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Utjecaj osteoporoze na oralno zdravlje žena starijih od 45 godina

The Impact of Osteoporosis on Dental Health in Women Older than 45 Years

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Sažetak

Svrha istraživanja: Osteoporoza i gubitak zuba zdravstveni su problemi koji pogađaju stariju populaciju, osobito žene. Oboje znatno utječe na kvalitetu života. Svrha ovog istraživanja bila je ustanoviti postoji li statistički značajna povezanost mineralnog statusa kostiju u području kuka i slabinske kralježnice s brojem zuba i KEP-indeksom kod žena u dobi iznad 45 godina. **Materijali i metode:** Ovo presječno istraživanje obuhvatilo je 91 ženu stariju od 45 godina. Svima su digitalno panoramski snimljene čeljusti, a tehnologijom DEXA utvrđena je mineralna gustoća slabinske kralježnice (L1 – L4) i proksimalnog femura. Tijekom kliničkog pregleda usne šupljine zabilježen je zubni status. Broj zuba izračunat je s pomoću panoramske snimke. Uzorak je podijeljen u dvije skupine ovisno o vrijednostima gustoće kostiju na nalazu DEXA. **Rezultati:** Rezultati statističke analize pokazali su kako nije bilo značajne razlike u distribuciji ukupnog broja zuba ($t=-0,171$, $P>0,05$) između dviju skupina u sklopu analiziranog uzorka. Također nije bilo statistički značajne razlike u vrijednosti KEP-indeksa i broja zdravih zuba. Statistička analiza pokazala je značajnu korelaciju između dobi i broja zuba ($r=-0,26$; $P=0,005$), a korelacija između razine obrazovanja i broja zuba bila je još izrazitija. **Zaključak:** Na osnovi dobivenih rezultata zaključujemo da zubni status i gubitak zuba kod žena u dobi iznad 45 godina nisu povezani s mineralnom gustoćom kostiju. No potrebna su daljnja istraživanja kako bi se ispitalo utjecaj osteoporoze na oralno zdravlje, s osobitim naglaskom na promjene u čeljusnim kostima.

Zaprimljen: 14. listopada 2013.
Prihvaćen: 1. prosinca 2013.

Adresa za dopisivanje

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Ključne riječi

osteoporoza; oralno zdravlje; KEP indeks; žene; presječno istraživanje

Uvod

Osteoporoza i gubitak zuba zdravstveni su problemi starije populacije, osobito žena. Osteoporoza je stanje koštano sustava koje karakterizira smanjena čvrstoća kostiju te su mogući lomovi pri minimalnom naporu, pa čak i kada se obavljaju rutinske, svakodnevne aktivnosti (1). U menopauzi naglo pada razina estrogena u organizmu, što je osnovni razlog za sistemski gubitak kostiju (2).

Ova bolest može zahvatiti sve kosti u tijelu, prema su kuk, kralježnica i ručni zglobovi najskloniji lomovima. Osteoporoza je prilično teško otkriti te često ostaje nedijagnosticirana kod oboljelih sve dok se ne dogode lomovi kostiju. Zbog visoke učestalosti i neprimjetne simptomatologije naziva se i *tihom epidemijom*.

U sve više istraživanja autori upućuju na moguću povezanost osteoporoze s oralnim zdravljem, uključujući parodontne bolesti, smanjenu gustoću čeljusnih kostiju i gubitak zuba (3 – 8).

Introduction

Osteoporosis and tooth loss are health problems that affect older population, especially women. Osteoporosis is a condition of the skeletal system characterized by decreased hardness of bones resulting in potential trauma upon minimal strain as well as during routine everyday activities (1). In menopause, estrogen levels decline rapidly, which is a major reason leading to systemic bone loss (2).

This disease can affect any bone in the body, although the bones in the hip, spine, and wrist are most often prone to fracture. Osteoporosis is difficult to detect, and most patients are not diagnosed until their bone density has decreased to the point when a fracture occurs. Due to its high frequency and indiscernible symptomatology, it is known as *silent epidemics*.

