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Ekstrakcija zuba iz parodontnih razloga u odrasloj populaciji u Grčkoj

Periodontal Reasons for Tooth Extraction in Adult Population in Greece

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Sažetak

Svrha: Željelo se istražiti prevalenciju ekstrahiranih trajnih zuba zbog parodontnih bolesti i njihov odnos prema čimbenicima kao što su dob, spol i koji je zub izvađen zbog parodontnih i neparodontnih razloga među pacijentima liječenima u privatnoj stomatološkoj ordinaciji. **Materijali i metode:** U skupini ispitanika bilo je 600 pacijenata (270 muškaraca i 330 žena) u dobi od 18 do 74 godine obrađenih u privatnoj ordinaciji dentalne medicine u Grčkoj. Razlozi za ekstrakcije zuba posljednje dvije godine uključivali su dob, spol i vrstu ekstrahiranog zuba zbog parodontnih i neparodontnih razloga. Na kraju su podaci obrađeni Hi-kvadrat testom. **Rezultati:** Iz različitih razloga bilo je ekstrahirano ukupno 1418 trajnih zuba. Većina (36,4%) je izvađena iz parodontnih razloga, 24,5 posto zbog karijesa, a 31,1 posto istodobno zbog karijesa i parodontnih razloga, zatim slijede traume korijena, vertikalne frakture korijena/krune, ortodontski razlozi, itd. Razlika između ekstrahiranih zuba zbog parodontnih i neparodontnih razloga statistički je bila znatna ($p < 0,01$). Osim toga, prosječan broj ekstrahiranih zuba iz parodontnih razloga to je veći što su pacijenti starije dobi. Maksilarni i mandibularni molari češće su ekstrahirani iz parodontnih razloga negoli ostali stražnji zubi iz obje čeljusti. Zbog samo parodontnih razloga ekstrahirani su najčešće prednji zubi s pomičnošću III. stupnja iz obje čeljusti, prednji zubi obje čeljusti s gubitkom epitelnog pričvrstka ($\geq 5,0$ mm) i stražnji zubi obje čeljusti s otvorenom furkacijom IV. stupnja. **Zaključak:** Iako je cilj Svjetske zdravstvene organizacije postignut kad je riječ o smanjivanju zubnog karijesa, bolesti parodonta i dalje su glavni razlog za ekstrakcije zuba te njihov postotak raste što su pacijenti stariji.

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Ključne riječi

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Uvod

Ekstrakcija zuba, bez obzira na napredak suvremene dentalne medicine, uzrokuje velike probleme i disfunkcije žvačnog sustava te se smatra složenim problemom kako za terapeuta tako i za pacijenta. Osim toga, broj ekstrahiranih zuba može dodatno upućivati na socijalno-ekonomsku i oralno-higijensku razinu. Smanjenje broja zuba posljedica je loše prehranbene navike i sve slabije kvaliteta života (1). Zato je važno istražiti razloge za ekstrakcije trajnih zuba. Na osnovi tih podataka mogli bi liječnici dentalne medicine predložiti i voditi odgovarajuću zdravstvenu politiku. Glavni razlozi za ekstrakciju zuba su karijes, parodontne bolesti, kombinacija karijesa i parodontnih bolesti, ozljede kod nesreća, ortodontski razlozi, impaktirani zubi (primjerice, očajnici, bočni sjekutići i ostali) te neuspjela endodontska liječenja (2-4).

Suvremena stomatologija usredotočuje se na održavanje trajnih zuba primjenom nekoliko preventivnih programa za cijelu populaciju. U ranijim istraživanjima bilo je izričito upozoreno da su u mnogim državama karijes i parodontne

Introduction

Tooth extraction, regardless of the progress of modern dentistry causes serious problems and dysfunction of the masticatory system and is thought as a multi-complex problem for both the clinical dentist and the patient. In addition, the number of extracted teeth could serve as an indicator of the socio-economic and the oral hygiene level. Decrease in the number of teeth results in poor dietary habits and deterioration of quality of life (1). Therefore it is important to investigate the reasons for permanent tooth extraction. Based on those information the community dentistry could put into practice adequate dental health policies.

The main reasons for tooth extraction in general are: dental caries, periodontal disease, the combination of dental caries and periodontal disease, accidents-injuries, orthodontic reasons, impacted teeth (e.g. canines, lateral incisors), failed dental treatments (root canal treatments, etc.) (2-4).

The philosophy of modern dentistry focuses its efforts on the maintenance of permanent teeth putting into prac-

bolesti glavni uzroci ekstrakcije zuba. U tim je studijama karijes proglašen glavnim "krivcem" (3, 5-18) te se dodaje da se broj izvađenih zuba povećava s dobi pacijenata. Samo u četirima istraživanjima istaknuto je da je glavni razlog za ekstrakciju, bez obzira na dob, parodontna bolest (4, 19, 27, 28).

Svrha ovog istraživanja bila je predvidjeti prevalenciju trajnih zuba zbog parodontne bolesti i istražiti njezine korelacije s različitim parametrima poput spola, dobi i vrste ekstrahiranih zuba izvađenih zbog parodontnih i neparodontnih razloga.

