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DOPRINOS SPREČAVANJU ŠIRENJA INFEKCIJE U STOMATOLOŠKOJ ORDINACIJI

CONTRIBUTION TO INFECTION SPREAD PREVENTION IN DENTAL OFFICE

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Sažetak

Uvod: Intervencije u zubnim ordinacijama podrazumevaju direktan kontakt sa pljuvačkom i krvlju pacijenata pa je, samim tim, stomatološko osoblje izloženo stalnom riziku od prenosa različitih infektivnih oboljenja.

Cilj rada bio je prikaz načina i puteva širenja infekcije u stomatološkim ordinacijama, kao i mera njihovog sprečavanja radi zaštite zdravlja stomatološkog osoblja i pacijenata.

Rizik od infekcije u zdravstvenim ustanovama, posebno u stomatološkim ordinacijama, permanentno je prisutan. Intervencije u ustima podrazumevaju kontakt sa pljuvačkom i krvlju pacijenta, kao i sa velikim brojem patogenih mikroorganizama, koji čine stalnu ili tranzitornu oralnu floru pacijenta. Porast broja obolelih od hepatitisa B i hepatitisa C, kao i inficiranih virusom HIV, upućuje na dodatni oprez. Pandemija virusa COVID-19 determinisala je još rigoroznije preporuke u cilju sprečavanja širenja ove infekcije. Od izuzetnog je značaja da stomatološko osoblje, poznavajući karakteristike, načine i puteve širenja infekcije, preduzme odgovarajuće aktivnosti kako bi ukupnim naporima doprinelo sprečavanju i suzbijanju zaraznih bolesti i istovremeno zaštitilo sebe i svoje pacijente.

Zaključak: Poštovanje komplananse preporučenih procedura kontrole infekcije imperativ je za celokupno stomatološko osoblje

Gljučne reči: infekcija, stomatološko osoblje, zaštita

Abstract

Introduction: Interventions in dental offices involve direct contact with the saliva and blood of patients, thus, dental staff is exposed to a constant risk of transmission of various infectious diseases

Aim of the paper was to present the ways and means of spreading infection in dental offices, as well as measures to prevent it in order to protect the health of dental staff and patients.

The risk of infection in healthcare institutions, especially in dental offices, is ever-present. Interventions in the mouth involve contact with the patient's saliva and blood, as well as with numerous pathogenic microorganisms that make up the patient's permanent or transient oral flora. The increase in the number of hepatitis B and hepatitis C patients, as well as those infected with HIV, indicates additional caution. The COVID-19 pandemic determined even more rigorous recommendations to prevent the spread of this infection. It is crucial that dental staff, bearing in mind the characteristics and ways of spreading the infection, undertake appropriate activities to prevent and control infectious diseases, thereby protecting themselves and their patients.

Conclusion: Compliance with recommended infection control procedures is imperative for the entire dental staff.

Key words: infection, dental staff, protection

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Uvod

Intervencije u zubnim ordinacijama podrazumevaju direktan kontakt sa pljuvačkom i krvlju pacijenata pa je, samim tim, stomatološko osoblje izloženo stalnom riziku od prenosa različitih infektivnih oboljenja. Usna duplja je kolektor različitih bakterijskih i gljivičnih vrsta koje se preko aerosoli šire ordinacijom za vreme stomatoloških intervencija, što može rezultovati respiratornim infekcijama i infekcijama oka stomatologa^{1,2}. Porast obolelih od hepatitisa B i hepatitisa C, kao i inficiranih virusom humane imunodeficijencije (HIV), citomegalovirusom (CMV) i herpes simplex virusom (HSV tip I i II) zahteva dodatni oprez u svakodnevnoj stomatološkoj praksi, kako bi se opštim i posebnim merama opreza sačuvalo zdravlje stomatološkog osoblja i pacijenata.

