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IZVORNI ZNANSTVENI RAD
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# Profesionalni zdravstveni problemi među stomatolozima u Hrvatskoj

# *Occupational Health Problems among Dentists in Croatia*

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**Sažetak**
**Svrha:** Istražiti zdravstveni status među stomatolozima u Hrvatskoj s obzirom na simptome mišićno-koštanih, kožnih, vidnih, slušnih i neuroloških poremećaja. **Metode:** Među 506 hrvatskih stomatologa provedena je anonimna internetska anketa. **Rezultati:** Ustanovljeno je da je 78,18 % ispitanih stomatologa iskusilo bolove u gornjem dijelu leđa koje povezuju sa svojim poslom, a njih 76,97 % istaknulo je bolove u donjem dijelu leđa. Profesionalno izazvani problemi s kožom utvrđeni su kod 29,29 % stomatologa. Probleme s vidom navelo je njih 46,87 %, a tegobe sa sluhom 19,03 %. O neurološkim problemima izvijestilo je 15,76 % stomatologa. **Zaključak:** Ovo istraživanje prvo je koje objavljuje podatke o zdravstvenom stanju hrvatskih stomatologa i, nažalost, to stanje nije dobro. Mnogobrojni zdravstveni rizici, povećani profesionalni zahtjevi i ograničeni ergonomski uvjeti u radnom okruženju uzrokuju hrvatskim stomatolozima različite i vrlo česte zdravstvene poteškoće.

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**Ključne riječi**
stomatolozi; profesionalne bolesti; mišićno-koštani poremećaji; Hrvatska

## Uvod

Profesionalna bolest može se definirati kao bolest ili zdravstveni poremećaj izazvan radom ili radnim uvjetima (1). Legislativno se u pojedinim državama razlikuju profesionalne bolesti i bolesti povezane s radom. U tom slučaju profesionalna etiologija profesionalnih bolesti mora biti nedvojbeno dokazana i moraju je potvrditi zdravstveni stručnjaci, pa se ta bolest ili tegoba uvrštava u službeni popis profesionalnih bolesti pojedine države. Bolesti vezane uz rad mogu imati višeuzročno podrijetlo, a radni uvjeti jedan su od više ili manje dominantnih čimbenika koji pridonose pojavi i razvoju zdravstvenih poremećaja. Obično je broj službeno priznatih profesionalnih bolesti u pojedinoj državi obrnuto proporcionalan broju i vrsti prava koja imaju osobe s profesionalnim bolestima.

Godine 2013. objavljen je izvještaj Europske komisije o trenutačnoj situaciji s obzirom na profesionalne bolesti među zemljama članicama Unije. U tom su dokumentu profesionalne bolesti definirane kao bolesti koje su specifično ili čvrsto povezane s određenim zanimanjem, te obično samo s jednim prepoznatim uzročnikom; bolesti vezane uz rad defi-

## Introduction

An occupational (professional) disease can be defined as a disease or health disorder that is caused by the work or working conditions (1). Legislation of some countries distinguishes occupational diseases and diseases related to work. In this case, the occupational etiology of the occupational disease must be undoubtedly evidenced and confirmed by medical experts and such diseases or disorders are listed on the official list of occupational diseases of the country. Work related diseases have multifactorial origin and working conditions appear to be among dominant factors contributing to occurrence and development of health disorders. Usually, the number of officially accepted occupational diseases in a country is inversely proportional with the number and rights which individuals affected by occupational diseases have. In 2013, a review of the European Commission of the current situation related to the occupational diseases system in EU Member States was released. In this document, occupational diseases were defined as diseases having a specific or a strong relation to occupation, generally with only one causal agent, and recognized as such. Work-related diseases were defined as diseas-

nirane su kao bolesti s više različitih uzročnika, pri čemu čimbenici u radnom okruženju mogu zajedno s drugim rizičnim čimbenicima pridonijeti razvoju bolesti, a etiologija im je složena. Bolesti koje pogađaju radno stanovništvo definirane su kao bolesti bez uzročno-posljedične veze s radom, ali mogu biti pogoršane profesionalnim zdravstvenim rizicima (2).

U usporedbi s drugim zdravstvenim zanimanjima, stomatologija se smatra jednim od najopasnijih (3 – 5). Zdravstveni rizici i opasnosti u stomatologiji mogu se klasificirati kao biološki, biomehanički, fizikalni, kemijski i psihološki (6, 7). Biološke opasnosti (biohazardi) biološke su tvari koje prijete zdravlju stomatološkog osoblja, a uključuju viruse, bakterije, gljivice i prione (7, 8). Biohazardi uzrokuju različite infekcije u organizmu. Biomehaničke opasnosti u stomatologiji mogu biti nepravilan položaj tijela tijekom rada, pojedinačne ili ponavljajuće kretnje te prenaprezanje tijela s potencijalnom opasnošću da uzrokuje ili pridonese ozljedi ili bolesti koja pogađa mišićno-koštani ili neurološki sustav (9, 10). Fizikalne opasnosti u stomatologiji uključuju zračenje (ionizirajuće i neionizirajuće), buku, umjetnu rasvjetu, polimerizacijsko svijetlo i drugo. (11). Štetni fizikalni čimbenici mogu izazvati poremećaje sluha i vida, ali i druge zdravstvene probleme ako je riječ o zračenju. Kemijskim opasnostima u stomatologiji smatraju se lijekovi, preparati, stomatološki materijali te oprema za osobnu zaštitu kao što su rukavice, dezinficijensi i drugo. (12). Te opasnosti mogu uzrokovati alergije, toksične reakcije, preosjetljivost, kemijske ozljede itd. Psihološke opasnosti uključuju stres, kronični umor i sindrom izgaranja na poslu (4, 13). One mogu biti izvor mnogobrojnih psiholoških tegoba, poput depresije i anksioznosti, ali i izvor nekih somatskih poremećaja, poput krvožilnih bolesti, povišenoga krvnog tlaka, neuroloških poteškoća i dr.

Dugotrajna gospodarska kriza koja je počela sredinom prvog desetljeća 21. stoljeća i česte racionalizacije u javnoj i privatnoj stomatološkoj skrbi u Hrvatskoj, učinile su tijekom posljednjih desetljeća stomatološku profesiju manje profitabilnom i mnogo složenijom s obzirom na profesionalne, poslovne i administrativne zahtjeve. Sve je to dodatno došlo do izražaja 1. srpnja 2013. godine kada je naša zemlja postala 28. članica Europske unije, jer su se dogodile promjene i pojavili su se novi izazovi u svakodnevnom radu stomatologa. Istraživanja usmjerena na zdravstvene probleme među hrvatskim stomatolozima i povećane profesionalne zahtjeve nisu dostupna u literaturi. Ovo istraživanje prvo je koje se bavi sveukupnim zdravstvenim statusom naših stomatologa. Svrha je bila utvrditi zdravstveni status hrvatskih stomatologa s obzirom na simptome mišićno-koštanih, dermatoloških, vidnih, slušnih i neuroloških poremećaja.

