorded by a questionnaire including age, working status, education level, number of children, dental visit frequency and tooth brushing habits. The study protocol was approved by Istanbul University Committee of Ethics and written informed consent was obtained. The study was performed in Istanbul University Dental Faculty Periodontology Department.

Menopausal Assesment

Serum estrogene level (EL) was collected at the baseline and 6 months following the periodontal treatment. EL was obtained from approximately 250 µl of serum, which was extracted by the centrifugation centrifusion of 15 ml of venous blood samples at a speed of 3000 x g for 10 minutes. Solid phase estradiol ¹²⁵I radioimmunoassay method was used to measure the EL. Bone mineral density (BMD) measurement was recorded at the baseline and 6 months following the periodontal treatment. Bone mineral density of the lumbar spine was measured by means of dual-energy x-ray absorptiometry (DXA; Hologic QDR 4500, Whatman, MA, USA) with a bone densitometer (variation coefficient <1%). Bone mineral density was expressed as grams per square centimeter.

Peridontal Treatment and Assessment

All patients received the same oral hygiene instructions and periodontal treatment by the same clinician. The periodontal treatment was scaling,

root planning and polishing. The clinical recordings were taken from 6 sites at each tooth: mesio-buccal, mid-buccal, disto-buccal, disto-lingual/palatinal, mid-lingual/palatinal, and mesio-lingual/palatinal. All clinical recordings were recorded by the same previously trained examiner with a Williams periodontal probe (Hu-Friedy PW, Chicago, IL, USA).

All subjects were given an identical examination by recording; plaque index (PI) (40), sulcus bleeding index (SBI) (41), periodontal pocket depth (PD) and relative attachment level (RAL). RAL was measured from the apical end of the previously prepared stents to the bottom of the periodontal pocket. All teeth except the third molars and the restored teeth were recorded. The measurements were recorded at baseline and 1 month, 3 months, and 6 months following the periodontal treatment. The treatment was phase I periodontal therapy including; scaling, polishing and root planing under local anesthesia. The test group started receiving HRT simultaneously with the periodontal treatment.

Statistical analysis

The statistical assessment was performed by considering mean values of each patient as the unit of measurement. The baseline values were evaluated by comparing the means of clinical values between groups. The differences of means between each measurement were used when comparing clinical status between groups. The evaluation of clinical indices within the groups was performed by Wilcoxon Signed Rank test. The comparison between the groups was performed by Mann Wittney U test. The EL and bone density examination within groups was calculated by Paired samples t test. The intergroup evaluation was performed by independent samples t test. The reported p values demonstrate differences at least $p < 0.05$.

Results

Demographics of this population including working status, menopausal age, education level, number of children, dental visit frequency and tooth brushing habits did not differ statistically between the groups ($p > 0.05$, data not shown). The mean age of test and control groups were 47.91 ± 5.80 and 52.92 ± 3.82 years, respectively. The difference between the groups was not statistically significant ($p > 0.05$). The baseline measurements of PI, SBI, PD and RAL did not show any significant difference between groups (Table 1).

Table 1. Statistical assessment of clinical parameters at baseline.

	Control (n=11)	Test (n=12)	Z	p
PI (scores 0-3)	1.52 ± 0.92	1.58 ± 1.00	-1.555	0.12
SBI (scores 0-5)	2.08 ± 1.12	2.15 ± 1.08	-1.555	0.12
PD (mm)	2.67 ± 1.32	2.66 ± 1.36	-0.517	0.60
RAL (mm)	6.11 ± 1.81	6.00 ± 1.59	-1.090	0.27

The PI values decreased significantly in both groups for each measurement compared to the baseline values. The PI decrease did not differ between groups 1 month after periodontal treatment (Table 2). 3 months after periodontal treatment PI in the control group decreased more than the test group, while a greater decrease in PI was present in the test group at the end of the study (6 months after treatment). The SBI values were significantly decreased in both groups for each measurement compared to the baseline values. There was a significantly greater decrease in the control group in the 1 and 6 month SBI measurements compared to the test group. SBI did not differ significantly between groups 3 months after periodontal treatment (Table 2). The PD was significantly decreased in both groups for each measurement compared to the baseline values. There was a significantly greater decrease in the control group 1 month after periodontal treatment compared to the test group 3 and 6 months after periodontal treatment; both of the groups did not statistically differ from each other (Table 2). The RAL was significantly decreased in the test group for every measurement compared to the baseline. In the control group, 3 months after periodontal treatment, there was a significant decrease compared to the baseline. 1 and 6 months after periodontal treatment the changes in the control group were rather small and did not present statistical significance. There was a significantly greater attachment gain in the test group compared to the control (Table 2).

EL significantly increased in the test group at the end of the study compared to the baseline. In the control group, the EL change was not significant during the study period. The EL was not statistically different between the groups in the baseline measurement. At the end of the study EL was significantly higher in the test group compared to the control (Table 3).

BMD of two groups was not statistically different between the groups in the baseline measurement or at the end of the study (data not shown).

