

The Evaluation of the Relation Between Osteoporosis and Periodontal Diseases in Turkish Women[¶]

TÜRK KADINLARINDA OSTEOPOROZİS VE PERİODONTAL HASTALIKLAR ARASINDAKİ İLİŞKİNİN DEĞERLENDİRİLMESİ

H.Hüseyin YILMAZ*, Aytekin ŞİRİN**, Özlem ÜÇOK***, Tuncer ÖZEN****, Kemal KARAKURUMER*****

- * Resident, Department of Oral Diagnosis and Radiology, Süleyman Demirel University, ISPARTA
** Private practice
*** Assist.Prof., Department of Oral Diagnosis and Radiology, GMMA,
**** Assoc.Prof., Department of Oral Diagnosis and Radiology, GMMA,
*****Prof., Department of Oral Diagnosis and Radiology, GMMA, ANKARA

Summary

Purpose: The aim of this study was to investigate the relationship between periodontal disease and postmenopausal osteoporosis.

Material and Method: Periodontal examination was carried out in 111 postmenopausal women diagnosed with osteoporosis and 99 healthy women aged 51 to 60 (mean 55,6) years. Periodontal examination included the measurements of gingival recession, plaque index, gingival index, depth and periodontal attachment levels.

Results and Conclusions: Gingival recession in postmenopausal women with osteoporosis was significantly greater than in the healthy group. The mean attachment loss was significantly different in the two groups. However, the mean pocket depth was not found different between both groups. This study showed that postmenopausal osteoporosis may be a factor in periodontal attachment loss.

Key Words: Osteoporosis, Periodontal diseases

T Klin Diş Hek Bil 2003, 9:75-78

Özet

Amaç: Bu çalışmanın amacı postmenopozal osteoporosis ile periodontal hastalıklar arasındaki ilişkiyi araştırmaktır.

Materyal ve Metod: Yaşları 51-60 arasında değişen 111 postmenopozal osteoporozisi olan kadın ile 99 herhangi bir hastalığı olmayan kadın periodontal hastalıklar açısından değerlendirildi. Periodontal dokular dişeti çekilmesi, plak indeksi, gingival indeks, cep ve periodontal ataşman seviyeleri açısından değerlendirildi.

Bulgular ve Sonuç: Postmenopozal kadınlardaki dişeti çekilmesi sağlıklı gruptaki kadınlardan dikkat çekici ölçüde fazla olduğu gözlemlendi. Ortalama ataşman kaybı her iki grupta da önemli ölçüde farklılık göstermekteydi. Bununla birlikte ortalama cep derinliği her iki grupta çok farklı bulunmadı. Bu çalışma postmenopozal osteoporozisin, periodontal ataşman kaybında bir faktör olabileceğini göstermektedir.

Anahtar Kelimeler: Osteoporozis, Periodontal hastalıklar

T Klin J Dental Sci 2003, 9:75-78

Osteoporosis is a metabolic bone disease that has a high morbidity-mortality rate and requires expensive treatment. The clinical diagnosis of this disease is the easy formation of fractures with little trauma in bones due to a reduction in bone mineral density (16). In women over the age of 50, the World Health Organization (WHO) classifies those with a bone mineral density (BMD) up to 1 standard deviation (SD) from the young population

as normal, and those whose SD value is 1-2,5 as osteopenic, while a value below 2,5 SD denotes osteoporotic patients (1).

Osteoporosis and periodontal diseases are important public diseases and they have certain similarities. These similarities can be summarized as follows: (8).

-The etiology of both diseases is multifactorial,

- Losses in bone mass is involved in both,
- Some of their results affect millions of people,
- They require billions of dollars for annual treatment.

Hildebolt (5), Whalen and Krooks (15) have stated that periodontal diseases could be the early findings of osteoporosis. There are also other researchers who believe that osteoporosis might be contributing to the etiological factors of periodontal diseases (4,9,10,14). However, other researchers were not able to determine such a definite relationship (2,6,7). The aim of this study was to evaluate the relationship between osteoporosis and periodontal diseases in postmenopausal women.

Material and Method

210 postmenopausal women, 99 of whom were healthy, joined the study at the GATA Center of Dental Sciences, Department of Oral Diagnosis and Radiology. The patients were between 50 and 61 year old and were systemically healthy 61 (average age: 55.6). These patients also had never received a hormone replacement treatment (HRT) or advanced periodontal treatment. All patients were informed and only volunteers joined the study.