Ispitanici i postupci

Skupina se sastojala od 600 pacijenata - 270 muškaraca i 330 žena u dobi od 18 do 74 godine (srednja dob $45,3 \pm 5,4$) i svi su bili pacijenti privatne stomatološke ordinacije u Petri, jednom od najvećih grčkih gradova. Razlozi za ekstrakciju prikupljali su se dvije godine (od lipnja 2007. do svibnja 2009.), uključujući i one poput dobi, spola i koji su zubi ekstrahirani iz parodontnih i neparodontnih razloga. Od svih je sudionika bila uzeta detaljna povijest bolesti, obavljena su i klinička mjerenja, a zube je ekstrahirao jedan operater. Nakon toga je uzorak bio podijeljen u šest skupina ovisno o dobi ispitanika:

- I. skupina od 18 do 24 godine - 110 ispitanika;
- II. skupina od 25 do 34 godine - 166 ispitanika;
- III. skupina od 35 do 44 godine - 130 ispitanika;
- IV. skupina od 45 do 54 godine - 94 pacijenta;
- V. skupina od 55 do 64 godine - 52 pacijenta;
- VI. skupina ≥ 64 - 48 pacijenata.

Ispitanici su bili dobrog općeg zdravlja, što je procijenjeno na temelju odgovarajuće ankete.

Etika

Svi ispitanici znali su kakvoj će procjeni biti podvrgnuti te su se složili sa sudjelovanjem u istraživanju (potpisali su informirani pristanak).

Klinički pregled

Kao što je već navedeno, klinička mjerenja obavio je jedan operater.

Pomičnost zuba, stupanj oštećenja i gubitka pričvrstka te otvorenost furkacije bili su glavna mjericila za ekstrakciju parodontno oštećenih zuba (20, 21). Zubi i gingiva sušili su se komprimiranim zrakom, a područje rada osvjetljavalo se reflektorom stomatološke jedinice.

Za svaki zub s lošom prognozom bila je izmjerena udaljenost cementno-caklinskoga spoja (CCS-a) do dna gingivnog sulkusa i za to se rabila Williamsova sonda na središnjem bukalnom području svih zuba, osim trećih molara, kako bi se procijenio gubitak epitelnog pričvrstka. Ako je CCS bio prekrivan kamencem, skriven ispunom ili izgubljen zbog karijesa, smještaj spoja procjenjivao se prema susjednom zubu.

several preventive dentistry programmes for the whole population.

Previous studies have strongly implicated dental caries and periodontal disease as the major cause of tooth extraction in several countries.

In those studies dental caries appears to be the main cause of tooth extraction in a large number of countries (3, 5-18) and the number of extracted teeth showed an increasing percentage with age. Only four studies showed that the main reason for tooth extraction regardless of the age was periodontal disease (4, 19, 27, 28).

The aim of the present study was to estimate the prevalence of permanent teeth extracted due to periodontal disease and to investigate its correlations to several aspects such as gender, age, type of the teeth extracted due to periodontal and non-periodontal reasons.

Material and Methods

Study population consisted of 600 patients, 270 males and 330 females, 18-74 years of age (mean age 45.3 ± 5.4) from a private practice in Patra, one of the biggest cities in Greece. The reasons for extractions of teeth in the sample for a period of two years (June 2007-May 2009) were obtained including aspects such as age, gender and the type of teeth extracted due to periodontal and non-periodontal reasons. A comprehensive history was taken and all examinations, clinical measurements and extractions were performed by one investigator. The sample was divided into six groups according to the age range:

- group I-18 to 24 years: 110 patients;
- group II-25 to 34 years: 166 patients;
- group III-35 to 44 years: 130 patients;
- group IV-45 to 54 years: 94 patients;
- group V-55 to 64 years: 52 patients;
- group VI- ≥ 64 years: 48 patients.

The participants were in good general health as estimated by a health questionnaire.

Ethics

All participants were informed about the evaluation to which they would be submitted and gave their informed consent to participate in the study.

Clinical Examination

The clinical measurements of the participants were performed by one investigator as mentioned above.

Tooth mobility, severity of attachment loss and furcation involvement were the main criteria which indicate the extraction of periodontally affected teeth (20, 21). The teeth and gingival were dried with compressed air while dental unit light was used as the light source for the inspections.

The following measurements were calculated on each tooth with poor prognosis:

- i. the distance in millimetre from cement-enamel junction (CEJ) to the bottom of the gingival sulcus using a William's probe in the mid-facial buccal surfaces of all teeth except for the 3rd molars, in order to estimate the attachment loss; in cases of which the CEJ was covered by calculus, hid-

Oštećenje parodonta smatralo se velikim ako je gubitak kliničkoga epitelnog pričvrstka bio 5,0 milimetara ili više.

ii. Klinički stupanj pomičnosti: svaki zub se čvrsto držao između držaka dvaju metalnih instrumenata te ga se pokušalo micati u svim smjerovima.

Bilježio se samo III. stupanj (opsežna pomičnost vestibulo-oralno i meziodistalno u kombinaciji s vertikalnim pomakom).

iii. Zahvaćenost furkacije procjenjivala se prema Glickmanovoj klasifikaciji (od I. do IV. stupnja). Samo IV. stupanj parodontna sonda prolazi ravno s jedne strane zuba na drugu te se bilježio za ekstrakciju.

Ostali razlozi bili su: karijes i njegove posljedice (fraktura zuba oslabljenih karijesom ili endodontskim liječenjem), parodontalni razlozi i karijes, trauma korijena, vertikalne frakture krune/korijena, ortodontski razlozi i neuspjele endodontske terapije.

