Occupational Injuries among Dentists in Croatia

Ozljede na radu među stomatolozima u Hrvatskoj

Introduction

The dental profession is rated worldwide as a high-risk profession by many parameters (1).

Research shows that dentists have a distinct tendency for occupational diseases, work-related illnesses and, unfortunately, a high risk of injury during work (2, 3).

Occupational diseases and injuries at work have multiple etiologies, and specific working conditions are one of the important factors (4, 5). The cause of the disease is usually long-term exposure and a high concentration of specific harmful and adverse substances, various microorganisms, and repeated forced non-physiological positions of the body (5). The tendency toward incurring work-related injuries results from constant handling of a large number of sharp instruments and needles, a small working area and the flow of air and water which, in addition to the saliva and blood of the patient, can cause injury to the eye by foreign objects (tooth splinters, material, etc.).

Objective:
The aim of this study was to examine the frequency of occupational injuries among dentists in Croatia, to establish most common injuries, and to determine the main risk factors. The aim of this research was also to determine the dentists’ opinion on causes that are responsible for the occupational diseases and injuries. Material and methods: The survey was conducted based on a sample of 406 dentists from Croatia as respondents to an electronic survey. Results: 63.05% of the respondents suffered injuries caused by dental practitioners. The most common injuries were needle puncture incidents (57.75%) and cuts (20.86%), followed by eye injuries (13.37%), patient bite (4.81%) and punches (1.60%). The largest number of respondents stated the improper posture as the most important cause of occupational diseases and injuries, followed by stress, infection and noise. Conclusion: Knowledge of risk factors is the first step of injury prevention. Our respondents were largely aware of the dangers surrounding them. Nevertheless, the frequency of injuries was high and there is still a need for preventive measures to minimize the frequency of injuries in dentistry.
Risk factors in the dental profession can be divided into biological, biomechanical, chemical, physical and psychogenic (5).

Biological factors include viruses, fungi, bacteria and prions that dentists encounter through direct labor in the patient’s mouth, due to exposure to saliva, which in many cases is contaminated with the patient’s blood. Dentists’ awareness of the risks of transmission of infections, primarily hepatitis and HIV, is a necessary prerequisite for prevention, combined with the mandatory use of protective equipment (1, 5).

Biomechanical risk factors include involuntary improper posture and repeated movements, body overstimulation affecting the musculoskeletal and / or neurological system (1).

The term chemical risk factors include various medicines and dental materials that can cause chemical injury, as well as protective equipment and disinfectants that, cumulatively, could be potential allergens with a potential toxic effect (1, 5).

Physical factors are factors that can lead to hearing and vision disorders such as radiation, noise, vibration, artificial lighting, and polymerization light (5).

Psychogenic factors include high levels of daily stress, chronic fatigue and burnout syndrome at work. As a result, various psychosomatic diseases can occur. Also, mental and physical fatigue can lead to decreased concentration and careless behavior while working, which increases the risk of stabbing and other injuries (6).

Due to the specific working conditions and a large number of sharp instruments and needles used by dentists in their work, stabbing incidents are possible and unfortunately occur during clinical work. Apart from the mechanical injury itself, a much bigger problem is the possibility of transmission of the infections and diseases from patients to dentists, if the patient is ill or infected with HIV or hepatitis B and C.

It is estimated that around 257 million people worldwide are chronically infected with hepatitis B and 71 million people with hepatitis C. Croatia is one of the countries with a low rate of hepatitis, but it still poses a high risk for dentists, given that about 25,000 people in Croatia are chronically infected with hepatitis B virus and 40,000 hepatitis C virus (7).

In Croatia, between 1985 and the end of 2018, there were 1,640 people diagnosed as HIV positive (8). The overall number is not large, but it is not a negligible risk when it comes to possible transmission of infection in dental work.

In order to take a serious approach to the problem and to ensure adequate preventive action, Croatian dentists need to study risk factors and the current situation. As we have not found data on occupational injuries within the dental profession in Croatia in the recent literature, we decided to carry out a survey and collect data on the most common injuries as well as data on the awareness of dentists about the health risks present in the workplace.