Increasing number of study results suggest that it may be associated with oral health conditions including periodontal disease, reduced jaw bone density and tooth loss (3-8).

Prema podatcima iz nekoliko istraživanja, opseg gubitka kostiju kod žena u menopauzi značajno je povezan s gubitkom zuba. U svojem su istraživanju Krall i suradnici zaključili da rizik od gubitka zuba raste više od četiri puta za svakih jedan posto sniženja mineralne gustoće kostiju godišnje u cijelom tijelu (9). Kribbs je, pak, u istraživanju istaknuo da su žene s osteoporozom tri puta češće bezube u usporedbi sa zdravim ženama iste dobi u kontrolnoj skupini (10).

Unatoč navedenim rezultatima u pojedinim istraživanjima nije potvrđena povezanost između broja zuba i skeletalne mineralne gustoće (11,12). Tako u longitudinalnom istraživanju Famili i suradnici nisu pronašli povezanost između sistemskog gubitka kostiju, parodontnih bolesti i bezubosti (13). To pokazuje kako je veza između gubitka alveolne kosti, gubitka zuba i sistemskih koštanih promjena složena i još nije potpuno razjašnjena.

Svrha ovog presječnog istraživanja bila je ustanoviti moguću razliku u broju zuba i vrijednosti KEP-indeksa između dviju skupina žena s različitim vrijednostima mineralne gustoće kostiju.

Materijal i metode

Ovim presječnim istraživanjem bila je obuhvaćena 91 žena starija od 45 godina. Istraživanje je odobrilo Etičko povjerenstvo Stomatološkog fakulteta Sveučilišta u Zagrebu. Sve ispitanice pročitale su informacije o istraživanju te potpisale pristanak za sudjelovanje. Uzorak je prikupljen među pacijenticama Kliničkog zavoda za opću stomatologiju Klinike za stomatologiju KBC-a Zagreb. No ako su uzimale lijekove koji utječu na koštani metabolizam ili su to bile pacijentice s metastatskim karcinomom u kostima, hiperparatiroidizmom, leukemijom, multiplim mijelomom, bubrežnom insuficijencijom, bolestima jetara i sa sekundarnom osteoporozom te one koje su uzimale glukokortikoide, nisu mogle sudjelovati.

S pacijenticama smo razgovarali kako bismo prikupili opće informacije, podatke o općem zdravstvenom stanju, postojećim bolestima, fizičkoj aktivnosti i početku menopauze. Također su zabilježeni podatci o njihovim dentalnim navikama, četkanju zuba, vrsti četkice, dodatnim sredstvima za održavanje oralne higijene, učestalosti posjeta stomatologu te vrsti protetskih nadomjestaka.

Zubni status zabilježen je tijekom kliničkog pregleda i dodatno provjeren na ortopanima. Broj zuba zabilježen je na osnovi analize panoramske snimke. Izračunat je i KEP-indeks. Sve ispitanice pregledao je specijalist nuklearne medicine, a mineralna gustoća kostiju utvrđena je tehnologijom DEXA.

Radiološka analiza

Digitalne panoramske snimke dobivene su uređajem Cranex D Ceph (Soredex, Tuusula, Finska) a mineralna gustoća kostiju izmjerena je aparatom Hologic QDR 4500 (Hologic, Waltham, MA, SAD) u području slabinske kralježnice (L1 – L4) i proksimalnog femura DEXA tehnologijom u Klinici za nuklearnu medicinu i onkologiju Kliničkoga bolničkog centra *Sestre milosrdnice* u Zagrebu. Gustoća kosti donje čeljusti procijenjena je mjerenjem razine sivila u području između

According to several investigations, the rate of bone loss in postmenopausal women is significantly correlated to tooth loss. In their study, Krall et al. found that the risk of tooth loss increases more than four times for every percent of yearly decrease of BMD in the whole body (9). Kribbs found that women with severe osteoporosis were three times more likely to be edentulous than healthy, age-matched controls (10).