Evidencija transmisije infekcija u stomatološkim ordinacijama bazirana je na rezultatima seroprevalentnih studija, epidemioloških istraživanja i na prikazima slučajeva³. Ipak, treba imati u vidu da 50% transmisija virusa nije dokumentovano³, jer su dale simptome na supkliničkom nivou³.

Današnja stomatološka doktrina zahteva da se svakom pacijentu na stomatološkoj stolici pristupa kao potencijalnom izvoru zaraze. To znači da članovi stomatološkog tima moraju sprovesti sve predviđene higijensko-preventivne mere, kako bi zaštitili svakog od svojih pacijenata, ali i sebe. Sa druge strane, bez obzira na medijsku zastupljenost mera opreza i prevencije širenja virusnih infekcija u zdravstvenim ustanovama, istraživanja brojnih autora ukazala su na to da zaposleni u stomatološkoj praksi i studenti stomatologije^{1,5,6} slabije poznaju načine zaštite.

Cilj rada bio je prikaz načina i puteva širenja infekcije u stomatološkim ordinacijama, kao i mera njihovog sprečavanja radi zaštite zdravlja stomatološkog osoblja i pacijenata.

Rizik od virusnih infekcija u stomatološkoj ordinaciji

Zaposleni u stomatološkoj praksi, posebno hirurškim granama, izloženi su riziku od virusnih infekcija nego ostali zdravstveni radnici. To se odnosi i na infekciju HIV, koja progresivno vodi do sindroma SIDA, ali posebno na viruse hepatitisa B i hepatitisa C (HBV i HCV), s obzirom na njihovu učestalost. Naime, prevalenca HBV-a u Jugoistočnoj Evropi iznosi od 2% do 7%, što je znatno više nego u razvijenim zemljama³.

Introduction

Interventions in dental offices involve direct contact with the saliva and blood of patients, thus, dental staff is exposed to a constant risk of transmission of various infectious diseases. The oral cavity is the habitat of various bacteria and fungi that spread via aerosols throughout the dental office during dental interventions, which can result in respiratory and eye infections of the dentist^{1,2}. The increase in patients with hepatitis B and hepatitis C, as well as those infected with the human immunodeficiency virus (HIV), cytomegalovirus (CMV), and herpes simplex virus (HSV type I and II) requires additional caution in everyday dental practice, in order to preserve the health of dental staff and patients.

The record of infection transmission in dental offices is based on the results of seroprevalence studies, epidemiological research, and case reports³. However, it should be considered that 50% of virus transmissions were not documented, given that they presented with symptoms at a subclinical level³.

Today's dental doctrine requires that every patient in the dental chair be approached as a potential source of infection. This means that dental staff must implement all the prescribed hygienic-preventive measures to protect each of their patients, as well as themselves. On the other hand, regardless of the media coverage of precautionary measures and the prevention of the spread of viral infections in healthcare institutions, studies by numerous authors have shown that employees in dental offices and dental students are less familiar with ways of protection^{1,5,6}.

The aim of the study was to present the ways and means of spreading infection in dental offices, as well as measures to prevent it in order to protect the health of dental staff and patients.

The risk of viral infections in the dental office

Employees in dental practice, especially in surgical branches, are more exposed to the risk of viral infections than other healthcare workers. This also applies to HIV infection, which progressively leads to the AIDS syndrome, and especially to hepatitis B and C viruses (HBV and HCV), given their frequency. Namely, the prevalence of HBV in Southeast Europe ranges from 2% to 7%, which is significantly higher than in developed countries³.

HBV infekcija je kod stomatologa od tri do pet puta češća nego kod drugih zdravstvenih radnika. Serološke studije Gillcrista i saradnika i Martinsa i saradnika dokazale su veću prevalencu HBV-a, sa značajnijim transmissionim potencijalom kod stomatologa nego kod opšte populacije; to je posebno izraženo kod oralnih i maksilofacijalnih hirurga i parodontologa^{8,9}.