The purpose of this paper was to investigate into the frequency of occupational injuries among dentists in Croatia, the injuries which occur most frequently to dentists during work, and to identify the risk factors that may be associated with a higher incidence of injuries (gender, age, specialization, and years of practice). One of the goals of the research was to determine the opinion of the dentist about the contagious (5).

In biološke čimbenike ubrajamo virus, glivice, bakterije i prione koji stomatolozima prijete zbog izravnog rada u pacijentovim ustima i izloženostih slini koja je često kontaminirana krvlju pacijenta. Sjevernost stomatologa o rizicima u slučaju prijenosa infekcija, ponajprije hepatitisa i HIV-a, nužan je preduvjet u prevenciji, uz obveznu upotrebu zaštitne opreme (1, 5).

Biomehanički rizični čimbenici su prisilan nepravilan položaj tijela i opetovane kretanje te prenaprezanje tijela, što pogađa mišićno-koštani i/ili neurološki sustav (1).

Rizičnih kemijskih čimbenika su različiti lijekovi i stomatološki materijali koji mogu uzrokovati kemijske ozljede te zaštitna oprema i dezinficijenciji zato što mogu, u kumulativnom smislu, biti alergeni s toksičnim učinkom (1, 5).

Fizikalni čimbenici su oni koji svojim djelovanjem mogu potaknuti poremećaj sluha i vida, kao što su, na primjer, zračenje, buka, vibracije, umjetna rasvjeta, polimerizacijsko svjetlo itd (5).

U psihogene čimbenike ubrajamo visoku razinu svakodnevnog stresa, kronični umor i sindrom izgaranja na poslu. Posljedično se mogu pojaviti različite psihosomatske bolesti. Psihički i fizički umor također mogu smanjiti koncentraciju i potaknuti neoprezno ponašanje tijekom rada, što povećava rizik od ubodnih i drugih ozljeda (6).

Zbog specifičnih radnih uvjeta te mnogobrojnih oštrih instrumenata i igala kojima rukujut stomatolozi, ubodni su incidenti mogući i, nažalost, događaju se u kliničkom radu. Osim same mehaničke ozljede, mnogo je veći problem eventualni prijenos infekcije s pacijenta na stomatologa, ako pacijent boluje ili je zaražen virusom HIV-a ili hepatitisa B i C.

Procjenjuje se da je oko 257 milijuna ljudi u svijetu kronično zaraženo hepatitismom B, a 71 milijun hepatitismom C. Hrvatska je među zemljama s niskom učestalocom hepatitisa, ali ta bolest i dalje je velik rizik za stomatologe, s obzirom na to da je oko 25 000 osoba u našoj zemlji kronično zaraženo virusom hepatitisa B i 40 000 virusom hepatitisa C (7).

U Hrvatskoj je u razdoblju od 1985. do kraja 2018. zabilježeno 1640 bolesnika kojima je dijagnosticiran infekcija HIV-om (8). Sveukupan broj nije velik, ali ipak nije zanemariv rizik kad govorimo o mogućem prijenosu infekcije u stomatološkom radu.

Kako bi se ozbiljno pristupilo problemu i osiguralo odgovaraće preventivno djelovanje, najvažnije je proučiti rizične čimbenike i trenutačno stanje među hrvatskim stomatologima. Budući da u recentnoj literaturi nismo pronašli podatke o ozljedama na radu unutar stomatološke profesije u Hrvatskoj, odlučili smo provesti istraživanje i prikupiti podatke o najčešćim ozljedama i svjesnosti stomatologa o zdravstvenim rizicima na njihovu radnom mjestu.

Svraha ovoga rada bila je istražiti učestalost ozljeda hrvatskih stomatologa na radu i koje su najčešće, te utvrditi rizične čimbenike koja možemo povezati s njihovom češćom pojavom (spol, dob, specijalizacija, godine staža). Jedan od ciljeva istraživanja bio je i ustanoviti što stomatolozi misle o uzročnicima odgovornima za nastanak profesionalnih bolesti i ozljeda na radu.
tributing factors responsible for the occurrence of occupational diseases.