In spite of these findings, in some studies the association between tooth count and skeletal status was not found (11, 12). In their longitudinal study, Famili et al. found no association between systemic bone loss, periodontal disease, and edentulism (13). This shows that the relationship between alveolar bone and tooth loss and systemic bone loss is multifactorial and not yet fully understood.

The aim of the present cross-sectional study was to investigate possible differences in tooth number and DMFT index between two groups of women with different BMD status.

Material and methods

This cross-sectional study included 91 women older than 45 years. The study was approved by the Ethics Committee of the School of Dental Medicine, University of Zagreb. All subjects received Information for study subjects in a written form and they all signed the written consent agreeing to participate in the study. The study sample was obtained from the patients of the Department of General Dentistry, Dental Clinic, University Hospital Centre Zagreb, Croatia. Patients who were taking medications which affected bone metabolism, patients with existing bone metabolic diseases, those with carcinoma with metastasis to the bones, as well as patients with hyperparathyroidism, leukemia, multiple myeloma, renal insufficiency, liver diseases, patients with secondary osteoporosis and those who were using glucocorticoids were excluded from the study.

All subjects were interviewed to obtain general information, information of health status, existing illnesses, physical activities and the time of menopause. Information about dental habits, tooth brushing activities, type of the toothbrush used, additional means of oral hygiene, visits to the dentist and type of prosthetic appliances, if existed, were recorded.

Dental status was recorded by clinical examination and checked on panoramic radiographs. Number of teeth was counted on radiographs. The DMFT index was calculated. All subjects were examined by specialist of nuclear medicine and bone density was estimated by dual-energy X-ray absorptiometry (DEXA).

Radiological analysis

Digital panoramic radiographs were taken by Cranex D Ceph (Soredex, Tuusula, Finland) and bone mineral density was determined for the lumbar spine region (L1-L4) and the proximal femur by DEXA technology (DEXA Hologic QDR 4500, Hologic, Waltham, MA, USA) at the Clinic for Nuclear Medicine and Oncology at the Clinical Hospital Center "Sestre milosrdnice" in Zagreb. Mineral bone density of the lower jaw was estimated by Digora for Windows 2.8

drugog premolara i prvog molara, na pola udaljenosti između gornjeg ruba alveolnog grebena i donjeg ruba mandibule korištenjem specifičnog računalnog programa Digora for Windows 2,8 (Soredex, Tuusula, Finska).

Statistička analiza

Statistička analiza obavljena je u programu SPSS (verzija 17,0, SPSS Inc., Chicago, IL, SAD), s razinom statističke značajnosti postavljenom na $P < 0,05$. Univarijantna analiza sastojala se od frekvencija i postotka varijabli svake kategorije unutar svake skupine određene na osnovi broja postojećih zuba.

Deskriptivna statistika uključivala je prosjek, raspon standardne devijacije te maksimalne i minimalne vrijednosti za numeričke varijable. Nezavisni t-test korišten je za usporedbu vrijednosti između dviju skupina unutar uzorka. Pearsonovim korelacijskim koeficijentom uspoređene su numeričke varijable dentalnog statusa kod pacijentica s osteoporozom/osteopenijom.

Rezultati

Istraživanje je obuhvatilo 91 ženu stariju od 45 godina. Od ukupnog broja ispitanica 79 (87 %) izjavilo je da su, u razdoblju kada se obavljalo istraživanje, bile u menopauzi ili postmenopauzi. Zatim su podijeljene u dvije skupine, ovisno o njihovu DEXA nalazu. One koje su imale T-vrijednost < -1 u području kuka i/ili kralježnice svrstane su u skupinu s osteoporozom/osteopenijom prema prepozicijama Svjetske zdravstvene organizacije za dijagnosticiranje osteoporoze. Osnovne karakteristike dviju ispitivanih skupina unutar uzorka nalaze se u tablici 1. i tablici 2.

software by measuring the grey area between the second premolar and the first molar at half distance between the upper edge of the alveolar bone and the lower edge of the mandible (Soredex, Tuusula, Finland).