## Sudionici i metode

Ukupno 800 hrvatskih stomatologa slučajnim je odabirom pozvano preko e-pošte na sudjelovanje u anonimnoj i dobrovoljnoj internetskoj anketi o profesionalnim zdravstvenim poremećajima. Svi su najmanje jednu godinu radili u praksi.

es with multiple causal agents, where the factors in the work environment may play a role, together with other risk factors in the development of such diseases, which have a complex etiology. The diseases affecting working populations were defined as diseases without a causal relationship with work but which may be aggravated by occupational hazards to health (2).

Compared to other health related professions, dental profession is considered to be among the most hazardous professions (3-5). Health risks and hazards in dentistry can be classified as biological, biomechanical, physical, chemical and psychological (6, 7). Biological hazards (biohazards) are biological substances that pose a threat to the health of dental personnel and include viruses, bacteria, fungi and prions (7, 8). Biohazards can cause body infections of different kind. Biomechanical hazards in dentistry include awkward body working posture, single or repetitive movements and forces imposing stress on the body with a potential to cause or contribute to injury or disease affecting the musculoskeletal or neurological systems (9, 10). Physical hazards in dental medicine include radiation (ionizing and non-ionizing), noise, artificial light including polymerization light etc. (11). Physical hazards can cause hearing and sight disorders and health problems related to radiation. Chemical hazards in dentistry are recognized as drugs and remedies, dental materials, dental personal equipment, gloves, disinfectant etc. (12). Chemical hazards can cause allergies, toxic reactions, hypersensitivity, chemical injuries etc. Psychological hazards include stress, chronic tiredness and burn-out syndrome (4, 13). Exposure to psychosocial hazards in the workplace not only produces psychological damage to individual employees such as depression and anxiety, but also causes somatic disorders such as cardiovascular diseases, hypertension, neurological disorders etc.

A long-lasting economic crisis which commenced in the middle of the first decade of 21st century and frequent rationalization initiatives in public and private dental care in Croatia during the last two decades have made dental profession on average less lucrative and more demanding regarding professional, business and administrative requirements. The effects of this economic downturn were additionally highlighted on 1 July 2013, when Croatia became the 28th EU member introducing new changes and challenges in the everyday work of Croatian dentists. The results of investigations that address health related problems among Croatian dentists and increased requirements are not available in the relevant literature. This study is the first to report on the overall health status of Croatian dentists. The aim of this study was to assess the health status among dentists in Croatia regarding the symptoms of musculoskeletal, dermatological, sight, hearing and neurological disorders.

## Participants and methods

A total of 800 randomly selected dental practitioners from all parts of Croatia were invited by e-mail to participate in an anonymous and voluntary online survey related to the occupational health disorders. All subjects had at least one year experience in clinical practice.

Na temelju dostupne i relevantne literature, a u suradnji s liječnicima različitih specijalnosti (ortopedi, dermatolozi, otorinolaringolozi, oftalmolozi i neurolozi), sastavljen je upitnik za procjenu općeg zdravlja stomatologa (14 – 17). Sastojao od tri dijela – prvi je uključivao demografske podatke o spolu, dobi i duljini radnog staža, drugi se bavio osviještenošću stomatologa o profesionalnim zdravstvenim poteškoćama, a u trećem dijelu obrađeni su simptomi mišićno-koštanih, dermatoloških, vidnih, slušnih i neuroloških tegoba. Istraživanje je odobrilo Etičko povjerenstvo Stomatološkog fakulteta Sveučilišta u Zagrebu.

Prikupljeni podatci statistički su obrađeni računalnim programom SPSS Statistics 17.0 for Windows (SPSS Inc., Chicago, IL, SAD). Hi-kvadrat test korišten je za testiranje statističke značajnosti. Vrijednosti $p < 0,05$ smatrane su statistički značajnima.

## Rezultati

U istraživanju je sudjelovalo ukupno 529 stomatologa (stopa odgovora je bila 66,10 %), a na kraju, nakon što su odbačeni nedovršeni upitnici, njih 506 cjelovito je odgovorilo na sva pitanja u anonimnom internetskom upitniku (310 žena – 61,3 % i 196 muškaraca – 38,7%). Distribucija ispitanika s obzirom na dob i duljinu radnog staža prikazana je u tablicama 1. i 2.

Istaknimo da 92,9 % ispitanika smatra stomatologiju profesijom štetnom za zdravlje, a 97,6 % slaže se da bavljenje stomatologijom može izazvati mišićno-koštane poremećaje. Samo 46,8 % ispitanika smatra da bavljenje stomatologijom može rezultirati i mentalnim poremećajima. Prema mišlje-

Based on the available and relevant literature in a close cooperation with physicians of different specialties (orthopedist, dermatologist, otolaryngologist, ophthalmologist and neurologist) a questionnaire for the assessment of a dentist's overall health status was developed (14-17). The questionnaire was divided into 3 sections. The first section included demographic questions regarding gender, age and work duration. The section two dealt with the awareness of dental practitioners regarding the occupational health disorders. The third section dealt with symptoms of musculoskeletal, dermatological, sight, hearing and neurological disorders. Ethics approval for the study was obtained from the Ethics Committee at University of Zagreb School of Dental Medicine.

The obtained data were subjected to descriptive statistics using "SPSS Statistics 17.0 for Windows"(SPSS Inc., Chicago, IL). Chi square test was employed to check statistical significance. $P < 0.05$ was considered significant at 95% confidence interval.

## Results

A total of 529 dental practitioners participated in the survey (response rate was 66.1 %), and finally, after elimination of incomplete questionnaires, 506 dentists completed an anonymous online questionnaire (310 females – 61.3 % and 196 males - 38.7 %). The age distribution of the participants and distribution of the participants regarding duration of work with patients is shown in Tables 1 and 2.

92.9 % of participants considered dentistry a profession that is harmful for their health and 97.6 % agreed that practicing dentistry can cause musculoskeletal disorders. Only 46.8 % of participants thought that practicing dentistry can cause mental disorders. 63.8 % of participants stated that

**Tablica 1.** Distribucija ispitanika po dobi
**Table 1** Age distribution of participants

| Dobne skupine (godine) • Age groups (years) | Žene • Females | | Muškarci • Males | | Žene + Muškarci • Females + Males | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| 21-30 | 34 | 11.0 | 24 | 12.2 | 58 | 11.5 |
| 31-40 | 114 | 36.8 | 63 | 32.1 | 177 | 35.0 |
| 41-50 | 72 | 23.2 | 57 | 29.1 | 129 | 25.5 |
| 51-60 | 76 | 24.5 | 44 | 22.4 | 120 | 23.7 |
| 61+ | 14 | 4.5 | 8 | 4.1 | 22 | 4.3 |
| **Ukupno • Total** | 310 | 61.3 | 196 | 38.7 | 506 | 100.0 |