**Material and methods**

The research was conducted through electronic survey, which was sent via email to 800 addresses of actively working dentists in the Republic of Croatia. Participation in the survey was anonymous and voluntary and all respondents had been in the dental profession for at least one year. The questionnaire consisted of three parts; demographics included gender, age, length of service and specialization. The second part was about the dentist’s awareness of occupational health risks. The third part deals with previous experience of workplace injuries in dental offices.

The study was approved by the Ethics Committee of the School of Dental Medicine in Zagreb.

Statistical analysis was performed using the Statistica® computer program (TIBCO Software Inc, Palo Alto, CA, USA). A chi-square test was used to analyze the data obtained in order to determine a statistically significant difference in the frequency of the tested parameters between multiple groups, with a statistical significance level of $p < 0.05$.

**Results**

Out of 800 dentists surveyed, 406 dentists completed and answered the questionnaire; the response rate was 50.8%. Out of the total number of respondents, 39.16% were men and 60.84% were women.

The distribution of respondents by age and years of practice is shown in Figure 1. Most of the respondents were general dental practitioners (69.88%); however, all specialist branches were covered by the answers (Figure 2).

33.25% of the respondents with infections believed that they were related to the workplace, while 14.70% of the respondents requested medical intervention because of this. A statistically significant correlation was found between infections (for which the respondents believed were related to dental practice) with age ($p < 0.05$, $\chi^2 = 11.84$, df = 3) and years of practice ($p < 0.05$, $\chi^2 = 8.99$, df = 3), the number of reported infections increased with age. There were no significant associations with other parameters such as gender and specialization. The number of subjects who sought medical attention for such an infection was not associated with any parameters, as to seek medical attention on 800 adresa stomatologa koji obavljaju djelatnost na području Republike Hrvatske. Sudjelovanje je bilo anonimno i dobrovoljno, a svi ispitanici obavljali su stomatološku djelatnost najmanje godinu dana. Uputnik se sastojao od triju dijelova. U prvom dijelu tražili su se demografski podatci – o spolu i dobi, te duljini radnog staža i specijalizacije. Dugi dio odnosio se na osviđenost stomatologa kad je riječ o profesionalnim zdravstvenim rizicima. U trećem dijelu odgovarali su na pitanja o dosadašnjim iskustvima s ozljedama na radu u svojim ordinacijama.

Istraživanje je odobrilo Etičko povjerenstvo Stomatološkog fakulteta u Zagrebu.

Statistička analiza obavljena je računalnim programom Statistica® (TIBCO Software Inc, Palo Alto, CA, SAD). Za analizu dobivenih podataka korišten je hi-kvadrat test u svrhu utvrđivanja statistički značajne razlike u učestalosti ispitivanog svojstva između više skupina, uz razinu statističke značajnosti $p < 0.05$.

**Ispitanici i metode**

Istraživanje je provedeno elektronički, anketom poslanom na 800 adresa stomatologa koji obavljaju djelatnost na području Republike Hrvatske. Sudjelovanje je bilo anonimno i dobrovoljno, a svi ispitanici obavljali su stomatološku djelatnost najmanje godinu dana. Uputnik se sastojao od triju dijelova. U prvom dijelu tražili su se demografski podatci – o spolu i dobi, te duljini radnog staža i specijalizacije. Dugi dio odnosio se na osviđenost stomatologa kad je riječ o profesionalnim zdravstvenim rizicima. U trećem dijelu odgovarali su na pitanja o dosadašnjim iskustvima s ozljedama na radu u svojim ordinacijama.

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**Rezultati**

Anketa je poslana na 800 adresa, a upitnik je ispunio i odgovorilo na postavljena pitanja 406 stomatologa. Dakle, stopa sudjelovanja bila je 50,8 %. Od ukupnog broja ispitanika 39,16 % bili su muškarci, a 60,84 % žene.