Statistical analysis

Statistical analysis was performed using SPSS statistical package (version 17.0, SPSS Inc., Chicago, IL, USA), with $P < 0.05$ set as statistical significance. Univariate analysis comprised frequencies and percentages of variables for each category according to tooth number groups. Descriptive statistics included mean, standard deviation range, maximum and minimum for numerical variables. Independent samples t-test was used to check the differences between sample groups. Pearson correlation coefficient was used for the comparison of numerical variables of oral status in the group of patients with osteoporosis/osteopenia.

Results

The study included a total of 91 female subjects older than 45 years, 79 of them (87%) stated that at the time of the study they were menopausal or postmenopausal. The subjects were divided into two groups according to their DEXA report. Women with T-score < -1 in the hip and/or spine region formed osteoporosis/osteopenia group according to WHO propositions for diagnosing osteoporosis/osteopenia. The basic features of the two group samples are shown in Table 1 and Table 2.

Tablica 1. Osnovna deskriptivna statistika skupine ispitanica s osteoporozom/osteopenijom
Table 1 Descriptive statistics of the group with osteoporosis/osteopenia

	N	Min	Max	Srednja vrijednost • Mean	Standardna devijacija • Std. Deviation
Dob (godine) • Age (years)	52	45	76	58.83	7.065
Visina (cm) • Height (cm)	52	152	176	163.40	5.637
Tjelesna težina (kg) • Body weight (kg)	52	49	90	66.85	10.092
Indeks tjelesne mase (kg/m ²) • Body mass index (kg/m ²)	52	18.36	35.15	25.04	3.66
Broj zuba koji nedostaju • Missing teeth	52	1	30	13.02	7.347
Broj zdravih zuba • Sound teeth	52	0	20	8.02	5.105
KEP-indeks • DMFT	52	12	32	23.98	5.105
Broj postojećih zuba • Present teeth	52	2	31	18.98	7.347

Tablica 2. Osnovna deskriptivna statistika skupine ispitanica bez osteoporoze/osteopenije
Table 2 Descriptive statistics of the group without osteoporosis/osteopenia

	N	Min	Max	Srednja vrijednost • Mean	Standardna devijacija • Std. Deviation
Dob (godine) • Age (years)	39	45	80	57.31	8.529
Visina (cm) • Height (cm)	39	145	172	163.72	5.853
Tjelesna težina (kg) • Body weight (kg)	39	56	120	77.18	14.716
Indeks tjelesne mase (kg/m ²) • Body mass index (kg/m ²)	38	20.61	42.15	28.90	5.31
Broj zuba koji nedostaju • Missing teeth	39	2	32	12.74	7.946
Broj zdravih zuba • Sound teeth	39	0	23	8.13	5.836
KEP-indeks • DMFT	39	9	32	23.87	5.836
Broj postojećih zuba • Present teeth	39	0	30	19.26	7.946

Broj postojećih zuba podijeljen je u skupine: 0 – 5, 5 – 10, 10 – 15, 15 – 20, 20 – 25 i 25– 32. Nije bilo statistički značajne razlike u distribuciji broja zuba ukupno ($t = -0,171$, $p > 0,05$) i podijeljeno u šest skupina između skupine s osteoporozom/osteopenijom i onih bez osteoporozе/osteopenije ($t = -0,452$; $P > 0,05$) (tablica 3. i tablica 4.).

Nije bilo statistički značajne razlike vrijednosti KEP-indeksa i broja zdravih zuba između dviju skupina (tablica 5.).

Također nije bilo statistički značajne korelacije između mandibularne gustoće i broja postojećih zuba u skupini s osteoporozom ($r = -0,04$), ni u skupini bez osteoporozе ($r = 0,04$, $P > 0,05$). Statistička analiza upozorila je na značajne korelacije između dobi ispitanica i broja postojećih zuba – starije ispitanice imale su znatno manje zuba ($r = -0,26$; $P = 0,005$). Korelacija između razine obrazovanja i broja zuba bila je još izraženija ($r = 0,29$; $P < 0,001$).