N – broj sudionika • Number of participants

**Tablica 2.** Distribucija ispitanika s obzirom na dužinu rada s pacijentima
**Table 2** Distribution of participants regarding the duration of work with patients

| Radni vijek (godine) • Work duration (years) | Žene • Females | | Muškarci • Males | | Žene + Muškarci • Females + Males | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| 1 - 10 | 100 | 32.3 | 61 | 31.1 | 161 | 31.8 |
| 11 - 20 | 101 | 32.6 | 71 | 36.2 | 172 | 34.0 |
| 21 - 30 | 71 | 22.9 | 42 | 21.4 | 113 | 22.3 |
| 31+ | 38 | 12.3 | 22 | 11.2 | 60 | 11.9 |
| **Ukupno • Total** | 310 | 61.3 | 196 | 38.7 | 506 | 100.0 |

N – broj sudionika • Number of participants

**Tablica 3.** Sumirani podaci o osviještenosti stomatologa o profesionalnim zdravstvenim poremećajima
**Table 3** Summarized data on dental practitioners' awareness of occupational health disorders

| | Žene • Females | | | | | | Muškarci • Males | | | | | | Žene + Muškarci • Females + Males | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Da • Yes | % | Ne • No | % | Ne zna • Do not know | % | Da • Yes | % | Ne • No | % | Ne zna • Do not know | % | Da • Yes | % | Ne • No | % | Ne zna • Do not know | % |
| Bavljenje stomatologijom može štetno utjecati na moje zdravlje • Practicing dentistry can harm my health | 288 | 92.9 | 16 | 5.2 | 6 | 1.9 | 182 | 92.9 | 10 | 5.1 | 4 | 2.0 | 470 | 92.9 | 26 | 5.1 | 10 | 2.0 |
| Trebao bih se više brinuti o svome zdravlju • I should take more care of my health | 279 | 90.0 | 23 | 7.4 | 8 | 2.6 | 176 | 89.8 | 16 | 8.2 | 4 | 2.0 | 455 | 89.9 | 39 | 7.7 | 12 | 2.4 |
| Mislim da bavljenje stomatologijom može izazvati mišićno-koštane poremećaje • In my opinion, practicing dentistry can cause musculoskeletal disorders | 304 | 98.1 | 3 | 1.0 | 3 | 1.0 | 190 | 96.9 | 5 | 2.6 | 1 | 0.5 | 494 | 97.6 | 8 | 1.6 | 4 | 0.8 |
| Mislim da bavljenje stomatologijom može izazvati dermatološke poremećaje • In my opinion, practicing dentistry can cause dermatological disorders | 225 | 72.6 | 58 | 18.7 | 27 | 8.7 | 152 | 77.6 | 30 | 15.3 | 14 | 7.1 | 377 | 74.5 | 88 | 17.4 | 41 | 8.1 |
| Mislim da bavljenje stomatologijom može izazvati poremećaje vida • In my opinion, practicing dentistry can cause sight disorders | 250 | 80.6 | 41 | 13.2 | 19 | 6.1 | 166 | 84.7 | 21 | 10.7 | 9 | 4.6 | 416 | 82.2 | 62 | 12.3 | 28 | 5.5 |
| Mislim da bavljenje stomatologijom može izazvati poremećaje sluha • In my opinion, practicing dentistry can cause hearing disorders | 195 | 62.9 | 82 | 26.5 | 33 | 10.6 | 117 | 59.7 | 62 | 31.6 | 17 | 8.7 | 312 | 61.7 | 144 | 28.5 | 50 | 9.9 |
| Mislim da bavljanje stomatologijom može izazvati neurološke poremećaje • In my opinion, practicing dentistry can cause neurological disorders | 163 | 52.6 | 78 | 25.2 | 69 | 22.3 | 110 | 56.1 | 50 | 25.5 | 36 | 18.4 | 273 | 54.0 | 128 | 25.3 | 105 | 20.8 |
| Mislim da bavljenje stomatologijom može izazvati mentalne poremećaje • In my opinion practicing dentistry can cause mental disorders | 133 | 42.9 | 123 | 39.7 | 54 | 17.4 | 104 | 53.1 | 60 | 30.6 | 32 | 16.3 | 237 | 46.8 | 183 | 36.2 | 86 | 17.0 |
| Profesionalne bolesti u stomatologiji mogu se spriječiti • Professional diseases in dentistry can be prevented | 187 | 60.3 | 58 | 18.7 | 65 | 21.0 | 136 | 69.4 | 34 | 17.3 | 26 | 13.3 | 323 | 63.8 | 92 | 18.2 | 91 | 18.0 |

nju 63,8 % sudionika, profesionalne bolesti mogu se spriječiti. Nije bilo statistički značajne razlike u odgovorima između muškaraca i žena. Sažeti podatci o osviještenosti stomatologa s obzirom na profesionalne bolesti nalaze se u tablici 3.

Na popisu rizičnih čimbenika koji potiču razvoj profesionalnih bolesti, prema mišljenju ispitanika, na prvom je mjestu nepravilan položaj tijela pri radu (33,9 %), na drugom mjestu je stres (24,6 %), a zatim slijede infekcije (18,1 %), buka (7,7 %) i alergija na stomatološke materijale (4,8 %). Kao učinkovitu zaštitu od profesionalnih bolesti sudionici ističu važnost redovitog bavljenja sportom (30,1 %), cijepljenje (20,5 %), korištenje zaštitnih maski i rukavica (18,5 %), uravnoteženu i zdravu prehranu (17,7 %), učestalo mijenjanje položaja tijela pri radu (16,7 %) i ergonomski oblikovane stomatološke instrumente i opremu (15,5 %).

Najčešći zdravstveni problem među stomatolozima bile su mišićno-koštane tegobe s bolovima u gornjem i donjem dijelu leđa, ramenima, rukama, prstima, nogama i stopalima,

professional diseases in dentistry could be prevented. There was no statistically significant difference in answers between males and females. The summarized data about awareness of dental practitioners regarding the occupational health disorders are shown in Table 3.

In participants' opinion, an incorrect posture during work ranked first on the list of the risk factors for development of occupational diseases (33.9 %), stress ranked second (24.6 %), and followed by infections (18.1 %), noise (7.7 %) and allergy to dental materials (4.8 %). For the efficient protection of occupational diseases, the participants highlighted the importance of practicing sports regularly (30.1 %), vaccination (20.5 %), usage of masks and gloves (18.5 %), balanced and healthy diet (17.7 %), frequent changes of working position (16.7 %) and ergonomically shaped dental instruments and equipment (15.5 %).

The most common health problem in dentists were musculoskeletal disorders with pain in upper back, lower back,

te dermatološki problemi. Najčešći razlog za traženje pomoći liječnika bili su bol u gornjem dijelu leđa (36,8 %) kad je riječ o ženama, te bol u donjem dijelu leđa (36,1 %) kod muškaraca. Na drugom mjestu su poteškoće s vidom (34,7 % žene i 32,0 % muškarci).

Broj žena koje su iskusile profesionalno izazvanu bol u gornjem dijelu leđa veći je od broja muškaraca. Postoji statistički značajna razlika između broja žena i muškaraca koje su patile od bolova u gornjem dijelu leđa i tražile pomoć liječnika (36,8 % žena i 21,6 % muškaraca – $\chi 2 = 14,92$; df = 2; P = 0,001).