Distribucija ispitanika, s obzirom na radni staž i godine, nalazi se na slici 1. Među ispitanicima uglavnom su bili za stupljeni opći stomatolozi (69,88 %), no odgovorima su bile obuhvaćene sve specijalističke grane (slika 2).

Infekcije za koje smatra da su bile povezane s radnim mje stom navelo je 33,25 % ispitanika te je njih 14,70 % zatražilo liječničku pomoć. Statistički značajna povezanost pokazala se između infekcije (za koju su ispitanici smatrali da je povezana s obavljanjem njihove djelatnosti), dobi ($p < 0.05$, $\chi^2 = 11.84$, df = 3) i radnoga staža ($p < 0.05$, $\chi^2 = 8.99$, df = 3). Broj prijavljenih infekcija rasta je o dob i sputani. S ostalim parametrima, kao što su spol i specijalizacija, nije bilo značajne povezanosti. Broj ispitanika koji je zbog infekcije potražio liječničku pomoć nije bio povezan ni s jednim od ispitivanih parametara. Ozljedu koja je nastala tijekom obavljanja stomatološke djelatnosti navelo je 63,05 % ispitanika, a 16,5 % zbog toga je potražilo pomoć liječnika. Učestalosti ozljeda kod muškaraca (61,64 %) i žena (63,97 %) bila je gotovo podjednaka, no ispitanice su znatno češće potražile liječničku pomoć nakon ozljede ($p < 0.05$, $\chi^2 = 3.39$, df = 1). Od ostalih ispitivanih parametara traženje liječničke pomoći nakon ozljede bilo je povezano samo s duljinom radnoga staža ($p < 0.05$, $\chi^2 = 10.01$, df = 3). Udobni incidenti iglom (57,75 %) i perezotine (20,6 %) bili su najzastupljeniji među ozljedama, a slijede ozljede oka (13,37 %), ugriz pacijenta (4,81 %) te udarac (1,60 %). Udobni incident iglom nije pokazao značajniju povezanost sa spolom, dobi, specijalizacijom i duljinom radnog staža, a perezotine su bile statistički znatno povezane
Figure 1. Distribution of respondents by work experience and age (years)

Slika 1. Distribucija ispitanika prema dobi i radnom iskustvu (godine)

Figure 2. Distribution of respondents by specialization

Slika 2. Distribucija ispitanika prema specijalizaciji

Figure 3. Graphic representations of respondents’ opinions on the most important contributing factors responsible for the occurrence of occupational diseases

Slika 3. Grafički prikaz mišljenja ispitanika o najvažnijim uzročnicima profesionalnih bolesti i bolestima vezanima uz rad
significant association with gender, age, specialization, and length of practice, while the cuts were statistically significantly related to gender only, more commonly occurring in men. Eye injuries were found to be statistically significantly related to the age of the subjects (p<0.05, \( \chi^2 = 14.01, df = 3 \)), most commonly occurring in the age group between 41 and 50 years and 11–20 years of practice (p<0.05, \( \chi^2 = 8.71, df = 3 \)). The bite was reported by 8 respondents and the hit by one respondent. It was not possible to establish a statistical correlation with tested parameters because of a small number of cases. One respondent reported a fall that caused damage to the cervical spine. A stabbing incident in the treatment of patients infected with HIV and/or hepatitis was reported by three respondents.

The respondents' opinion on the most important causes of occupational diseases and diseases related to work is shown in Figure 3.

The largest number of respondents considered incorrect working posture the most important cause of occupational diseases and injuries (N = 393). Gender, age, length of practice and specialization did not significantly affect the responses. Stress was recognized as second most common risk factor (N = 288); tested parameters had no significant effect on the frequency of this response. In the third place, the respondents reported infections (N = 210) and in the fourth they reported noise (N = 85) as the causative agent of occupational diseases and injuries at work. The frequency of selection of infection as the main cause of disease and injury was not influenced by the parameters studied, while noise was statistically significantly more frequently reported by women (p<0.05, chi-square = 5.39, df = 1) and subjects in the older age groups (p<0.05, chi-square = 9.73, df = 3).