Spinal bone mineral density (BMD) measurements were made using a Lunar DPX (Lunar Corporation, Madison WI, USA) and with a Dual Energy X-Ray Absorptiometry (DEXA) method. In this method, the x-ray first passes through an adjustment disc that comprises absorption material, and then through the patient. Afterwards, the values taken from the patient are compared to the values attained from the absorption material. Those with a lower BMD value than 2,5 SD were evaluated as osteoporotic patients.

During periodontal examination the plaque and gingival indexes were determined, and pocket depth along with gingival recession and periodontal attachment loss were measured. The loss of attachment was calculated by the addition

of pocket depth to the amount of recession. The pocket depth was measured for every patient and every tooth with a periodontal sond in 3 buccal and 3 lingual regions (mesial, mid, distal). Recession, on the other hand, was measured from the enamel-cement border to the middle section of buccal and lingual faces of the gingival edge. One examiner who was blinded concerning the osteoporotic patients made all periodontal measurements.

For every patient, mean values were calculated. In osteoporotic and healthy patients the mean values of periodontal parameters were compared and a Student t test was applied. For the multi-variant analysis of Spinal BMD and periodontal variants, the Pearson correlation coefficient was used.

Results

Average age was 55.6 for healthy and osteoporotic patient groups (53,5±2,3 in healthy individuals, 57,2±3,4 in osteoporotic patients).

Average attachment loss was 3,65 in osteoporotic patients and 2,24 in healthy individuals. Average recession was 1,89 in osteoporotic patients and 0,79 in healthy individuals. As shown in Table 1, attachment loss and recession were statistically significant for the two groups, whereas gingival index, plaque index and pocket depth were not significant (P<0,05).

There was an important negative correlation between Spine BMD and attachment loss (-0,364). Another negative correlation was determined between recession and spine BMD (0,426). No relationship between pocket depth and spine BMD was found (Table 2).

Discussion

Gilbert and Heft (3), Yoneyama et al (17) have shown in their studies that pocket depth does not have a higher value in regions with high attachment losses. They believed that the reason for attachment loss in old patients could be the result of recession rather than pocket depth. The comparison of osteoporotic and control group patients showed the major finding to be attachment loss in our study as well.

Table 1. Periodontal status in postmenopausal women

	Osteoporosis (n=111)		Healthy (n=99)	
	mean	SD	mean	SD
Spine BMD	0,712	0,047*	1,112	0,023
Plaque Index	1,22	0,43	0,96	0,35
Gingival Index	0,55	0,54	0,36	0,42
Attachment loss	3,65	1,42*	2,24	1,08
Pocket depth	1,76	0,34	1,45	0,45
Recession	1,89	1,13**	0,79	0,63

*P<0,05

**P<0,01

Table 2. Correlation coefficient between spine BMD and indicators of periodontal disease

	Spine BMD	Gingival Index	Age	Attachment Loss	Recession
Gingival Index	-0,145				
Plaque Index		-0,396**		-0,483**	-0,322**
Age	-0,186	0,218			
Attachment Loss	-0,364*	0,489**	0,212		
Recession	-0,426**	0,455**	0,220	0,916**	
Pocket depth	-0,074	0,301*	0,113	0,085**	0,371**

*P<0,05

**P<0,01

Groen et al (4), have reported severe periodontal diseases for 27 patients in their study that included 38 osteoporotic patients. Ward and Manson (14) have measured the metacarpal index and alveolar bone loss in patients between ages of 35 and 45, and found an important relation between metacarpal index values and bone loss. Philips and Ashley (10) have proved an important relationship between metacarpal BMD and periodontal diseases by just analyzing posterior teeth. Also Whalen and Krook (15) have re-evaluated their own study of 1972 and the work of other researchers in their study in 1996 and have claimed that clinically periodontal diseases are precursors of more serious findings such as vertebrae and long bone fractures. Mohammed et al (9) have examined periodontal parameters like plaque index, gingival index in a study that included 42 patients with low and high spinal BMD values and ranging between the ages of 50 to 75. Taking the results of this study into consideration, they claimed that osteoporosis

might contribute to attachment loss. The results of our study are in accordance with the findings of their researches. Reinhardt et al (11) have measured the (E2) serum estradiol level in 75 patients whose menopausal stage was completed at least 5 years ago. 59 of these patients had periodontitis while 16 constituted the control group. They determined osteoporosis with the DEXA method. They reported that the level of E2 (serum E2>40 pg/ml) played a role in the increase of gingival inflammation and the increasing rate of clinical attachment loss in post-early menopausal osteoporotic women. Tezal et al (13) have shown in a study that involved 70 post-menopausal women, that attachment loss is related to BMD in all regions of the skeleton. However, they have stated that this relationship is statistically not significant. Ronderos et al (12) have found a statistically significant relation between high clinical attachment loss and recession in their study that involved women with low BMD values.