Broj žena koje su iskusile profesionalno izazvanu bol u ramenima, rukama i prstima veći je od broja muškaraca. Postoji statistički značajno više žena koje su iskusile tu bol i tražile pomoć liječnika (36,3 % žena i 21,1 % muškaraca – $\chi 2 = 23,57$; df = 2; P < 0,001).

Broj žena koje su patile od profesionalno izazvane boli u nogama i stopalima veći je od broja muškaraca. Statistički je značajno više žena iskusilo bol u nogama i stopalima od broja muškaraca (23,3 % žena i 12,4 % muškaraca – $\chi 2 = 15,95$; df = 2; P < 0,001).

Postoji također visoka korelacija između dobi i učestalosti pojedinih zdravstvenih poteškoća. Muškarci u dobi od 51 do 60 godina imaju statistički značajno češće bol u donjem dijelu leđa zbog kojeg traže pomoć liječnika ($\chi 2 = 18,58$; df = 8; P < 0,017) u usporedbi s mlađim dobnim skupinama (21 – 30 i 31 – 40). Žene u dobi od 41 do 50 godina i od 51 do 60 godina imaju statistički značajno češće bol u donjem dijelu leđa zbog koje traže pomoć liječnika negoli one u dobnim skupinama od 21 do 30 i od 31 do 40 godina ($\chi 2 = 36,07$; df = 8; P < 0,001). Slični podatci dobiveni su kada se korelirala duljina radnog staža s bolom u donjem dijelu leđa.

Neke profesionalno izazvane kožne probleme imalo je 30,0 % ispitanih žena i 27,9 % muškaraca. Žene su zbog toga češće tražile pomoć liječnika (10,3 %) negoli muškarci (5,2 %). Muškarci od jedne do 10 godina radnog staža pomoć liječnika zbog kožnih problema tražili su statistički značajno češće negoli njihovi kolege s više staža ($\chi 2 = 14,89$; df,=,6; P,=,0,021).

Poremećaji vida zabilježeni su kod 45,7 % žena, te 48,5 % kod muškaraca. Broj žena koje su zbog toga tražile pomoć liječnika (34,7 %) nešto je veći od broja muškaraca (32,0 %). Ozljede oka najčešći su razlog za traženje liječničke pomoći. Broj žena u dobi od 51 do 60 godina i iznad 60 godina koje su tražile pomoć liječnika zbog problema s vidom statistički je značajno veći negoli u drugim dobnim skupinama ($\chi 2 = 76,45$; df,= 8; P < 0,001).

Broj žena s profesionalnim slušnim tegobama (20,4 %) veći je od broja muškaraca (16,5 %), s tim da su žene češće tražile pomoć liječnika negoli muškarci (žene 6,0 %, muškarci 4,1 %). Broj stomatologa s profesionalno izazvanim slušnim problemima povećava se s dobi, a kad je riječ o ženama u dobnoj skupini od 51 do 60 godina. Ta je razlika i statistički značajna u usporedbi s drugim dobnim skupinama ($\chi 2 = 34,73$; df = 8; P < 0,001).

Neurološki poremećaji zabilježeni su kod 17,0 posto žena i 14,0 posto muškaraca. U slučaju neuroloških poremećaja 9,0 % žena i 5,2 % muškaraca tražilo je liječničku pomoć.

shoulders, hands, fingers, legs and feet followed by dermatological disorders. The most common reasons for asking a doctor for help were pain in upper back (36.8 %) in females and pain in lower back (36.1 %) in males. Sight disorders ranked second (34.7 % in females and 32.0 % in males).

The number of females who experienced professionally related pain in upper back is higher than the number of males. There was a statistically significant difference between male and female scores. Females scored significantly higher values regarding professionally related pain in upper back and asking a doctor for help than males (36.8 % females and 21.6 % males, $\chi 2=14.92$ df=2 P=0.001).

The number of females who experienced professionally related pain in shoulders, hand or fingers was higher than the number of males. There was a statistically significant difference between the females who experienced professionally related pain in shoulders, hand or fingers and asking a doctor for help and the males. Females obtained significantly higher scores (36.3 % females and 21.1 % males, $\chi 2=23.57$ df=2 P<0.001).

The number of females who experienced professionally related pain in legs and feet was higher than the number of males. There was a statistically significant difference between the number of females who experienced professionally related pain in legs and feet and asking a doctor for help and the number of males (23.3 % females and 12.4 % males, $\chi 2=15.95$ df=2 P<0.001).

There was also a high correlation between the age and frequency of some health disorders. The males from age group 51-60 obtained statistically more significant scores regarding lower back pain and asking a doctor for help ($\chi 2=18.58$ df=8 P<0.017) compared to younger age groups (21-30 and 31-40). In females, the age groups 41-50 and 51-60 obtained statistically more significant scores regarding lower back pain and asking for help than age groups 21-30 and 31-40 ($\chi 2=36.07$ df=8 P<0.001). Similar findings were found regarding the duration of work with a patient, which was correlated with the frequency of lower back pain.

30.0 % of examined females and 27.9 % of males experienced professionally related skin disorders. The females asked a doctor for help (10.3 %) more often than the males (5.2 %). There was a statistically significant difference between males with 1-10 year work experience and their colleagues with more than one year of work experience. Males with 1-10 year work experience asked a doctor for help more often than their colleagues with more than one year of work experience ($\chi 2=14.89$ df=6 P=0.021).

Sight disorders were recorded in 45.7 % of female dentists and in 48.5 % of male dentists. The number of female dentists who asked a doctor for help (34.7 %) was slightly higher than the number of male dentists (32.0 %). Eye injuries were the most common reported reason for asking a doctor for help. The number of females in age groups 51-60 and 60+ who asked a doctor for help in case of sight disorders was significantly higher than the number of females belonging to other age groups ($\chi 2=76.45$ df=8 P<0.001).

The number of females (20.4%) who experienced professionally related hearing disorders was higher than the number of males (16.5 %), and females asked more often a doctor

Učestalost neuroloških problema također raste s dobi i godinama radnog staža. Žene u dobi od 41 do 50 godina imaju statistički značajno više neurološki poteškoća negoli one u mlađim dobnim skupinama ($\chi2$=24,88 df=6 P<0,001).

Objedinjene podatke o zdravstvenom stanju stomatologa vidi u tablici 4.

for help than males (females 6.0 %, males 4.1 %). The number of dentists with professionally related hearing disorders increases with age. Similar results were obtained for females in the age group 51-60. The difference between age groups is statistically significant ($\chi2$=34.73 df=8 P<0.001).

Neurological disorders were found in 17.0 % of females and in 14.0 % males. In case of neurological disorders, 9.0 % of females and 5.2 % of males asked a doctor for help. The frequency of neurological disorders also increases with age and years of work experience. The females in the age group 41-50 (and above) obtained higher scores compared to younger age groups. There was a statistically significant difference between the mentioned groups regarding neurological disorders ($\chi2$=24.88 df=6 P<0.001).