Also, the respondents who were general dentists were more likely to report noise as the causative agent compared to specialists (p<0.05, \( \chi^2 = 4.02, df = 1 \)). Likewise, X-rays were more often considered a risk factor by general dentists (N=38) compared to specialists (N=9), however, due to the small number of specialists, statistical significance could not be established. None of the parameters tested had a significant impact on the selection of the small work field and allergy as the cause of disease and injury.

**Discussion**

406 dentists participated in this research, representing 8.01% of the 5066 currently active dentists in Croatia (9).

The choice of dentistry as a profession involves a great risk for development of occupational diseases, diseases related to work and injuries at work, which is confirmed by the results of our research, along with data from previously published research on the health status of dentists in our country (1).

The most commonly reported injuries among the respondents were related to stab incidents, which was also expected and confirmed in similar studies in other countries (10). In our study, more than 78% out of the total of the respondents had a stabbing incident and other percutaneous injuries.

After Croatia’s accession to the European Union, the obligation to report every stabbing incident to the Croatian In-

**Rasprava**

U ovom istraživanju sudjelovalo je 406 stomatologa, što je 8,01% od 5066 danas aktivnih stomatologa u Hrvatskoj (9).

Stomatologija kao profesija uključuje velik rizik od razvoja profesionalnih bolesti, bolesti vezanih uz rad te ozljeda na radu što, uz podatke iz ranije objavljenog rada o zdravstvenom stanju stomatologa u našoj zemlji, potvrđuju i rezultati našeg istraživanja (1).

Najčešće prijavljene ozljede među ispitanicima odnosile su se na ubodne incidente, što je također očekivano i potvrđeno u sličnim istraživanjima u drugim zemljama (10). U našem istraživanju ubodni incident i druge percutane ozljede navelo je više od 78% ispitanika.

Nakon ulaska Hrvatske u Europsku uniju jasno je propisano da se svaki ubodni incident mora prijaviti Hrvatsko-
stitute for Occupational Health and Safety has been clearly stipulated. In 2018, 827 injuries with sharp objects and other exposure incidents were reported, among healthcare professionals in total (11). This number is not large, but the problem is that, unfortunately, many incidents are still not being reported, due to negligence or ignorance of its importance. There are reports that only 5% to 25% of exposure incidents are reported in Croatia because of the fear of stigmatization, concerns about data confidentiality, i.e. serological testing findings, and the assumption that the application process is time consuming (12). A stabbing incident by itself does not usually constitute significant tissue damage. Its importance is primarily related to the possibility of transmission of the infection during the injection, after the use of a needle or sharp instrument in patients infected with hepatitis B or C virus, and HIV. The risk of transmission of infection after needlestick infection used in an infected patient is 22-31% for hepatitis B (12). Due to the systematic and very thorough implementation of the vaccination program, the diseases covered by the vaccination program show a very low incidence. The primary focus here is hepatitis B, since no vaccination prophylaxis is available for hepatitis C and HIV.

Croatia is listed as a country with a low rate of hepatitis B, which has been declining for the past twenty years because of the introduction of vaccination. However, hepatitis B remains a major public health problem, given that about 25,000 people in Croatia are infected with this virus (2, 7).

Since 1999, hepatitis B vaccination has been introduced into the compulsory vaccination calendar and children are vaccinated at the age of 12 (6th grade of primary school). During this period, it was also mandatory to vaccinate individuals at increased risk for infection (i.e. healthcare professionals, hemodialysis persons, intravenous drug users, home contacts of chronic patients, new borns of HBsAg positive mothers). Subsequently, hepatitis B vaccination has been introduced into the vaccination program for newborns since 2007 (13).

In regard to HIV transmission, Croatia’s accession to the EU has led to faster population migration. Consequently, the risk of potential contagion is greater. In the results of our study, one stabbing incident occurred with a needle while working with an HIV-positive patient. The dentist subsequently underwent post-exposure prophylaxis for a month. The risk of transmission of infection after a percutaneous dental injury if the patient was infected with HIV is about 0.3%, and the possible side effects of post-exposure prophylaxis are not negligible (12).