The number of present teeth was divided into groups 0-5, 5-10, 10-15, 15-20, 20-25 and 25-32. There was no significant difference in distribution of total teeth number ($t = -0.171$, $p > 0.05$) and number of teeth divided into six groups between women with and without osteoporosis/osteopenia. ($t = -0.452$; $P > 0.05$), (Table 3, Table 4).

There was no significant difference between the two groups according to DMFT index and the number of sound teeth (Table 5).

There was no statistically significant correlation of the mandibular density and the number of present teeth in neither in the osteoporotic group ($r = -0.04$) nor in the non-osteoporotic group ($r = 0.04$, $P > 0.05$).

Statistical analysis showed significant correlation of the age and the number of present teeth, older patients had a significantly smaller number of teeth ($r = -0.26$; $P = 0.005$). Correlation between the educational level and the number of present teeth was even stronger ($r = 0.29$; $P < 0.001$).

Tablica 3. Distribucija zuba unutar skupine ispitanica s osteoporozom/osteopenijom
Table 3 Distribution of teeth in a group of patients with osteoporosis/osteopenia

Broj prisutnih zuba • Number of teeth	Učestalost • Frequency	Postotak (%) • Percent (%)
0-5	2	3.8
5-10	8	15.4
10-15	5	9.6
15-20	10	19.2
20-25	17	32.7
25-32	10	19.2
Ukupno • Total	52	100.0

Tablica 4. Distribucija zuba unutar skupine ispitanica bez osteoporozе/osteopenije
Table 4 Distribution of teeth in a group of patients without osteoporosis/osteopenia

Broj prisutnih zuba • Number of teeth	Učestalost • Frequency	Postotak (%) • Percent (%)
0-5	3	7.7
5-10	2	5.1
10-15	4	10.3
15-20	9	23.1
20-25	12	30.8
25-32	9	23.1
Ukupno • Total	39	100.0

Tablica 5. Test neovisnih uzoraka
Table 5 Independent samples test

	Levenov test jednakosti varijanci • Levene's Test for Equality of Variances		t-test za jednakost srednjih vrijednosti • t-test for Equality of Means					95% int.pouzdanosti • 95% Confidence Interval of the Difference	
	F	Sig.	t	Stupanj slobode • df	Sig. (2-tailed)	Srednja vrijednost • Mean Difference	Standardna devijacija • Std. Error Difference	Donji • Lower	Gornji • Upper
Broj zuba koji nedostaju • Missing teeth	.095	.758	.171	89	.865	.276	1.612	-2.927	3.478
Broj zdravih zuba • Sound teeth	.517	.474	-.095	89	.925	-.109	1.150	-2.394	2.176
KEP-indeks • DMFT	.517	.474	.095	89	.925	.109	1.150	-2.176	2.394

Rasprava

Osteoporoza je jedan od najvećih zdravstvenih problema koji pogađa sredovječne i starije osobe, poglavito žene. Povezana je s nekoliko rizičnih čimbenika. Neki od njih, kao što su dob, pušenje, spol, sistemske bolesti, lijekovi i genetski čimbenici jednaki su i kod parodontnih bolesti (14). Osteoporoza pogađa 10 do 15 posto europske kavkaske populacije. U Hrvatskoj 15 posto žena u postmenopauzi ima osteoporozu, a 30 posto osteopeniju. Manje od 10 posto oboljelih se liječi (15).

Gubitak zuba može biti posljedica karijesa, parodontitisa, traume, neuspješnog endodontskog liječenja, ortodontskih zahvata i ostalih razloga. Premda je karijes glavni uzrok gubitka zuba u svim dobnim skupinama, parodontitis je osobito važan uzročni čimbenik među starijom populacijom (16, 17). Gubitak zuba utječe na svakodnevne aktivnosti kao što su govor, smijanje, žvakanje i osjet okusa (18).