Summarized data on health status of dental practitioners are shown in Table 4.

**Tablica 4.** Sumirani podaci o zdravstvenom statusu stomatologa
**Table 4** Summarized data on health status of dental practitioners

| Da li ste tijekom svoje stomatološke karijere iskusili profesionalno izazvane … • Have you experienced any profession related disorders during your dental carrier | Žene • Females | | | | | | Muškarci • Males | | | | | | Žene + Muškarci • Females + Males | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Da-D • Yes-D | % | Da-ND • Yes-ND | % | Ne • No | % | Da-D • Yes-D | % | Da-ND • Yes-ND | % | Ne • No | % | Da-D • Yes-D | % | Da-ND • Yes-ND | % | Ne • No | % |
| bol u gornjem dijelu leđa • pain in upper back | 110 | 36.8 | 136 | 45.5 | 53 | 17.7 | 42 | 21.6 | 98 | 50.5 | 54 | 27.8 | 152 | 30.8 | 234 | 47.5 | 107 | 21.7 |
| bol u donjem dijelu leđa • pain in lower back | 100 | 33.4 | 126 | 42.1 | 73 | 24.4 | 70 | 36.1 | 83 | 42.8 | 41 | 21.1 | 170 | 34.5 | 209 | 42.4 | 114 | 23.1 |
| bol u ramenima, rukama, prstima • pain in shoulders, hands or fingers | 109 | 36.3 | 137 | 45.7 | 54 | 18.0 | 41 | 21.1 | 85 | 43.8 | 68 | 35.1 | 150 | 30.4 | 222 | 44.9 | 122 | 24.7 |
| bol u nogama i stopalima • pain in legs and feet | 70 | 23.3 | 117 | 39.0 | 113 | 37.7 | 24 | 12.4 | 65 | 33.5 | 105 | 54.1 | 94 | 19.0 | 182 | 36.8 | 218 | 44.1 |
| dermatološke poremećaje • dermatological disorders | 31 | 10.3 | 59 | 19.7 | 210 | 70.0 | 10 | 5.2 | 44 | 22.7 | 140 | 72.2 | 41 | 8.3 | 103 | 20.9 | 350 | 70.9 |
| vidne poremećaje • sight disorders | 104 | 34.7 | 33 | 11.0 | 163 | 54.3 | 62 | 32.0 | 32 | 16.5 | 100 | 51.5 | 166 | 33.6 | 65 | 13.2 | 263 | 53.2 |
| slušne poremećaje • hearing disorders | 18 | 6.0 | 43 | 14.4 | 238 | 79.6 | 8 | 4.1 | 24 | 12.4 | 162 | 83.5 | 26 | 5.3 | 67 | 13.6 | 400 | 81.1 |
| neurološke poremećaje • neurological disorders | 27 | 9.0 | 24 | 8.0 | 249 | 83.0 | 10 | 5.2 | 17 | 8.8 | 167 | 86.1 | 37 | 7.5 | 41 | 8.3 | 416 | 84.2 |

Da-D znači „Da, tražio sam pomoć liječika". Da-ND znači „Da, ali nisam tražio pomoć liječnika" • Yes-D means "Yes and I asked a doctor for help". Yes-ND means "Yes, but I have not asked a doctor for help".

## Rasprava

Podatci dobiveni ovim istraživanjem podupiru već postojeće dokaze da je stomatološko osoblje u velikoj opasnosti od razvoja profesionalnih bolesti i bolesti vezanih uz rad. Pripreme za ulazak Hrvatske u Europsku uniju te dugotrajna ekonomska kriza u zemlji rezultirale su mnogobrojnim promjenama i racionalizacijama u pružanju stomatološke skrbi. Istraživanje Jonkera i suradnika pokazalo je da racionalizacija često završava povećanim rizikom od razvoja mišićno-koštanih tegoba povezanih s radom (18). Ovo istraživanje prvo je koje objavljuje podatke o općem zdravstvenom statusu hrvatskih stomatologa i, nažalost, ti podatci nisu dobri. Zbog nedostatka sličnih istraživanja u Hrvatskoj, tumačenje dobivenih podataka kroz povijesnu perspektivu i u svjetlu ulaska naše zemlje u Europsku uniju nije moguće.

## Discussion

The findings of this study are consistent with those from other studies since a claim that dental health professionals are at high risk of occupational and work related diseases is supported by evidence. The preparation process for joining the European Union and the long-lasting economic crisis in Croatia led to different changes and rationalization initiatives in dental care. The research of Jonker et al. has shown that rationalization often results in increased risk of developing work-related musculoskeletal disorders (18). This study is the first to report on the overall health status of Croatian dentists and, unfortunately, it showed undesirable results. A lack of previous similar studies in Croatia makes the interpretation of obtained data in a historical perspective and in the light of the Croatian accession to the European Union impossible.

Ovo istraživanje obuhvatilo je 506 stomatologa i oni čine gotovo 20 % ukupnog broja aktivnih stomatologa u Hrvatskoj. Usporedbom s podatcima iz dostupne literature, ovo je jedno od najopsežnijih nacionalnih istraživanja o profesionalnim bolestima među stomatolozima i s najvećim brojem sudionika ako se uzme u obzir ukupan broj aktivnih stomatologa u državi. Istraživanje slično ovome, s obzirom na broj sudionika i sličnu stopu odgovora, proveli su Šustova i njezini suradnici u Republici Češkoj, no bez podataka o ukupnom broju aktivnih stomatologa (19). Njihovo istraživanje obuhvatilo je 581 stomatologa, a stopa odgovora bila je 72,6 %. Što je veći broj sudionika, to su dobiveni podatci pouzdaniji.