In a survey of reported percutaneous injuries among health care professionals in Washington State, over a seven-year period, 20% of complaints were made by dental professionals. Out of a total of 894 percutaneous injuries, 8 were associated with the patients who were positive for HBV, 30 positive for HCV, 3 positive for HIV and 2 for HBV and HCV (14).

The survey in Lithuania included 2235 general dentists (15). Over 95.3% of dentists expressed concern about the potential risk of cross-infection with a patient. HBV immunization was present in 35.9% of dentists. Hepatitis infection is not a zavodu za zaštitu zdravlja i sigurnost na radu. Tijekom 2018. ukupno je prijavljeno 827 ozljeda oštrim predmetima i ostalih ekspozicijskih incidenata (11). Tijekom činjenica da se, nažalost, još uvijek mnogo incidenata ne prijavljuje (12). Problema je činjenica da se, moćno, mnogo incidenata ne prijavljuje, jer se umanjuje njihovo značajno zagovaranja ili neznanja. Prema dostupnim podacima u Hrvatskoj se prijavljuje između 3 i 25 % ekspozicijskih incidenata, a za razlozi neprijeljavljivanja najčešće se navode strah od stigmatizacije, zabrinutost za povjerljivost podataka, tj. nažalost, moćno, mnogo zdravstvenih testiranja, te stajalište da postupak prijave odumira mnogo vremena (12). Ubodni incident, inače, najčešće tkivo ne oštećuje znatno. Opasan je uglavnom zbog mogućeg prijenosa infekcije pri ubodu, nakon korištenja igle ili oštrog instrumenta ako je pacijent bio zaražen virusom hepatitisa B ili C, ili HIV-om. Rizik od prijenosa infekcije nakon uboda iglom korištenom u liječenju zaraženog pacijenta iznosi 22 do 31 % za hepatitis B (12). U populaciji građana RH, zahvaljujući sustavnoj provedbi cijepljenja, bolesti koje su obuhvaćene tim programom vrlo su rijetke. U primartom fokusu nalazi se hepatitis B, zato što za hepatitis C i HIV nije dostupna profilaksa u obliku vakcinacije.

Hrvatsku ubrajamo u zemlje s niskom učestalosti hepatitisa B – naime, ta bolje je u opadanju poslije 20. divadetak godina zbog cijepljenja, no i dalje je važan javnozdravstveni problem s obzirom na to da je oko 25 000 osoba u Hrvatskoj kronično zaraženo tim virusom (2, 7).

Od 1999. cijepljenje protiv hepatitisa B uvedeno je u kalendar obveznih cijepljenja te su cijepljena djeca u dobi od 12 godina (6. razred osnovne škole). U tom razdoblju obvezno je bilo i cijepljenje svih u povećanim riziku od infekcije (npr. zdravstvenog osoba, bolesnika na hemodializi, intravenskih korisnika droge, kućnih kontakata kroničnih vironoša, novorođenčadi i HBsAg pozitivnih majki). Nakon toga je u program cijepljenja, od 2007. godine, uvedeno cijepljenje novorođenčadi protiv hepatitisa B (13).

Kad je riječ o prijenosu HIV-a, ulazak Hrvatske u EU ubrzao je migraciju stanovništva. To je povećalo i opasnost od potencijalnih zaraza. U rezultatima našeg istraživanja jedan ubodni incident iglom dogodio se pri radu s HIV-pozitivnim pacijentom. Stomatolog je nakon toga mjesec dana bio prisijen na postekspozicijsku profilaksu. Rizik od prijenosa infekcije nakon perkutane ozljede stomatologa, ako je pacijent bio zaražen HIV-om, jest oko 0,3 %, a ne mogu se zanemariti ni moguće nuspojave postekspozicijske profilakse (12).

U istraživanju prijevijenih perkutanih ozljeda među zdravstvenim osobljem u Washington State tijekom sedam godina, 20 % prijava odnosilo se na stomatologe. Od ukupno 894 takve ozljede osam je bilo povezano s pacijentima koji su bili pozitivni na HBV, 30 s pozitivima na HCV, tri koji su bili pozitivni na HIV i dva na HBV i HCV (14).