Hepatitis B i hepatitis C i HIV infekcija prenose se istim putem: seksualnim kontaktom, vertikalnom transmisijom (sa majke na novorođenče) i preko krvi i krvnih produkata (kontaminiranim špricovima iatrogeno ili među intravenskim narkomanima). Nema rizika da će se infekcija u zdravstvenim ustanovama preneti u okviru svakodnevnih, uobičajenih kontakata, kao što su boravak u istoj ordinaciji ili čekaonici, zajednička upotreba toaleta, kašljanje ili kihanje. Virusna infekcija prenosi se direktno (neposrednim kontaktom stomatologa i pacijenta) ili indirektno (preko kontaminiranih instrumenata i površina).

Infekcija se u stomatološkoj ordinaciji može preneti na:

- 1) zdravstvene radnike^{2,10-12}:
 - povredom iglom ili nekim drugim oštirim instrumentom prethodno kontaminiranim krvlju zaražene osobe;
 - izlaganjem otvorene rane krvi ili drugim telesnim tečnostima zaraženog pacijenta;
 - ukoliko mukozna membrana (sluzokoža usta ili oka) bude u kontaktu sa inficiranom krvi ili drugom telesnom tečnošću;
- 2) pacijenta^{4,13}:
 - kontaminiranim instrumentima (iglama, borerima, špricovima, skalpelima i drugim oštrim instrumentima) koji se višekratno koriste, a nisu adekvatno dezinficirani i sterilisani;
 - kontaktom sa krvlju zaraženog zdravstvenog radnika.

Krv je telesna tečnost kojom se virusi u zdravstvenim ustanovama najčešće prenose¹⁴. U stomatologiji su krvave intervencije realnost. Čak i rutinske procedure podrazumevaju pojavu kapilarnih krvarenja, te je kontakt sa zaraznim materijalom skoro uvek prisutan. Kako bi se od transmisije zaštitili i zdravstveno osoblje i pacijenti, svaki pacijent se posmatra kao prenosilac virusa, a sva krv kao potencijalno kontaminirana. Postoje dokazi da se virusi hepatitisa, osim preko krvi, mogu preneti pljuvačkom i gingivalnim fluidom zaraženog pacijenta, što rizik povećava na alarmantan nivo^{15,16}. Opisan je i slučaj prenosa HBV-a sa zaraženog pacijenta na zubnog tehničara preko nedezinficiranog otiska¹⁷.

HBV infection is three to five times more common among dentists than among other healthcare workers.

Serological studies by Gillcrist et al. and Martins et al. demonstrated a higher prevalence of HBV, with a greater transmission potential in dentists than in the general population; this is especially pronounced in oral and maxillofacial surgeons and periodontists^{8,9}.

Hepatitis B, hepatitis C, and HIV infection are transmitted in the same way: sexual contact, vertical transmission (from mother to newborn), and through blood and blood products (contaminated syringes iatrogenically or among intravenous drug abusers). There is no risk of infection in healthcare facilities being transmitted through common everyday contact, such as being in the same dental office or waiting room, sharing the toilet, coughing, or sneezing. Viral infection is transmitted directly (through direct contact between the dentist and the patient) or indirectly (through contaminated instruments and surfaces).

In the dental office, the infection can be transmitted to:

- 1) healthcare workers^{2,10-12}:
 - injury with a needle or other sharp instruments previously contaminated with the blood of an infected person;
 - by exposing an open wound to the blood or other body fluids of an infected patient;
 - if the mucous membrane of the mouth or eyes is in contact with infected blood or other body fluid;
- 2) patient^{4,13}:
 - via contaminated instruments (needles, drills, syringes, scalpels, and other sharps) that are used multiple times and are not adequately disinfected and sterilized;
 - through contact with the blood of an infected healthcare worker.