Periodontal therapy in post menopausal women

Table 2. Statistical assessment of clinical parameters between measurements. (* represents the statistically significant difference within the groups. # represents the statistically significant difference between the groups)

PI (scores 0-3)	Control (n=11)	Test (n=12)	Z	p
Δ Baseline & 1. Month	*0.99 ± 0.96	*1.03 ± 1.14	0.114	0.91
Δ Baseline & 3. Month	*1.15 ± 0.89	*1.26 ± 1.05	2.838	0.01*
Δ Baseline & 6. Month	*1.19 ± 0.88	*1.07 ± 1.01	3.766	0.00*
*p<0.001				
SBI (scores 0-5)				
Δ Baseline & 1. Month	*1.55 ± 1.16	*1.36 ± 1.22	4.121	0.00*
Δ Baseline & 3. Month	*1.53 ± 1.13	*1.57 ± 1.14	0.913	0.36
Δ Baseline & 6. Month	*1.59 ± 1.14	*1.38 ± 1.18	5.114	0.00*
*p<0.001				
PD (mm)				
Δ Baseline & 1. Month	*0.68 ± 1.14	*0.45 ± 1.14	5.636	0.00*
Δ Baseline & 3. Month	*0.65 ± 1.16	*0.59 ± 1.18	1.469	0.14
Δ Baseline & 6. Month	*0.78 ± 1.16	*0.74 ± 1.21	0.348	0.73
*p<0.001				
RAL (mm)				
Δ Baseline & 1. Month	0.01 ± 1.42	*0.16 ± 1.41	3.338	0.00*
Δ Baseline & 3. Month	*0.12 ± 1.38	*0.22 ± 1.53	6.665	0.00*
Δ Baseline & 6. Month	0.02 ± 1.42	*0.32 ± 1.58	6.225	0.00*
*p<0.001				

Table 3. The intra-group and inter-group statistical assessment of EL.

EL (ng/ml)	Control (n=11)	Test (n=12)	t	p
Baseline	13.91 ± 6.29	11.81 ± 6.91	-0.765	0.45
6. Month	14.23 ± 6.38	46.64* ± 9.62	9.598	0.00
*p<0.001				

In this study, the test group did not use HRT before, by which it was possible to control the duration of the HRT and examine the effects of this therapy on periodontal treatment. However, standardization of HRT and patients in the test group unintentionally stopping HRT limited the study population to 23. Although this group of patients were standardized by the strict inclusion criteria, the comparisons were able to be carried out without confounding factors. Demographics of this population including age, working status, menopausal age, education level, number of children, dental visit frequency and tooth brushing habits did not differ statistically between the groups ($p>0.05$, data not shown). Both groups did not differ from each other by means of EL and BMD at the baseline measurements. At the end of the study, EL increased significantly in the HRT receiving group and did not change in the control group, as expected. BMD did not differ between the groups (Table 3). PI changes differed significantly between the groups in the 3 and 6 month measurements

(Table 1). This finding may highlight the differences of oral hygiene application between patients, although both groups received the same oral hygiene instructions. After periodontal treatment, the SBI values decreased more in the control group. This finding was interesting because in our study population, HRT seems to have a negative effect on gingival inflammation (Table 2). This finding was in conflict with the recent findings reported by Pizzo *et al.*(18), where they observed less bleeding on probing in HRT receiving post-menopausal women without applying any periodontal treatment. Estrogen has a wide range of effects on different tissues. It was shown that estrogen may increase capillary permeability and stimulation of blood flow (44, 45) and stimulate antigen-specific immune response (46). A smaller SBI decrease in the HRT receiving patients may be observed because our test group started to receive HRT with the initiation of the study and also with frequent measurements during our study period, we were able to detect rather small differences. Although, regarding the significant differences of PI values between the groups, difference of gingival inflammation decrease between the groups may just be the expected outcome of poorer oral hygiene execution of the patients. A statistically significant decrease in the PD values was observed in both of the groups after periodontal treatment when compared to baseline. Unlike the PI and SBI results, the PD change in the 3 and 6 month controls were not significantly different between the groups (Table 1). This finding was similar to the 1 year measurement results by Daltaban *et al.*(37). A greater attachment gain in all of the measurement times in the test group (Table 1) may suggest that the hormone therapy in post-menopausal females seems to have a positive effect on periodontal treatment outcomes in this study population. Since there was no significant difference in PD change between treatment and control groups, one could hypothesize that this might occur because of less gingival recession after periodontal treatment in the HRT receiving patients. Daltaban *et al.*(37) and Reinhardt *et al.*(16) did not report significant differences between the estrogen deficient and sufficient groups by means of periodontal attachment levels. However, it should be noted that these studies consisted of postmenopausal women who were already receiving a hormone therapy for an unmentioned period of time, and the clinical outcomes were not aimed to be evaluated after the periodontal treatment.

Conclusion

According to our findings, postmenopausal hormone

therapy had a positive effect on the attachment gain following phase I periodontal treatment. This new finding might count as a contribution to the effects of hormone replacement therapy on periodontal tissues. Further studies should address the biological mechanisms underlying this effect.

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Conflict of interest

None declared

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Corresponding Author:**Ali ÇEKİCİ**

Department of Periodontology
 Faculty of Dentistry Istanbul University
 34093 Çapa-Fatih -Istanbul / TURKEY
 Phone: +90 212 414 20 20 (30253)
 e-mail: cekici@istanbul.edu.tr