Kriteriji za uključivanje

Kriterij je bila dob iznad 18 godina i srednji broj od 20 vlastitih zuba jer bi veći manjak mogao nepovoljno utjecati na rezultate istraživanja.

Kriteriji za isključivanje

Treći molari bili su isključeni iz istraživanja.

Ni jedan ispitanik nije smio biti podvrgnut parodontnoj terapiji "struganja i poliranja korjenova" u posljednjih šest mjeseci.

Statistička analiza

Statistička jedinica istraživanja bio je zub.

Za svakog ispitanika bila je izračunata srednja vrijednost varijabli poput pomičnosti zuba (M), gubitka epitelnog pripoja (LAS-a) i zahvaćenosti furkacije (FINV-e).

Primijenjen je bio i Hi-kvadrat test kako bi se ispitala hipoteza da nema razlike između muških i ženskih ispitanika u prosječnom ukupnom broju ekstrahiranih zuba, prosječnom broju zuba izvađenih zbog parodontnih i neparodontnih razloga te broju ekstrahiranih zuba zbog parodontnih razloga. Podaci su se analizirali u računalskom programskom paketu SPSS 16,0 (SPSS Inc., Chicago, IL, SAD). Vrijednost p bila je postavljena na manje od pet posto ($p < 0,05$) i smatrala se statistički značajnom.

Rezultati

Ukupno je bilo ekstrahirano 1418 zuba od 600 ispitanika. Usporedba uzoraka prema dobi predstavljena je na Slici 1.

Slika 2. prikazuje postotak zuba ekstrahiranih zbog parodontnih i neparodontnih razloga, bez obzira na dob i spol.

Na Slici 3. prikazan je prosječan broj ekstrahiranih zuba zbog parodontnih i neparodontnih razloga, bez obzira na dob bilo žena bilo muškaraca.

Prosječan broj ukupno ekstrahiranih zuba bio je 2,36 - od toga 2,60 kod muškaraca i 2,16 kod žena, sa statistički

den by a restoration or loss due to caries or wear lesions, the location of such junction was estimated on the basis of the adjacent teeth. Periodontal destruction was considered severe when 5.0 mm or more of clinical attachment loss has occurred.

ii. the clinical grade of mobility; each tooth is held firmly between the handles of two metallic instruments and an effort is made to move it in all directions. Only grade III mobility (severe mobility faciolingually and / or mesiodistally, combined with vertical displacement) was recorded.

iii. the clinical grade of furcation involvement according to Glickman's classification (grades I-IV); Only grade IV furcation involvement, in which the periodontal probe passes readily from one aspect of the tooth to another.

Other reasons for tooth extraction were the following: dental caries and its sequel (fracture of teeth weakened by caries or endodontics), periodontal reasons and dental caries, root trauma, vertical fracture of crown/root, orthodontic reasons, failed dental treatments.

Inclusion criteria

The selection criteria comprised age above 18 years and a mean number of 20 natural teeth, since large numbers of missing teeth might interfere with the results of the present study.

Exclusion criteria

Third molars were excluded from the study.

None of the participants had received scaling and root planning or periodontal treatment during the previous six months.

Statistical analysis

The statistical unit of the present study was the tooth.

For each patient average values of variables such as tooth mobility (M), loss of attachment (LAS) and furcation involvement (FINV) were calculated.

As appropriate chi-square test was employed to test the hypothesis of no differences between males and females regarding the average number of extracted teeth overall, the average number of extracted teeth due to periodontal and non-periodontal reasons and the number of extracted teeth due to periodontal reasons. The data analysis was performed using the statistical package of SPSS ver.16.0 program package (SPSS Inc., Chicago, IL). A p value less than 5% ($p < 0.05$) was considered to be statistically significant.

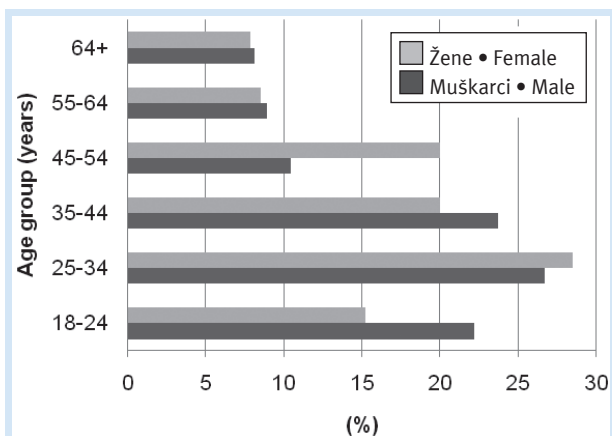
Results

A total of 1418 permanent teeth was extracted from the 600 patients surveyed.

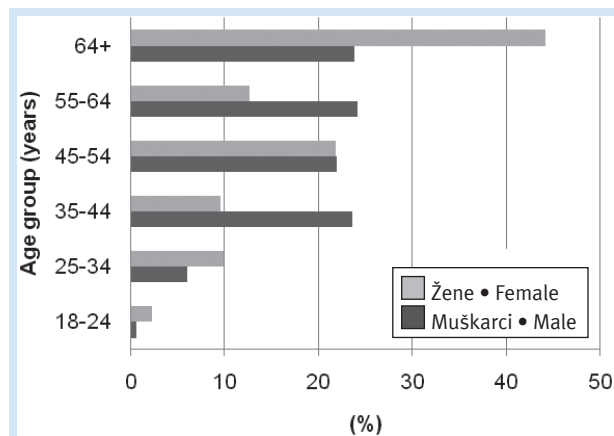
The composition of the sample according to age groups in males and females is presented in Figure 1.