Istraživanjem u Litvi bilo je obuhvaćeno 2235 općih stomatologa (15). Njih više od 95,3 % izrazilo je zabrinutost zbog potencijalnog rizika a da će se zaraziti od pacijenta. Kod 35,9 % stomatologa bila je zabilježena imunizacija protiv HBV-a. Kod 4,3 % ustanovljena je infekcija hepatitisa B, u ranijem razdoblju, a 78,5 % doživjelo je ubodni incident iglom ili oštrim instrumentom. Statistički značajna razlika uočena je u procijenjenoj između stomatologa koji
tion from an earlier period was reported in 4.3% of dentists. A puncture incident with a needle or sharp instrument was present in 78.5% of dentists. A statistically significant difference was found in the vaccination rate among dentists who work in urban areas, where immunization coverage is greater, compared to the rural environment.

A study conducted in Germany (16) was focused on the exposure to blood pathogens in dentists and dental students. The study confirmed that the dentist's skill plays an important role in the occurrence of potential injuries. Thus, dental students had twice as many needle injuries as dentists with work experience. 54.3% of dentists had at least one stabbing incident in their working lives. As many as 25% of dentists stated that they did not wear a protective mask, and 55.6% said that they did not wear safety glasses while working. 50% of respondents reported stress and loss criteria as a trigger for a stabbing incident. Fatigue was reported by 32.9% as the cause for the injury.

Injury of the eyes in dentistry may be caused by mechanical or chemical factors. In this study, 13.37% of respondents had such an injury. Mechanical injury was most often caused by pieces of amalgam and cement, while one dentist made eye contact with the blood of an infected patient (HBV and HCV).

Zarra and Lambrianidis examined the incidence of eye injuries in endodontics specialists in Greece (6). In the five-year period, infections and mechanical injuries were monitored in 147 subjects. 73% of respondents reported an injury wherein gender and years of work had no effect on injury frequency.

The study in Saudi Arabia included 233 dentists. Over 51% of respondents reported experiencing an eye incident. The risk increased with years of work and lack of education. It is also reported that 15% of dentists have never worn protective equipment (17).

Among the causes of occupational diseases and injuries at work, which were identified by the respondents as the most important risk factors in our study, the incorrect position of the body at work (N = 402), stress (N = 291) and infections (N = 215) have been highlighted. Improper posture is the main cause of neck, lower back and shoulder pain, which has been confirmed by numerous studies. (5, 18, 19) Stress, loss of concentration and fatigue have also been recognized as important role models for the emergence of a stabbing incident.

Injury was identified as a risk factor by 215 subjects, which supports the fact that dentists are aware of this danger but perhaps not sufficiently. It is necessary to make efforts on raising the awareness about this problem during the period of university education, but also continuously within the framework of continuing education (20, 21).

Conclusion

From the results of this research conducted on a representative sample of dentists in the Republic of Croatia, we can conclude that the rates of occupational injuries are disturbing. More than 63% of respondents had some type of injury of the eyes in dentistry may be caused by mechanical or chemical factors. In this study, 13.37% of respondents had such an injury. Mechanical injury was most often caused by pieces of amalgam and cement, while one dentist made eye contact with the blood of an infected patient (HBV and HCV).

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Zaključak

Iz rezultata ovog istraživanja provedenog na reprezentativnom uzorku stomatologa u Republici Hrvatskoj, možemo zaključiti da su anketirani stručnjaci zabrinuti zbog učestalosti ozljeda na radu. Više od 63% ispitanika navelo je neki ozljede u urbanoj sredini gdje je procijepljenost veća, u odnosu prema ruralnim krajevima.