Blood is the body fluid through which viruses are most often transmitted in healthcare institutions¹⁴. In dentistry, bloody interventions are quite common given that even routine procedures involve capillary bleeding. Therefore, contact with infectious material is almost always present. To protect both the staff and patients from transmission, each patient is regarded as a carrier, and all blood as potentially contaminated. There is evidence that hepatitis viruses, in addition to blood, can be transmitted by the saliva and gingival fluid of an infected patient, which increases the risk to an alarming level^{15,16}. A case of HBV transmission from an infected patient to a dental technician via a non-disinfected impression was also described¹⁷.

Povrede stomatologa na radnom mestu rezultat su zahteva za velikom preciznosti u radu na malom i ograničenom prostoru, velike frekvence pacijenata i upotrebe različitih stomatoloških instrumenata⁷. Isto tako, većina stomatoloških sestara svake godine doživi neku vrstu povrede ubodom na iglu ili na neki drugi oštri instrument (skalpel, lentula, nerv igla, matrica, nožić, makazice i dr.). Rizik za transmisiju infekcije sa pacijenta na stomatološku sestru ovim putem je mali, ali je ipak prisutan i realan, što je prikazano u Tabeli 1.

Iako nošenje rukavica može umanjiti rizik od inficiranja prilikom uboda iglom, treba pomenuti da upotreba rukavica ne sprečava povrede oštrim predmetima i posekotine¹⁴. Stoga, napor u sprečavanju širenja infekcije moraju se usmeriti ka sprečavanju povređivanja bezbednim rukovanjem iglama i drugim oštrim predmetima i njihovim bezbednim odlaganjem. Zdravstvene radnike treba podržati u prijavljivanju povreda i izlaganja zaraznom materijalu odgovarajućoj službi u okviru zdravstvene ustanove, i to neposredno nakon što do njih dođe.

Work-related injuries to dentists are the result of demands for great precision in working in a small and limited space, high frequency of patients, and the use of various dental instruments³. Likewise, every year most dental nurses experience a needlestick or sharps injury (scalpel, lentulo spiral, nerve needle, matrix, knife, scissors, etc.). The risk of the transmission of infection from the patient to the dental nurse in this way is small, but still present and real, and it is shown in Table 1.

Even though wearing protective gloves can reduce the risk of infection during a needlestick injury, it should be noted that the use of gloves does not prevent injuries from sharp objects¹⁴. Therefore, efforts to prevent the spread of infection must be directed towards preventing injuries through safe handling and safe disposal of needles and other sharps. Healthcare workers should be supported in reporting injuries and exposures to infective material to the appropriate department within the healthcare facility, immediately after they occur.

Tabela 1. Rizik od prenosa virusa preko povređene kože (perkutani kontakt)^{2,18,19}
Table 1. Risk of virus transmission through injured skin (percutaneous contact)^{2,18,19}

| | |
|---|------------------------------|
| Virus humane imunodeficijencije (HIV) / Human immunodeficiency virus (HIV) | 0.4% (nizak) (low) |
| Virus hepatitisa B / Hepatitis B virus | 9% – 30% (visok) (high) |
| Virus hepatitisa C / Hepatitis C virus | 3% – 10% (umeren) (moderate) |

Tretman pacijenata zaraženih infektivnom bolešću

Svaki pacijent ima prava na poštovanje i stomatološku zaštitu. Odnos lekara i pacijenta zasnovan je na poverenju, te se očekuje da se uzimanjem anamnestičkih podataka identifikuju oboleli od zaraznih bolesti. Ipak, empirijski je dokazano da pacijenti neretko kriju svoju bolest, bojeći se nerazumevenja i odbijanja tretmana⁷. Izbegavanje pružanja pomoći inficiranim i pacijentima rizika, odlaganje ili zakazivanje termina u večernjim satima rezultat su nedovoljnog poznavanja mera zaštite od zaraznih bolesti od strane stomatološkog osoblja⁷. Istraživanja su pokazala da inficirane pacijente češće prihvataju mlađi lekari i lekari muškog pola, i to u ordinacijama sa više osoblja³.