Figure 2 shows the percentage (%) of teeth, which were extracted due to periodontal and non-periodontal reasons in each age group by gender.

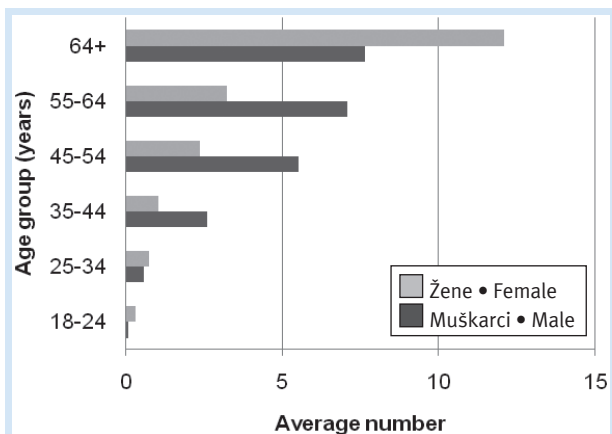
Figure 3 shows the average number of teeth extracted due to periodontal and non-periodontal reasons in each age group in males and females.



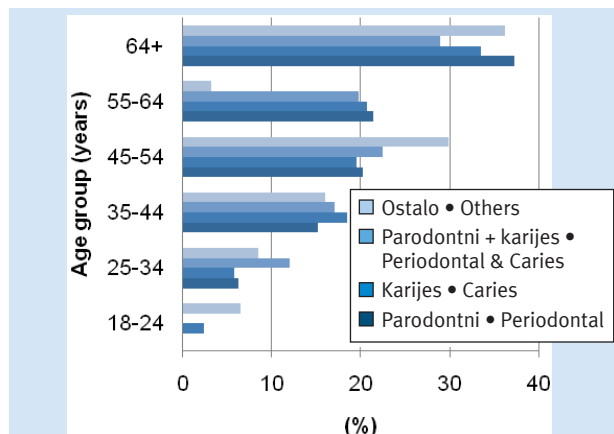
Slika 1. Sastav uzorka prema dobi muškaraca i žena
Figure 1 The composition of the sample according to age groups in males and females



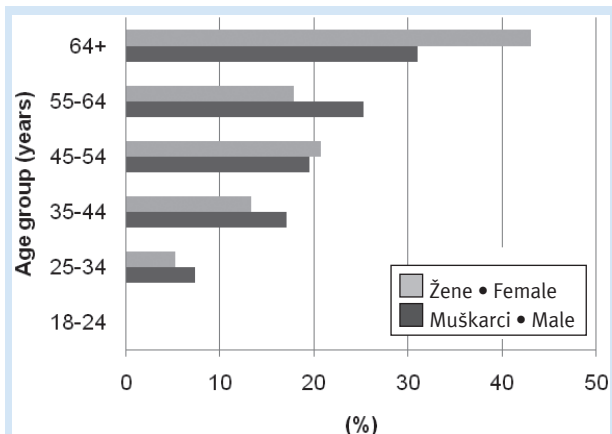
Slika 2. Distribucija (%) ekstrahiranih zuba iz parodontnih i neparodontnih razloga kod žena i muškarca, bez obzira na dob
Figure 2 Distribution (%) of teeth extracted due to periodontal and non-periodontal reasons in each age group in males and females



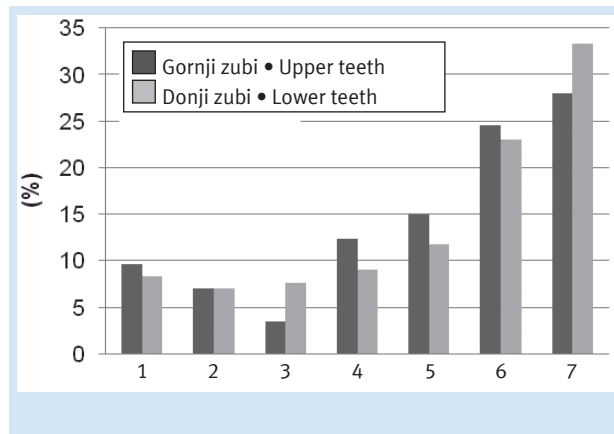
Slika 3. Distribucija ekstrahiranih zuba (srednja vrijednost) zbog parodontnih i neparodontnih razloga kod žena i muškaraca, bez obzira na dob
Figure 3 Distribution of teeth extracted (average number) due to periodontal and non-periodontal reasons in each age group in males and females