S javnozdravstvenog stajališta prevencija gubitka zuba i rana dijagnostika osteoporoze vrlo su važne kako bi se održalo dobro opće zdravstveno stanje i kvaliteta života. Najvažniji čimbenik u očuvanju prirodnih zuba jest prevencija karijesa, a kod odrasle populacije i parodontitisa. No ako se povremeno ne uspije, unatoč primjeni odgovarajućih preventivnih mjera, mogući razlog za to jest i neprepoznata postojeća koštana bolest.

U mnogobrojnim istraživanjima proučavala se povezanost između broja preostalih zuba i mineralne gustoće kostiju. Rezultati su neujednačeni (9 – 13). No samo u nekoliko istraživanja bio je uključen velik broj ispitanika i korištena multivarijantna analiza kako bi se prilagodili rezultati s obzirom na zajedničke čimbenike kao što su dob, spol, pušenje, uzimanje kalcija i ostali (19).

Rezultati našeg istraživanja ne upućuju na statistički značajne razlike u vrijednosti KEP- indeksa između skupine ispitanica s osteoporozom i skupine bez osteoporoze. Inagaki i suradnici također su dobili slične rezultate kad je riječ o postotku zuba s karijesom ili ispunima u skupinama žena u predmenopauzi i postmenopauzi. U njegovu istraživanju istaknuta je statistički značajna povezanost između snižene metakarpalne mineralne gustoće i broja preostalih zuba kod žena u postmenopauzi (20).

Statistički značajna povezanost pronađena je u našem istraživanju između razine obrazovanja ispitanica i broja prisutnih zuba. Ti se rezultati podudaraju se s onima Gura i suradnika (21).

U našem istraživanju nije pronađena značajna razlika u ukupnom broju postojećih zuba između dviju skupina ispitanica. Ewa Kulikowska-Bielaczyc i njezini suradnici proučavali su 65 žena u postmenopauzi s djelomičnim gubitkom zuba, prosječne dobi 66,2 godine (22). Uzorak je bio podijeljen na tri podskupine: zdrave žene, žene s osteopenijom i žene s osteoporozom. Zaključili su kako snižena mineralna gustoća kostiju nije utjecala na broj preostalih vlastitih zuba.

Stvarni razlog gubitka zuba često ostaje nepoznat i zbog toga gubitak zuba kao mjerilo opsega parodontnih bolesti nije potpuno prikladna. Ta činjenica, uz različitu metodologiju u provedbi istraživanja, može biti ograničavajući čimbenik u usporedbi istraživanja s odstupajućim rezultatima.

Discussion

Osteoporosis is one of the major health problems affecting middle-aged and older individuals, especially women. It is associated with several risk factors. Some of them, such as age, smoking, sex, systemic diseases, medications and genetic factors are common for periodontal disease (14). Osteoporosis affects 10-15% of European Caucasian population. In Croatia, 15% of postmenopausal women have osteoporosis and 30% have osteopenia. Less than 10% of them are adequately treated (15).

Tooth loss can be a consequence of caries, periodontal disease, accidents or trauma, previous root canal treatment, orthodontic procedures and some other reasons. Although caries is a major reason for tooth loss across all age groups, periodontal disease is a particularly important reason among older adults (16, 17). Tooth loss affects daily activities such as speaking, smiling, chewing, and tasting (18).

From the point of view of public health, prevention of tooth loss and early detection of osteoporosis is important to maintain good general health and high quality of life.

The most important factor in maintaining natural teeth is prevention of caries and periodontitis, especially among older patients. In some cases, the failure of preventive measures and treatment may be due to unrecognized bone disease.

Many studies have been conducted on the association between the number of remaining teeth and skeletal BMD that resulted in conflicting results (9-13). However, only a few studies included a large number of subjects and used multivariate analyses to adjust the results for confounding factors such as age, sex, smoking, calcium intake or other (19).