There are other studies in which no significant relation between osteoporosis and periodontal diseases could be found (2,6,7). Elders et al (2) have decided that bone mass loss is not an important factor in the pathogenesis of periodontitis as a result of their study that was performed on 286 women patients ranging between the ages of 46 to 55. Kribbs et al (6) have performed periodontal measurements on 112 patients with an average age of 69, and have not found any difference between healthy women and osteoporotic women. The different results in our study may be attributed to the measurements of all teeth.

As a result, we concluded that osteoporosis might contribute to periodontal attachment loss. We have also found that gingival recession was higher in osteoporotic patients.

REFERENCES

1. Arasil T: Osteoporoz. Merck Sharp Dohme 1997, p.5-10
2. Elders P, Habets L, Netelenbos J, Van der Linden L, Van der Stelt S: The relationship between periodontitis and systemic bone mass in women between 46 and 55 years of age. *J Clin Periodontol* 19: 492, 1992
3. Gilbert GH, Heft MW: Periodontal status of older Floridians attending senior activity centers. *J Clin Periodontol* 19: 249, 1992
4. Groen J, Menezel J, Shapiro S: Chronic destructive periodontal disease in patients with presenile osteoporosis. *J Periodontol* 39: 19, 1978
5. Hildebolt CF: Osteoporosis and oral bone loss;a review. *Dentomaxillofacial Radiology* 26: 3, 1997
6. Kribbs PJ, Chestnut CH, Ott SM, Kilcoyne RF: Relationship between mandibular and skeletal bone in an osteoporotic population. *J Prosthet Dent* 62: 703, 1989
7. Kribbs P: Comparison of mandibular bone in normal and osteoporotic women. *J Prosthet Dent* 60: 218, 1990
8. Mohammed AR, Jones JD, Brunsvold MA: Osteoporosis and periodontal disease; a review. *CDAJ* 22: 69, 1994
9. Mohammed AR, Brunsvold MA: The strength of association between systemic postmenopausal osteoporosis and periodontal disease. *Int J Prosthodont* 9: 479, 1996
10. Phillips H, Ashley F: The relationship between periodontal disease and metacarpal bone index. *Brit Dent J* 137: 237, 1973
11. Reinhardt RA, Payne JB, Patil KD, Gallager SJ, Mattson JS: Influence of estrogen and osteopenia/osteoporosis on clinical periodontitis in postmenopausal women. *J Periodontol* 70: 823, 1990
12. Ronderos M, Jakops DR, Himes JH, Pihlstrom BL: Association of periodontal disease with femoral bone mineral density and estrogen replacement therapy: cross-sectional evaluation of US adults from NHANES III. *J Clin Periodontol* 27: 778, 2000
13. Tezal M, Wactawski-Wende J, Grossi SG, Ho AW, Dunford R, Genco RJ: The relationship between bone mineral density and periodontitis in postmenopausal women. *J Periodontol* 71: 1492, 2000
14. Ward V, Manson J: Alveolar bone loss in periodontal disease and metacarpal bone index. *J Periodontol* 44: 763, 1973
15. Whalen JP, Krook L: Periodontal disease as an early manifestation of osteoporosis. *Nutrition* 12: 53, 1996
16. Yılmaz C: Güncel bilgiler ışığında tüm yönleriyle osteoporoz. Ankara Bilimsel Tıp Yayınevi 1997, p. 3
17. Yoneyama T, Okamoto H, Lindhe J, Socransky S, Haffajee A: Probing depth, attachment loss and gingival recession findings from a clinical examination in Ushiku, Japan. *J Clin Periodontol* 15: 581, 1988

Geliş Tarihi: 28.04.2003

Yazışma Adresi: Dr.Özlem ÜÇÖK
GATA Dışhekimliği Bilimleri Merkezi
Oral Diağnoz ve Radyoloji AD
cucok@dentistry.ankara.edu.tr

*Bu araştırma 28-30 Mart 2002 de Kuşadası'nda yapılan 7. Congress of the Balkan Stomatological Society'de sunulmuştur.