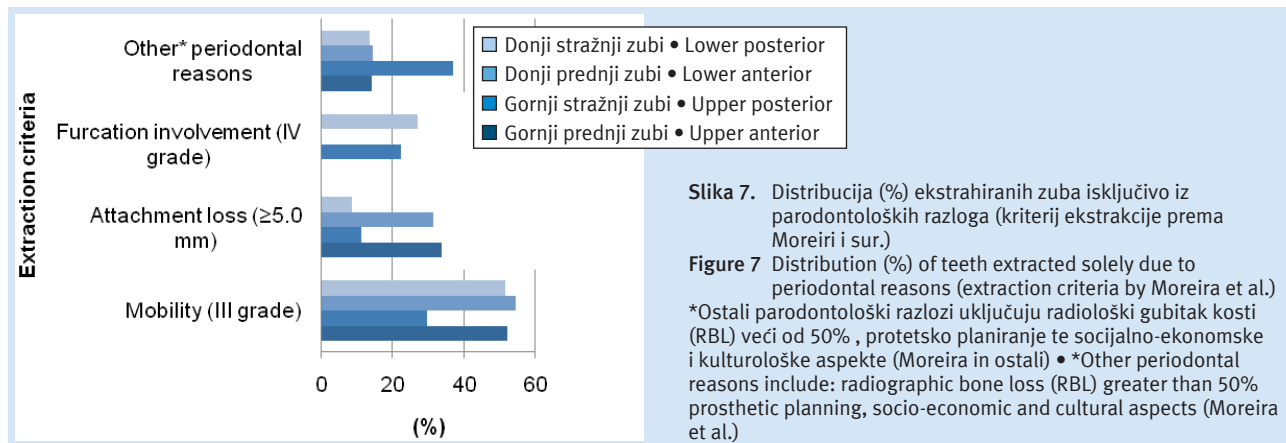
Slika 4. Indikacije (%) za ekstrakciju zuba prema dobi pacijenata
Figure 4 Indications (%) for tooth extractions according to the age group of patients
*Ostali razlozi: zubni karijes i parodontni razlozi, trauma zuba, vertikalna fraktura krune/korijena, ortodontski razlozi te neuspjeli endodontski zahvati • *Other reasons: dental caries and periodontal reasons, root trauma, vertical fracture of crown / root, orthodontic reasons, failed dental treatments



Slika 5. Distribucija (%) ekstrahiranih zuba iz parodontnih razloga kod muškaraca i žena, bez obzira na dob
Figure 5 Distribution (%) of teeth extracted due to periodontal reasons in each age group in males and females



Slika 6. Distribucija (%) ekstrahiranih zuba iz parodontnih razloga prema vrsti zuba te maksili i mandibuli
Figure 6 Distribution (%) of extractions due to periodontal reasons by tooth type in maxilla and mandible



Slika 7. Distribucija (%) ekstrahiranih zuba isključivo iz parodontoloških razloga (kriterij ekstrakcije prema Moreiri i sur.)

Figure 7 Distribution (%) of teeth extracted solely due to periodontal reasons (extraction criteria by Moreira et al.)

*Ostali parodontološki razlozi uključuju radiološki gubitak kosti (RBL) veći od 50%, protetsko planiranje te socijalno-ekonomske i kulturološke aspekte (Moreira in ostali) • Other periodontal reasons include: radiographic bone loss (RBL) greater than 50% prosthetic planning, socio-economic and cultural aspects (Moreira et al.)

značajnom razlikom ($p < 0,01$) iako je prosječan broj ekstrahiranih zuba zbog parodontnih bolesti ukupno bio 0,86 - od toga 0,91 kod muškaraca i 0,82 kod žena, pa razlika statistički nije bila velika ($p > 0,1$).

Postotci ekstrahiranih zuba iz parodontnih i neparodontnih razloga prema dobi nalaze se na Slici 4. Postotak ekstrahiranih zuba iz parodontnih razloga bio je 36,4 posto, a karijesa 24,5 posto. Razlika između ekstrahiranih zuba zbog parodontnih bolesti i drugih razloga između muškaraca i žena bila je statistički značajna ($p < 0,01$).

Slika 5. pokazuje raspodjelu ekstrahiranih zuba zbog parodontalnih bolesti za muškarce i žene u svakoj skupini.

Na Slici 6. su ekstrahirani zubi iz parodontnih razloga, ovisno o vrsti ekstrahiranog zuba.

Općenito su prvi i drugi kutnjaci maksile i mandibule bili najčešće vađeni zubi iz parodontnih razloga.

Na Slici 7. predstavljeni su postotci zuba u skupinama ekstrahiranih iz parodontnih razloga prema kriterijima Moreira i njegovih suradnika (20).

Gornji prednji, donji prednji i stražnji zubi često su ekstrahirani zbog pomičnosti III. stupnja.

Uočeno je također da su prednji zubi iz gornje i donje čeljusti najčešće ekstrahirani zbog gubitka pričvstva ($\geq 5,0$ mm).

Razmjerno nizak postotak stražnjih zuba u obje čeljusti ekstrahiran je zbog zahvaćenosti furkacije IV. stupnja.

Rasprava

U ovom istraživanju pacijentima je prosječno manjkalo 2,36 zuba, što je manje negoli u sličnim studijama obavljenu u Grčkoj (29-31) u posljednjem desetljeću. To upozorava na sve bolje socijalno-ekonomske uvjete, na zanimanje grčke populacije za oralno zdravlje te da se prihvaćaju vrijednosti i važnosti preventive.

The average number of extracted teeth was overall 2.36, 2.60 in males and 2.16 in females statistically significant difference ($p < 0.01$), however the average number of extracted teeth due to periodontal disease was overall 0.86, 0.91 in males and 0.82 in females, difference non-statistically significant ($p > 0.1$).