U istraživanju provedenom u Njemačkoj (16) analizirala se izloženost stomatologa i studenata stomatologije krvnim patogenima. Potvrđeno je da je vještina stomatologa vrlo važna u nastanku potencijalnih ozljeda. Tako su studenti stomatologije imali dva puta više ozljeda iglom, negoli stomatologi s radnim iskustvom. Barem jedan ubodni incident u radnom vijeku navelo je 54.3% stomatologa. Njih čak 25% izjavilo je da se ne služe zaštitnom maskom, a 55.6% da se ne koriste ni zaštitnim naočalama tijekom rada. Kriterij stresa i gubitka koncentracije istaknulo je kao okidač u slučaju ubodnog incidenta 50% ispitanika. Umor kao razlog za ozljedu navelo je njih 32.9%.

Ozljedu oka u stomatološkoj djelatnosti mogu uzrokovati mehanički ili kemijski čimbenici. U ovom istraživanju navelo je 13.37% ispitanika. Najčešće je bila riječ o mehaničkoj ozljedi kodamćima amalgama i cementa, a jednom stomatologu je spojnicu oka došla u doticaj s krvlju zaraženog pacijenta (HBV i HCV).

Zarra i Lambrianidis ispitivali su učestalost ozljeda oka među specijalistima endodonticije u Grčkoj (6). U petogodišnjem razdoblju pratri su infekcije i mehaničke ozljede 147 ispitanika. Istaknuli su da je njih 73% prijavilo incident. Prištemnog spol je godine rada nisu utjecale na frekvenciju ozljeda.

Istraživanje u dijelu Saudijske Arabije obuhvatilo je 233 stomatologa. Više od 51% ispitanika navelo je kao incident ozljedu oka. Rizik se povećavao s godinama rada i zbog nedovoljne izobrazbe. Zabilježen je i podatak da se 15% stomatologa nikad nije koristilo zaštitnom opremom (17).

Među uzroznicima profesionalnih bolesti i ozljeda na radu koje su ispitanici naveli kao najvažnije rizičне čimbenike, u našem istraživanju ističu se nepravilan položaj tijela pri radu (N = 402), stres (N = 291) te infekcije (N = 215). Nepravilan položaj tijela pri radu glavni je uzročnik bolova u svijetu, donjem dijelu leđa i ramenima, što je potvrđeno u mnogo- brojnim istraživanjima (5, 18, 19). Stres, gubitak koncentracije i umor također su navedeni kao važni čimbenici za nastanak ubodnog incidenta u istraživanju Wickera i Raubenaua provedenog Njemačkoj (16). Infekciju je, kao rizični čimbenik, navelo 215 ispitanika, što podupire stajalište da su stomatologi svjesni te opasnosti, ali možda ne i dovoljno. Jačati svijest o tom problemu potrebno je veće tijekom studija, ali i kontinuirano u sklopu trajne izobrazbe (20, 21).
injuries sustained while working with patients, most often a stabbing incident. The respondents were aware of the risks at their workplace and they identified the improper position of the body at work, stress, infections and noise as the most important risk factors. Knowledge of risk factors is the first step in injury prevention; hence we can conclude that our respondents were largely aware of the dangers surrounding them. Nevertheless, the occurrence of injuries was high. We may also reduce some risk factors ourselves and/or avoid their undesirable effects by careful and preventive behavior. Dentists need to be alert to do their job safely and efficiently, understand the need for on-going education and training to keep pace with demands of dental profession and design prevention programs in order to raise awareness about this issue. The risk of transmission of infections in dental work (hepatitis, HIV) dictates the need for lifelong care in terms of systemic preventive action.

Since 2014, the “Symposium on Occupational Diseases and Diseases Related to Work at Dentists” has been held regularly in Croatia, with the purpose of introducing dentists to the existing risks to their health and ways of preventive action and responsible behavior. Competition market unfortunately dictates the pace of work where, due to speed and high levels of stress, working conditions become unfavorable and the risk of injury at work increases.

Therefore, it is important to continuously educate dentists, during their study and later, enabling them to be ready to face the risk factors and behave responsibly during their activity, not to impair their own health while caring for oral health of their patients.

Conflict of interest
None declared

Sukob interesa
Autori nisu bili u sukobu interesa.

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