Treatment of patients with an infectious disease

Each patient has the right to be treated respectfully and courteously, as well as to receive proper dental care. The doctor-patient relationship is based on trust; therefore, it is expected that anamnestic data will identify those suffering from infectious diseases. Nevertheless, it has been empirically proven that patients often hide their diseases, fearing a lack of understanding and treatment refusal⁷. Refusing to help infected and risk patients, and postponing or scheduling appointments in the evening are the result of the fact that dental staff has insufficient knowledge of preventive measures against infectious diseases⁷. Research has shown that infected patients are more often treated by younger and male doctors in dental offices with more staff³.

Nasuprot tome, studija Blatchforda i saradnika pokazala je da pacijenti veruju u informisanost svojih lekara i u mere opreza koje u svojim ordinacijama primenjuju, te je 82% ispitanika izjavilo da bi zadržalo svog stomatologa i pored saznanja da je zaražen HBV infekcijom²⁰.

Mere zaštite od infektivnih bolesti u stomatološkoj ordinaciji

Rizik od transmisije uzročnika infekcija koje se mogu preneti krvlju ne može se u potpunosti eliminisati, ali se može svesti na najmanju moguću meru sprečavanjem izlaganja inficiranoj krvi i telesnim tečnostima.

Opšte mere opreza predstavljaju komplet preporučenih praktičnih postupaka dat od strane profesionalnih zdravstvenih agencija; ukoliko se pravilno primenjuje, nepotrebno izlaganje krvi i telesnim tečnostima²¹ svodi se na minimum. Uputstva ADA (engl. *America Dental Association*) za kontrolu infekcije primenjuju se u različitim delovima sveta²². Uvek treba poći od činjenice da je svaka krv potencijalno infektivna, bilo da potiče od pacijenta, stomatologa, lekara ili sestara. Alomari i saradnici su naveli da su mere opreza zastupljenije u društvenom nego u privatnom stomatološkom sektoru, što se može objasniti jačom kontrolom njihove primene²³.

U opšte mere opreza^{1,24} spadaju:

- bezbedno rukovanje oštrim medicinskim instrumentima i njihovo bezbedno odlaganje;
- bezbedna dekontaminacija instrumenata i ostale kontaminirane opreme;
- higijena osoblja;
- primena zaštitnih barijera radi sprečavanja direktnog kontakta sa telesnim tečnostima;
- bezbedno odlaganje medicinskog otpada.

Bezbedno rukovanje oštrim medicinskim instrumentima i njihovo bezbedno odlaganje

Sa svim oštrim instrumentima i predmetima treba postupati krajnje oprezno u svakom trenutku^{18,25}. To podrazumeva sledeće:

- upotrebljeni instrumenti i oštri predmeti nikada se ne dodaju direktno u ruke drugoj osobi;
- upotrebljene igle na špricovima za jednokratnu upotrebu prekrivaju se originalnim poklopcem, nikada se ne savijaju i lome;
- igle i špricovi se odmah nakon upotrebe odlažu u posudu sa čvrstim zidovima (kontejner), u kojoj ostaju sve do kontaminacije;

In contrast, a study by Blatchford et al. suggested that patients believe their doctors to be well-informed and apply precautionary measures in their dental offices. Thus, 82% of the respondents stated they would retain their dentist despite knowing they are infected with HBV²⁰.

Measures to protect against infectious diseases in the dental office

The risk of transmission of blood-borne infections cannot be entirely eliminated, but it can be minimized by preventing exposure to infected blood and body fluids.

General precautions are a set of recommended practical procedures provided by professional healthcare agencies; if applied correctly, unnecessary exposure to blood and body fluids is minimized²¹. The American Dental Association (ADA) guidelines for infection control are applied worldwide²². One should always start from the assumption that blood is potentially infective, whether it comes from a patient, dentist, doctor, or nurse. Alomari et al. stated that precautionary measures are more prevalent in the public than in the private dental sector, which can be explained by stronger control over their application²³.