Percentages (%) of teeth extracted due to periodontal and non-periodontal reasons according to age groups are shown in Figure 4. The percentage (%) of teeth extracted due to periodontal reasons and dental caries was overall 36,4% and 24,5%, respectively.

The difference between the extracted teeth due to periodontal disease and to other causes between males and females was statistically significant ($p < 0.01$).

Figure 5 shows the distribution (%) of teeth extracted due to periodontal reasons for males and females in each age group.

Figure 6 shows the extracted teeth (%) due to periodontal reasons by tooth type.

Generally the 1st and 2nd molars of the maxilla and the mandible were the most frequently extracted teeth for periodontal reasons.

In Figure 7 is presented the percentage (%) of the teeth groups extracted due to periodontal reasons according to the criteria determined by Moreira et al.(20).

Upper anterior, lower anterior and posterior teeth were often extracted due to mobility (III grade).

It is also observed that the anterior teeth of the maxilla and mandible were the most frequently extracted teeth due to attachment loss (≥ 5.0 mm).

A relatively low percentage (%) of the posterior teeth of both jaws was extracted due to furcation involvement (IV grade).

Discussion

In the present study the average number of missing teeth was overall 2.36, lower compared to similar studies performed in Greece (29-31) during the last decades. This observation shows the improvement of socio-economic level, the interest of the Greek population regarding its oral health, the acceptance of the value and importance of the role of preventive dentistry.

Ranija istraživanja u mnogim su zemljama identificirala karijes i parodontne bolesti kao najčešće uzroke za ekstrakciju zuba (3, 5-9, 10-18, 28), a postotci su se kretali od osam (18) do 94,4 posto (2).

Zubni karijes je, čini se, glavni razlog za ekstrakcije zuba u mnogim državama jer su zabilježene sljedeće vrijednosti: 70,3 posto (2), 67,5 posto (5), 63,3 posto (9), 59,2 posto (11), 59,0 posto (12), 56,4 posto (13), 52,6 posto (10), 50,0 posto (14), 51,0 posto (3), 47,9 posto (17), 46,9 posto (15), 43,7 posto (7), 43,3 posto (8) i 39,5 posto (32). Samo je u dvama istraživanjima navedeno da su karijes i parodontalne bolesti podjednako važni za ekstrakciju zuba, primjerice u Italiji (33) i Japanu (8).

U malobrojnim su istraživanjima bolesti parodonta glavni razlozi za vađenje zuba - takav je slučaj i s ovim istraživanjem u kojemu je to glavni razlog za ekstrakcije (36,4), te karijes (24,5%).

Istraživanjem azijske populacije (28) ustanovilo se da je 35,8 posto ekstrakcija bilo obavljeno zbog parodontnih bolesti, a 35,4 posto zbog karijesa. Istraživanje u Njemačkoj (27) pokazalo je da je 27,3 posto ekstrakcija bilo zbog parodontnih razloga, a 20,7 posto zbog karijesa. Isti rezultati dobiveni su u Kanadi (4) i Jordanu (22).

Zabilježen je i nizak postotak ostalih uzroka kao što su ozljede nakon nesreća, ortodontski razlozi, impaktirani zubi i neuspjeli endodontski zahvati.

Navedena razlika mogla je nastati zbog heterogenosti ispitivanih uzoraka, progresije zubnog karijesa i parodontne bolesti tijekom posljednjeg desetljeća i različitih metoda skupljanja podataka kako bi se procijenila učestalost nedostajanja trajnih zuba (primjerice, klinički pregledi i ispunjavanje upitnika) te različito prihvaćanje potrebe za održavanjem oralnoga zdravlja i redovitim kontrolama populacijskih uzoraka. U ovom istraživanju sudjelovali su ispitanici koji su tražili pomoć u privatnoj ordinaciji i zato se uzorak ne može smatrati nasumičnim. Prema dobivenim rezultatima, broj ekstrahiranih zuba zbog parodontnih razloga kod muškaraca i žena nije bio statistički značajan, premda je prosječan broj ekstrakcija bio nešto veći kod muškoga negoli kod ženskoga spola. Slični rezultati dobiveni su i u drugim studijama (7, 14, 18, 23, 24).

U ovom istraživanju broj ekstrahiranih zuba zbog parodontnih razloga upozoravao je na lagani porast s obzirom na dob ispitanika. Slično je i u drugim studijama (8, 9, 15, 23, 27, 28), iako je u njima upozoreno na to da su kod pacijenata u dobi do 35 godina i starijih glavni razlozi za ekstrakcije parodontni (7, 8, 11, 14, 15, 16, 24). Takav je rezultat dobiven zbog malog istraživanog uzorka i vjerojatno negativnog stajališta starije populacije prema preventivnim kontrolama.

Prema ovom istraživanju prvi i drugi gornji kutnjaci (52,6%) i donji kutnjaci (56,3) češće su se morali vaditi zbog parodontnih razloga. U drugima su, pak, dobiveni rezultati da su najčešće vadjeni zubi bili molari mandibule (13, 34), molari obiju čeljusti (17) i zubi maksile (15), središnji sjekutići mandibule (15, 24, 28, 35), očnjaci i sjekutići obiju čeljusti (7, 11), prednji zubi maksile (18, 24) i stražnji zubi obiju čeljusti (10, 11). Te se velike razlike mogu pripisati već navedenim čimbenicima.