In our study, there was no significant difference in DM-FT index between osteoporotic and non-osteoporotic groups of patients. Inagaki et al. found similar percentages of teeth with caries or restorations among premenopausal and postmenopausal women. In his study, there was a significant association between decreasing metacarpal BMD and number of teeth remaining in postmenopausal women (20).

A significant correlation was found between the education level of two groups and tooth number in our study. This result is consistent with findings of Gur et al. (21).

The result of our study showed no significant differences regarding the total number of teeth present between groups of analyzed sample. Kulikowska-Bielaczyc et al. studied 65 postmenopausal women with partial loss of dentition, mean age 66.2 years (22). The group was divided into 3 subgroups: healthy, with osteopenia and with osteoporosis. They concluded that there was no influence of the decreased mineral status of the body on the number of the subject's own teeth observed.

The real reason of tooth loss often remains unknown and because of that tooth loss, as a measure for periodontal disease extent is not suitable. This fact together with differences in study design may limit comparability of various studies with conflicting results.

Zaključak

Zaključujemo da zubni status kod žena u menopauzi i postmenopauzi nije povezan s mineralnom gustoćom kostiju te da to nije prikladno mjerilo za postavljanje sumnje i upućivanje pacijentica na denzitometrijski pregled. Daljnja istraživanja potrebna su kako bi se utvrdio utjecaj osteoporoze na oralno zdravlje, a isto tako da bi se procijenio mogući doprinos kliničkoga stomatološkog pregleda, uz radiološku analizu, u otkrivanju pacijentica s povećanim rizikom od osteoporoze. Doktor dentalne medicine mora prepoznati moguće promjene u usnoj šupljini i na radiološkim snimkama kojima se svakodnevno koristi u ordinaciji, a mogu nastati zbog snižene mineralne gustoće kostiju.

Zahvala

Istraživanje je obavljeno u sklopu projekta Ministarstva znanosti, obrazovanja i sporta – broj projekta: 065-0650445-0441.

Sukob interesa

Autori ističu da nisu bili ni u kakvom sukobu interesa.

Conclusion

We conclude that dental status in menopausal and postmenopausal women is not related to BMD, and therefore cannot be used as an indication for bone densitometry. Further studies are needed to assess the role of osteoporosis in oral health status. Furthermore, it is necessary to elucidate whether dental clinical examination might be of significant contribution to radiologic evaluation in initial screening for osteoporotic signs. Dentists should be aware of possible changes in oral cavity and especially of radiologic findings which could be associated with decreased skeletal BMD.

Acknowledgements

This study was supported by the grant of the Croatian Ministry of Science, Education and Sports, Grant No. 065-0650445-0441.

Conflict of interest

The authors certify that they have no any financial or non-financial interest in the subject matter or materials discussed in this manuscript.

Abstract

Objectives: Osteoporosis and tooth loss are health problems that affect older population, especially women. Both of them have great impact on life quality. The aim of this study was to determine the relationship between the mineral status in the hip and lumbar spine region and the number of teeth present and DMFT index in women older than 45 years. **Materials and Methods:** This cross-sectional study included 91 women older than 45 years. Digital panoramic radiographs were taken and bone mineral density was determined for the lumbar spine region (L1-L4) and the proximal femur by DEXA technology. Dental status was recorded by clinical examination. Number of teeth was counted on radiographs. Subjects were divided into two groups according to their DEXA report. **Results:** There was no significant difference in distribution of total teeth number ($t=0.171$, $p>0.05$) between two groups of the analyzed sample. There was no significant difference between the two groups according to DMFT index and number of sound teeth. Statistical analysis showed significant correlation of the age and the number of present teeth ($r=-0.26$; $P=0.005$). The correlation of educational level and the number of present teeth was even stronger. **Conclusion:** We conclude that dental status and tooth loss in women older than 45 years are not related to BMD. Further studies are needed to assess the role of osteoporosis in oral health with emphasis on oral bone changes.

Received: October 14, 2013

Accepted: December 1, 2013

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Key words

Osteoporosis; Oral Health, DMF Index, Women; Cross-Sectional Studies

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