Mišićno-koštani problemi jedna su od najčešće spominjanih zdravstvenih tegoba među stomatolozima diljem svijeta. Procjenjuje se da svake godine njih oko 70 % ima različite mišićno-koštane probleme. Najčešće lokalizacije boli su u donjem dijelu leđa, te u ramenima i vratu (20 – 22). Šustova i suradnici ispitivali su učestalost mišićno-koštanih tegoba među češkim stomatolozima. Podatke su prikupili anketiranjem 581 stomatologa. Njih 96,9 % izjavilo je da ima poteškoće s mišićno-koštanim sustavom. Utvrđena je statistički značajna korelacija između pojavnosti mišićno-koštanih poteškoća srednjega i jakog intenziteta, te spola, dobi, vođenja privatne ordinacije, ozljeda mišićno-koštanog sustava u prošlosti, te doživljaja posla kao psihološki zahtjevnoga (19). Kierklo i suradnici ispitivali su zdravstveni status među poljskim stomatolozima s obzirom na mišićno-koštanu bol. Ispitali su njih 220 i ustanovili da je 92 % iskusilo neki mišićno-koštani poremećaj, posebno u vratu (47 %) i donjem dijelu leđa (35 %) (14). Yi i suradnici angažirali su 271 završenog studenta stomatologije kako bi ustanovili koliko se rano pojavljuju mišićno-koštani poremećaji kod stomatološkog osoblja. Ovisno o stomatološkoj specijalnosti, mišićno-koštane tegobe u području vrata pojavljuju se kod 47,5 do 69,8 % ispitanih, u području ramena kod 50,8 do 65,1 %, u donjem dijelu leđa kod 27,1 do 51,2 %, u gornjem dijelu leđa od 25,6 do 46,5 %, u laktu od 5,1 do 18,6 %, u području kukova od 3,4 do 16,3 %, te gležnja od 5,1 do 11,6 % (23). Učestalost mišićno-koštanih problema u ovom se istraživanju kretala od 55,8 % (bol u nogama i stopalima) do 78,3 % (bol u gornjem dijelu leđa). Iako se čini da je učestalost mišićno-koštanih tegoba niža negoli u drugim državama, treba istaknuti da postoje određene razlike u primijenjenoj metodologiji istraživanja. Ako se rezultati usporede na razini određenog dijela tijela, očito je da hrvatski stomatolozi imaju dosta visoku učestalost mišićno-koštanih problema. Kao što je potvrđeno u istraživanju Kazancioglua i suradnika, pojavnost mišićno-koštanih tegoba u visokoj je korelaciji s položajem tijela pri radu i nepravilnim opterećenjem stopala (15). Prema stajalištu Ritzlinea, pojavnost i jakost mišićno-koštanih poremećaja među stomatolozima mogu biti znatno smanjeni ako se prihvate određena osnovna načela u vezi s postupanjem pri sindromu prenaprezanja, ako se modificiraju radni uvjeti na radnom mjestu i kod kuće, ako se održava zdravlje i ako se liječnici redovito bave nekom tjelesnom aktivnošću (10). Thanathornwong i suradnici koristili su se Bayesianovom mrežom i razvili sustav za predviđanje i prevenciju mišićno-koštanih tegoba povezanih s radom (24).

Our study involved 506 dentists representing almost 20 % of the entire number of active dental practitioners in Croatia. According to the data from the available literature, this study is among the most comprehensive national studies on occupational diseases in dentists with the highest number of participants compared to total number of active dental practitioners in the country. The study similar to ours according to the number of participants and response rate was performed by Šustova et al. in Czech Republic but without data about total number of active dentists (19). Their study involved 581 participants with response rate of 72.6 %. A large number of participants contributed to reliability of obtained data.

Musculoskeletal disorders are one of the most commonly reported health related problem among dentists worldwide. It is estimated that every year approximately 70 % of dentists have different types of musculoskeletal complaints. Among these, low back pains, pains in the shoulders and at the neck level seem to be the most common sites of pain (20-22). Šustova et al. examined the prevalence of musculoskeletal problems among Czech dentists. Information was gathered through questionnaire completed by 581 physicians. The occurrence of difficulties associated with the musculoskeletal system was reported by 96.9 % of dentists surveyed. A statistically significant correlation with the occurrence of musculoskeletal complaints of medium and major intensity was demonstrated for the following factors: sex, age, running a private practice, past injury or musculoskeletal diseases, and the perception of work as psychologically demanding (19). Kierklo et al. assessed the health status among dentists in Poland regarding the symptoms of musculoskeletal pain. Their survey was conducted among 220 dentists and they found that 92 % of the surveyed dentists experienced musculoskeletal disorders, especially in the neck (47 %) and lower back (35 %) (14). Yi et al recruited 271 dental postgraduates to determine how early musculoskeletal disorders develop in dental professionals. Depending on dental specialty, the musculoskeletal disorders in the neck region were reported by 47.5 % - 69.8 % of dental postgraduates, in the shoulder region by 50.8 % - 65.1 %, in lower back region by 27.1 % - 51.2 % and in upper back region by 25.6 % - 46.5 %, in elbow region by 5.1 % - 18.6 %, in hip region by 3.4 % - 16.3 % and in ankle region by 5.1 % - 11.6 % (23). The prevalence of musculoskeletal disorders in our study varied from 55.8 % (pain in legs and feet) to 78.3 % (pain in upper back). Although the prevalence of musculoskeletal disorders seems to be lower than in other above mentioned studies from different countries, there were some differences in applied methodology. If the obtained results are compared at the level of specific part of the body, it is obvious that Croatian dentists have a very high prevalence of musculoskeletal disorders. As found in the study of Kazancioglu et al., the occurrence of musculoskeletal disorders is highly correlated with body posture at work and improper loading to the foot (15). According to Ritzline, the occurrence and magnitude of musculoskeletal disorders among dentists can be decreased significantly by adopting several basic principles including the management of overuse syndromes, modification of the workstation and home, maintenance of health

U dvogodišnjem istraživanju Nemesa i suradnika praćeno je 390 stomatologa iz zapadnih dijelova Rumunjske kojima je dijagnosticiran neki od mišićno-koštanih poremećaja kako bi se pokazala učinkovitost rehabilitacije. Stomatolozima koji su odlazili na fizikalnu terapiju poboljšali su se funkcionalni pokazatelji te im je porasla radna produktivnosti (20). Ergonomska poboljšanja, promicanje zdravlja te intervencije u organizaciju posla, potrebne su kako bi se smanjio rizik od mišićno-koštanih tegoba (25, 26). Nažalost, istraživanja su pokazala da većina stomatologa ne primjenjuje mjere kojima se mogu spriječiti ili smanjiti profesionalni zdravstveni problemi (10). Kao što su zaključili Yi i suradnici, mišićno-koštani problemi zahvaćaju stomatološko osoblje već na početku karijere, pa s prevencijom treba početi što prije, no pritom se moraju uzeti u obzir pojedina specifična obilježja za specijalističko područje (23).

Profesionalne kožne bolesti drugi su najčešći profesionalni poremećaj, nakon mišićno-koštanih poteškoća. Stomatolozi se u svojem svakodnevnom radu koriste različitim kemikalijama, lijekovima i drugim potencijalno iritirajućim tvarima. Većina dermatoza povezanih s radom (više od 95 %) podvrste su kontaktnog dermatitisa (27). Glavni uzročnik kontaktnog dermatitisa jest doticaj kože s iritirajućom tvari i/ili alergenom. Pokazalo se da je alergija na lateks jedan od važnih uzročnika alergijskih reakcija, posebno kad je riječ o zdravstvenom osoblju – liječnicima, medicinskim sestrama, primaljama, laboratorijskim tehničarima i stomatolozima. Manifestacije alergije na lateks uključuju dermatološke i dišne simptome te, u najtežim slučajevima, anafilaksiju. Stomatološko osoblje neprestance je izloženo rukavicama od lateksa jer ih nosi od 8 do 10 sati svakog radnog dana (28, 29). Rezultati istraživanja Kurpiewske i suradnika pokazali su da primalje (67 %) i stomatolozi (64 %) imaju najveću učestalost profesionalnih kožnih bolesti među zdravstvenim radnicima i da su, kad je riječ o stomatolozima, one u 35 % slučajeva uzrokovane rukavicama (27). Prajapati i suradnici opisali su slučaj kontaktnog dermatitisa izazvanog metilnim metakrilatom koji se kod stomatologa manifestirao kao svrbež i osip u području kontakta (30). Metilni metakrilat koristi se za izradu akrilatnih mobilnih djelomičnih ili potpunih zubnih proteza za bezube pacijente i ima veoma senzibilizirajuća svojstva. U ovom istraživanju kožne bolesti pronađene su kod 29,2 % stomatologa, a alergija na lateks i kontaktni dermatitis prepoznati su kao glavni uzročnici.