Previous studies implicated dental caries and periodontal disease to be the most prevalent causes of tooth extraction in several countries (3, 5-9, 10-18, 28), and the percentage ranged from 31.8% (18) to 94.4% (2).

However, dental caries appears to be the main cause of tooth extraction in a large number of countries in which the following percentages were recorded: 70.3% (2), 67.5% (5), 63.3% (9), 59.2% (11), 59% (12), 56.4% (13), 52.6% (10), 50.0% (14), 51% (3), 47.9% (17), 46.9% (15), 43.7% (7), 43.3% (8) and 39.5% (32).

However, only two studies showed that both caries and periodontal disease were almost equally important reasons for tooth extraction, such as in Italy (33) and Japan (8).

Periodontal disease appears to be the main reason of tooth extraction in a small number of previous studies, included the present study in which periodontal disease was the main reason for tooth extraction (36.4%) followed by dental caries (24.5%).

A study in an Asian population (28) found that 35.8% of the extractions were due to periodontal disease and 35.4% due to dental caries, another one in Germany (27) showed that 27.3% of the extractions were due to periodontal reasons and 20.7% due to dental caries. The same results observed in Canada (4) and Jordan (22).

A low percentage of the other causes such as injuries-accidents, orthodontic reasons, impacted teeth, failed dental treatments (e.g. root canal treatments) was recorded.

The above differences could be attributed to the heterogeneous population samples which were examined, the progression of dental caries and periodontal disease during the last decades, the different methods which were used in order to estimate the frequency of permanent teeth missing (e.g. clinical examination, questionnaire), the different importance adopted by the population samples regarding the value of teeth maintenance and the need for a regular dental follow-up. The present study concerned subjects who sought dental treatment in a private practice, therefore the sample could not be considered as random.

According to the results of the present study the average number of extracted teeth due to periodontal disease between males and females was not statistically significant, even though the average number was greater in males than females. Similar results were observed in other studies (7, 14, 18, 23, 24).

In the present study the extracted teeth due to periodontal disease showed a significant increasing percentage with age. This finding was similar to other studies (8, 9, 15, 23, 27, 28), however, other studies have shown that periodontal disease was the main cause of extraction in patients up to and over 35 years of age (7, 8, 11, 14, 15, 16, 24).

That finding could be attributed to the small amount of the present sample and possibly to the negative attitude of the elderly people to seek preventive dental follow-up.

According to the present study the 1st and 2nd molars of the maxilla (52.6%) and the mandible (56.3%) showed a trend to be more frequently extracted for periodontal reasons. Other studies showed that the more frequent teeth were the molars of the mandible (13, 15), the molars of both

U istraživanju Moreire i suradnika (20) pomičnost zuba (M), opseg gubitka pričvrstka (LAT) i radiološki gubitak kosti (RBL) bili su veći od 50 posto kada je bio primijenjen kriterij koji indicira ekstrakciju parodontno kompromitiranog zuba. Drugi kriteriji koji su indicirali ekstrakciju zuba s parodontitisom bili su protetsko planiranje, zahvaćenost furkacije te socijalno-ekonomski i kulturološki aspekti povezani sa željama i mogućnostima ispitanika da se podvrgnu pojedinim terapijskim zahvatima (20).

Istraživanje Warrena i suradnika (25) pokazalo je, korištenjem jednadžbe generalizirane procjene (GEE-a), da su cijena terapije, pomičnost zuba, loša prognoza alternativnih terapijskih postupaka i opsežan karijes važni čimbenici povezani s ekstrakcijom, a da su raniji tretmani zuba i briga za pacijentovo zdravlje bili snažno povezani s mogućnostima ekstrakcije.

Bercy i Blase (26) predložili su sljedeće elemente za odluku da se zub ekstrahira iz parodontnih razloga: funkcionalnu i stratešku važnost zuba, opsežnost lezije, razinu interradikularnog napada, endodontsko-parodontnu leziju, frakture i luksacije, blizinu korijena, uključenost umnjaka i mogući razvoj nakon terapije.

U ovom istraživanju nisu uzeti u obzir predekstrakcijski radiogrami za RBL indeks kao kriterij koji bi upućivao na ekstrakciju parodontno pogođenih zuba. Osim toga većina je ispitanika odbila podvrgnuti se radiološkom pregledu.

U skladu s navedenim ograničenjima u ovom su istraživanju bila primijenjena tri kriterija za ekstrakcije parodontno ugroženih zuba: pomičnost III. stupnja, gubitak ep. pričvrstka ($\geq 5,0$ mm) i zahvaćenost furkacije (IV. stupanj).

To su bili uvjeti da se pomičnost zuba i zahvaćenost furkacije potvrde kao pojedinačni uzroci pomičnosti zuba prema nalazima u drugim istraživanjima (3, 6, 8) za stražnje zube gornje i donje čeljusti.

Pomičnost zuba i recesija u prijašnjim su studijama potvrđeni kao samostalni uzroci morbiditeta za prednje zube obiju čeljusti (1, 3, 5, 8, 11, 15, 16, 34, 35).

Prema rezultatima ovog istraživanja, parodontološke bolesti i zubni karijes i dalje su glavni razlozi ekstrakcija trajnih zuba kod odraslih. Zadaća kliničkih stomatologa dosta je važna kako bi se zadržali trajni zubi, posebice kod starijih ljudi kojima manjkaju iz parodontnih razloga.

Zaključak

Parodontalna bolest i karijes i dalje su glavni razlozi za ekstrakciju zuba, kako kod muškaraca tako i kod žena; učestalost ekstrakcije iz parodontnih razloga povećava se s dobi

jaws (17), the teeth of the maxilla, the central incisors of the mandible (15, 24, 28, 35), the canines and incisors of both jaws (7, 11), the anterior teeth of the maxilla (18, 24) and the posterior teeth of both jaws (10, 11). Those differences could be attributed to the factors mentioned above.

In a study by Moreira et al. (20) tooth mobility (M), severity of attachment loss (LAT) and radiographic bone loss (RBL) greater than 50% in this order, were the most frequently adopted criteria to indicate the extraction of periodontally affected teeth.

Other criteria that have adopted to indicate the extraction of teeth with periodontitis are prosthetic planning, furcation involvement, socio-economic and cultural aspects, that may be related with the wish and possibility of patients to undergo certain types of dental treatments (20).

Another study by Warren et al. (25) showed that by the use of Generalized Estimating Equations (GEE) they identified cost of treatment, presence of tooth mobility, poor prognosis of alternative treatment and presence of gross caries as significant factors associated with extraction while previous treatment of the tooth and concerns with patients' health were significantly associated with alternatives to extraction.

Bercy and Blase (26) suggested the following elements of the decision to extract teeth for periodontal reasons: function and strategic importance of the tooth, extension of the lesion, level of inter-radicular attack, endo-periodontal lesions, fractures and luxations, radicular proximity, implication of wisdom teeth and evolution after treatment.

In the present study pre-extraction radiographs were not taken in order to use the (RBL) index as a criterion which indicates the extraction of periodontally affected teeth. In addition the majority of the participants refused to undergo a radiographic examination.

According to the above mentioned limitations in the present study, three criteria were used in order to determine the extraction of periodontally affected teeth, such as tooth mobility (III grade), attachment loss (≥ 5.0 mm) and furcation involvement (IV grade).

Under those conditions tooth mobility and furcation involvement were confirmed as the sole cause of tooth mortality according to the findings of other studies (3, 6, 8) for the posterior teeth of maxilla and mandible.

However, tooth mobility and attachment loss were confirmed as the sole cause for tooth mortality according to the findings of previous studies (1, 3, 5, 8, 11, 15, 16, 34, 35) for the anterior teeth of both jaws.

According to the results of the present study, periodontal disease and dental caries remain the main causes for permanent tooth extraction in adults. The role of the clinical dentist is quite important in order to maintain the permanent teeth especially of the elderly people who miss their teeth due to periodontal disease.

Conclusions

Periodontal disease and dental caries were the main causes for tooth extraction both for males and females and the frequency of tooth extracted due to periodontal disease was in-

pacijenata. Najčešće ekstrahirani zubi iz parodontnih razloga su prvi i drugi molari u obje čeljusti. Prednji zubi maksile te prednji i stražnji zubi mandibule često su ekstrahirani zubi zbog pomičnosti III. stupnja. Prednji zubi maksile i mandibule najčešće su ekstrahirani zbog gubitka epitelnog pričvrstka ($\geq 5,0$ mm). Stražnji zubi gornje i donje čeljusti ekstrahirani su zbog zahvaćenosti furkacije IV. stupnja.

creased with age. The more frequently extracted teeth due to periodontal disease were the 1st and 2nd molars of both jaws. Anterior teeth of the maxilla, anterior and posterior teeth of the mandible were often extracted teeth due to mobility (III grade). Anterior teeth of the maxilla and mandible were the most frequently extracted teeth due to attachment loss (≥ 5.0 mm). Posterior teeth of the maxilla and the mandible were extracted due to furcation involvement (IV grade).

Abstract

Aim: The aim of this study was to investigate the prevalence of permanent teeth extracted due to periodontal disease and its relation to several aspects such as age, gender and type of extracted teeth due to periodontal and non-periodontal reasons, among patients attending a private practice. **Material and Methods:** Study population consisted of 600 patients, 270 males and 330 females, aged 18 to 74 years from a private practice in Greece. The reasons for extractions of teeth in the sample for a period of two years were obtained including aspects such as age, gender and the type of teeth extracted due to periodontal and non-periodontal reasons. Data were statistically analyzed using chi-square test. **Results:** One thousand four hundred and eighteen permanent teeth were extracted for various reasons during the study period. Majority (36.4%) were extracted because of periodontal reasons, 24.5% for dental caries and 31.1% for other reasons such as dental caries and periodontal disease, root trauma, vertical fracture of root/crown, orthodontic reasons, etc. The difference between the extracted teeth due to periodontal and non-periodontal reasons was statistically significant ($p < 0.01$). Furthermore, the average number of extracted teeth due to periodontal disease showed an increasing percentage with age. Maxillary and mandibular 1st and 2nd molars were the most frequently extracted teeth due to periodontal reasons than the other posterior teeth of both jaws, however, the anterior teeth of both jaws with mobility III grade, the anterior teeth of both jaws with attachment loss (≥ 5.0 mm) and the posterior teeth of both jaws with furcation involvement (IV grade) were the most frequently extracted teeth due to periodontal reasons solely. **Conclusions:** Although the targets of the WHO regarding the reduction of dental caries were accomplished, periodontal disease was still the main cause of tooth extraction and showed an increasing percentage with age.

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