Izvrstan vid preduvjet je za sigurno i visokokvalitetno obavljanje stomatološke djelatnosti. Tijekom zahvata oči stomatologa mogu biti izložene mehaničkim i/ili kemijskim iritacijama, te neionizirajućem zračenju (31, 32). Zarra i Lambrianidis ispitali su učestalost oftalmoloških ozljeda kod grčkih specijalista endodoncije te ustvrdili da ih je 73 % imalo takva iskustva. Amalgam i natrijev hipoklorit strana su tijela koja se najčešće povezuju s oftalmološkim ozljedama (31, 33).

Azodi i Ezeja proveli su presječno istraživanje među stomatolozima o zdravlju njihovih očiju (17). Od 148 ispitanika njih 27 (18,2 %) ocijenilo je zdravlje očiju kao loše/zadovoljavajuće. U ovom istraživanju poremećaji vida (uključujući ozljede oka) pronađeni su kod 46,8 % ispitanih stomatologa

and wellness, and participation in regular exercise (10). Thanathornwong et al. used Bayesian network and developed a system for predicting and preventing work-related musculoskeletal disorders (24). In a 2-year prospective study, Nemes at al. followed 390 dentists recruited from the western part of Romania, who were diagnosed with a musculoskeletal disorder, to show the efficiency of rehabilitation. They found that improvements of functional parameters and increase in work productivity were recorded in dentists who followed physical therapy (20). Ergonomics improvements, health promotion and organizational interventions are necessary to reduce the risk (25, 26). Unfortunately, the results of research show that most dental practitioners do not take measures to prevent or reduce the symptoms of occupational health related problems (10). As concluded by Yi et al., musculoskeletal disorders afflict dental professionals at an early stage of their career and prevention aimed at the specialty-related characteristics should be introduced as early as possible (23).

Skin diseases rank second on the list of most common occupational diseases, following musculoskeletal disorders. In their everyday work, dental professionals use different chemicals, drugs and other irritants. Most work-related dermatoses (over 95 %) are subtypes of contact dermatitis (27). The main cause of contact dermatitis is skin contact with irritants and/or allergens. Latex allergy has emerged as an important cause of allergic reactions, particularly in health care workers, physicians, nurses, midwives, laboratory technicians and dentists. The manifestations of latex allergy include dermatological and respiratory symptoms and, in its most severe form, anaphylaxis. Dental personnel have a very high exposure to latex gloves as they may be gloved eight to 10 hours each working day (28, 29). The results of research of Kurpiewska et al. showed that midwives (67 %) and dentists (64 %) have the highest prevalence of occupational skin diseases among healthcare workers and that occupational skin diseases among dentists are (35 %) caused by gloves (27). Prajapati et al. described a case of contact dermatitis due to methyl methacrylate in a dentist presented as itching and rashes of the contact areas (30). Methyl methacrylate is used for fabrication of acrylic removable partial or complete dentures for edentulous patients and has strong sensitizing properties. In this study, skin disorders are reported by 29.2 % dentists and latex allergy and contact dermatitis were identified as the main cause of skin disorders.

Excellent eyesight is a precondition for a safe and high quality practice of dentistry. During dental procedures, the eyes of dentists may be exposed to mechanical and/or chemical irritation and nonionizing radiation (31, 32). Zarra and Lambrianidis examined the incidence of ocular accidents during dental practice among Greek endodontists and found that ocular accidents were reported by 73 % of the participants. Amalgam and NaOCl were the foreign bodies most frequently associated with ocular accidents (31, 33). Azodo et Ezeja conducted a cross-sectional study on dental surgeons to determine the ocular health practices (17). Of the 148 respondents, 27 (18.2 %) rated their ocular health as poor/fair. In this study, sight disorders (including eye injuries) are reported by 46.8 % of examined dentists and are the sec-

te se, uz mišićno-koštane poteškoće, ubrajaju među najčešće profesionalne bolesti. Komadići amalgama i zubnog cementa najčešći su uzročnici ozljeda oka. Visoka učestalost poremećaja vida i ozljeda oka povezana je s razmjerno malim brojem stomatologa koji se pri radu koriste zaštitnim naočalama i vizirima. Neke promjene vida normalne su zbog starenja te i to treba uzeti u obzir pri tumačenju dobivenih podataka o zdravlju očiju, posebno u starijim dobnim skupinama, kao što je ovo istraživanje pokazalo za dobnu skupinu od 51 do 60 godina i za onu od 60+ godina. Broj žena u ovim dobnim skupinama koje su tražile pomoć liječnika zbog problema s očima statistički je značajno veći u odnosu na druge dobne skupine ($\chi 2$ = 76,45 df,=,8; P < 0,001).

Okolišna buka smatra se odgovornom za probleme sa sluhom, a svakodnevna osmosatna izloženost razini buke iznad 85 decibela povezuje se s trajnim gubitkom sluha. Buka je gotovo uvijek prisutna u radu stomatološkog osoblja. Izvori zvukova u stomatološkoj ordinaciji koji mogu biti opasni za sluh jesu turbinske bušilice, mikromotori, stomatološka sisaljka, ultrazvučni instrumenti, vibratori, uređaji za miješanje i trimeri (11, 34). U istraživanju Messana i Pettija, intervjuirano je 100 talijanskih stomatologa koji imaju ordinacije dulje od 10 godina o nizu profesionalnih čimbenika rizičnih za sluh, te o simptomima povezanima sa sluhom (tinitus, osjećaj punoće, te gubitak sluha) (11). Učestalost problema sa sluhom među stomatolozima bila je 30 %, a ultrazvučni strugači te turbinske bušilice starije od godinu dana istaknute su kao najopasniji uređaji. Willershausen i suradnici ispitali su 53 stomatologa kako bi usporedili sluh stomatologa sa sluhom nastavnika. Rezultati audiometrijskih testova pokazali su da je sluh stomatologa nešto oštećeniji u usporedbi s kontrolnom skupinom. Na frekvencijama od 3 i 4 kHz ove razlike bile su čak i statistički značajne na oba uha (16). U ovom istraživanju o problemima sa sluhom izvijestilo je 18,9 % ispitanika, no samo njih 5,3 % tražilo je pomoć liječnika, ali nema informacija o provedenim dijagnostičkim postupcima u svrhu postavljanja dijagnoze.

U ovom istraživanju 61,3 % ispitanih stomatologa bile su žene. Iako nema značajnih razlika između muškaraca i žena s obzirom na stajalište da je stomatologija zanimanje štetno za zdravlje, objedinjeni podatci o zdravstvenom statusu stomatologa predstavljeni su u tablici 4. i pokazuju da je kod žena veća učestalost boli u gornjem dijelu leđa, ramenima, rukama, prstima, nogama i stopalima te češće imaju slušne i neurološke tegobe u usporedbi s muškarcima. Uzimajući u obzir majčinstvo i roditeljstvo, stomatologija može biti itekako iscrpljujuća profesija za žene, s velikim rizikom od razvoja profesionalnih bolesti i njihova negativnog utjecaja na trudnoću i majčinstvo.

Razmjerno visoka učestalost profesionalnih zdravstvenih problema među stomatolozima u Hrvatskoj potvrdila je sumnje da su gospodarska kriza i racionalizacijske inicijative u zdravstvu praćene povećanim profesionalnim zahtjevima negativno utjecale na zdravlje stomatologa. Nažalost, ovakvo stanje može ubuduće biti pogoršano jer svake godine velik broj mladih stomatologa završava studij, a to premašuje hrvatske potrebe za stomatolozima i smanjuje mogućnost za pronalazak odgovarajućeg posla u struci. Pravilno strukovno

ond most common occupational disease, following musculoskeletal disorders. Amalgam and dental cement particles were most frequently associated with eye injuries. High prevalence of sight disorders and eye injuries is related to a low number of dentists who use protective googles and shields. Some vision changes are normal with aging, and this must be taken into account in the interpretation of obtained data regarding ocular health in older age groups, as shown in this study among females in the age groups 51-60 and 60+. The number of females in these age groups who asked a doctor for help in case of ocular health disorders was significantly higher than in other age groups ($\chi 2$=76.45 df=8 P<0.001).

Environmental noise is considered responsible for hearing impairment and daily exposure for 8 hours to noise levels above 85 decibels is associated with permanent hearing loss. Noise is almost always present during the work of dental staff. The sources of sounds in dental office that can be treated as potentially damaging to the hearing are high-speed turbine handpieces, low-speed handpieces, high-velocity suction, ultrasonic instruments, vibrators and other mixing devices, and model trimmers (11, 34). In the research of Messano and Petti, 100 Italian dental practitioners who commenced dental practice more than 10 years ago, were interviewed on a series of occupation related hearing impairment risk factors and on hearing impairment-associated symptoms (tinnitus, sensation of fullness, hypoacusis) (11). The prevalence of hearing impairment among dental practitioners was 30 % and ultrasonic scalers and dental turbines aged more than 1 year were identified as most dangerous devices. Willershausen et al. examined 53 dentists to determine the hearing ability of dentists in comparison to other academic professionals. The results of audiometric tests showed that the hearing of dentists tended to be slightly more impaired than the hearing in the control group. For the frequencies 3 kHz and 4 kHz, those differences were statistically significant for both ears (16). In our study, hearing disorders were reported by 18.9 % of dentists, but only 5.3 % of them asked a doctor for help without any information about diagnostic procedures performed for hearing impairment diagnosis.

In this study, 61.3 % of surveyed dentists were females. Although there was no significant difference between females and males in considering dentistry as harmful profession, according to summarized data on health status of dental practitioners presented in Table 4, it is obvious that females reported a higher prevalence of pain in upper back region, pain in shoulders, hands or fingers, pain in legs and feet, hearing disorders and neurological disorders than males. In the light of motherhood and parenthood, dentistry could be very exhausting profession for females with a high risk of developing occupational diseases and their negative influence on pregnancy and motherhood.

A relatively high prevalence of occupational health problems among dentists in Croatia confirmed our suspicions that economic crisis and rationalization initiatives followed by increased professional requirements had an unwanted impact on health. Unfortunately this could be worsened in the future because of a large number of young dentists graduating each year, exceeding the Croatian needs and decreasing

planiranje, teritorijalno ravnomjerno raspoređena stomatološka mreža, te usklađivanje broja studenata s potrebama tržišta rada, uz neizostavno vođenje računa o kvaliteti izobrazbe stomatologa, može uvelike pomoći.

Podizanje svijesti o ovom problemu među studentima stomatologije i stomatolozima prvi je i možda najvažniji potez u dugotrajnom procesu prevencije profesionalnih bolesti. Jedno od mogućih rješenja ovog problema jest i uvođenje u nastavni program novog kolegija na Stomatološkom fakultetu Sveučilišta u Zagrebu pod nazivom *Profesionalne bolesti u stomatologiji*.

## Zaključak

Profesionalne bolesti i bolesti vezane uz rad postaju sve veći problem među stomatološkim osobljem i mogu potaknuti niz poteškoća koje u konačnici mogu dovesti do preranog prekida profesionalne karijere. Među hrvatskim stomatolozima visoka je učestalost profesionalnih zdravstvenih problema. Mišićno-koštane tegobe, te poremećaji vida i kože najčešće su zabilježeni zdravstveni problemi. Podizanjem svijesti o stomatologiji kao o profesiji koja može znatno utjecati na zdravlje pojedinca jedan je od najvažnijih poteza u prevenciji profesionalnih bolesti.

## Sukob interesa

Nije bilo sukoba interesa.

the chance to find an appropriate job in dental profession. Proper professional planning, territorially evenly distributed dental network, and harmonization of the number of students with the labor market needs and the inevitable taking into account the quality of education of dentists can be of significant help.

Increasing the awareness of this problem among dental students and dental professionals is the first and maybe most important step in the long process of prevention of occupational diseases. A possible solution of this problem was presented at the School of Dental Medicine University of Zagreb by introducing a new course in the study program named "Occupational diseases in dental medicine".

## Conclusion

Occupational and work-related diseases or disorders have become increasingly common among dental professionals and can initiate a series of events that could result in a too early career ending. Croatian dentists have a high prevalence of occupational health problems. Musculoskeletal, sight and skin disorders were among most commonly reported health problems. The first and most important step in protecting against occupational diseases is to improve dental health professionals' awareness and understanding of occupational and work related diseases. Dental professionals need to recognize the significant impact of occupational diseases on health.

## Conflict of Interest

None declared

**Abstract**

**Aim:** To assess the health status among dentists in Croatia regarding the symptoms of musculoskeletal, dermatological, sight, hearing and neurological disorders. **Methods:** The anonymous online survey was conducted among 506 Croatian dentists. **Results:** It was found that over 78.18 % of the surveyed dentists experienced work related pain in upper back, 76.97 % of them in lower back. Work-related skin problems were reported by 29.29 % of dentists. Vision problems were reported by 46.87 % and hearing problems by 19.03 % of participants. Neurological disorders were reported by 15.76 % of dentists. **Conclusion:** This study is the first to report on the overall health status of Croatian dentists and, unfortunately, it showed undesirable results. Numerous health hazards, increased professional requirements and limited ergonomics in the work environment of Croatian dental practitioners cause various health disorders, and the prevalence of occupational diseases is very high.

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**Key words**
Dentists ; Occupational Disease; Musculoskeletal Disorders; Croatia

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