General precautions^{1,24} include:

- safe handling of sharp medical instruments and their safe disposal,
- safe decontamination of instruments and other contaminated equipment,
- dental staff hygiene,
- application of protective barriers to prevent direct contact with body fluids,
- safe disposal of medical waste.

Safe handling and safe disposal of sharp medical instruments

All sharp instruments and objects should always be handled with extreme caution^{18,25}. This implies the following:

- used instruments and sharp objects are never passed directly into the hands of another person,
- used needles on disposable syringes are covered with the original cap, they are never bent or broken,
- needles and syringes are disposed of immediately after use in a container with solid walls, where they remain until decontamination,
- containers should not be overfilled; they are filled up to 3/4 of their volume,
- wearing thick rubber gloves when handling containers is mandatory,
- the container content is burned.

- kontejnere ne treba prepuniti; pune se do 3/4 svoje zapremine;
- prilikom rukovanja kontejnerima nose se debele gumene rukavice;
- sadržaj iz kontejnera se spaljuje.

Ukoliko je došlo do povrede oštrim predmetom, treba isforsirati krvarenje stiskanjem, ranu dobro isprati tekućom vodom i sapunom i pokriti vodootpornim flasterom. Budući da prednost antiseptičnih sredstava nije dokazana, ne treba ih upotrebljavati zbog mogućeg kaustičnog delovanja²⁵.

Bezbedna dekontaminacija instrumenata i ostale kontaminirane opreme

Izbor metode dekontaminacije upotrebljenih stomatoloških instrumenata i opreme zavisi od njihove namene (Tabela 2).

Postupak rada sa korišćenim instrumentima⁶ obuhvata sledeće etape:

- sve upotrebjene instrumente (sem nasadnih) potopiti u dezinficijens (2% glutaraldehyd, 5% formaldehyd, 1% NaOCl), čime se postiže inaktivacija virusa;
- instrumente očistiti, oprati i pripremiti za sterilizaciju; pritom, obavezno je nošenje zaštitnih rukavica za jednokratnu upotrebu;
- sterilizacija.

Sterilisani instrumenti se čuvaju u suvim, čistim uslovima, najbolje u metalnim kasetama. Kontrola sterilizacije sprovodi se fizičkim, hemijskim i biološkim metodama.

Dezinfekcijom se označava niz različitih postupaka kojima se uništavaju, inhibiraju ili uklanjaju vegetativni oblici mikroorganizama, ali ne nužno i bakterijske spore⁶. Dijamantske borere treba oprati deterdžentom, asepsolom i držati u alkoholu od 70%. Nasadne instrumente treba spolja prebrisati alkoholom i ne treba ih potapati u dezinficijens. Za sterilizaciju nasadnih instrumenata koriste se parni sterilizatori, ali je u rutinskim uslovima gotovo nemoguće obezbediti njihov dovoljan broj za nesmetan i neprekidan rad u ordinaciji.

In case of an injury with a sharp object, bleeding should be forced by squeezing, followed by washing the wound well with soap and running water and covering it with a waterproof plaster. Given that the advantage of antiseptic agents has not been proven, they should not be used due to a possible caustic effect²⁵.

Safe decontamination of instruments and other contaminated equipment

The choice of method of decontamination of used dental instruments and equipment depends on their purpose (Table 2).

The procedure of working with used instruments⁶ includes the following stages:

- soak all the used instruments (except handpieces) in a disinfectant (2% glutaraldehyde, 5% formaldehyde, 1% NaOCl) to inactivate the virus,
- clean, wash, and prepare the instruments for sterilization; while doing so, it is mandatory to wear disposable protective gloves,
- sterilization.

Sterilized instruments are stored in dry, clean conditions, preferably in metal cassettes. Sterilization control is carried out using physical, chemical, and biological methods.

Disinfection refers to a number of different procedures that destroy, inhibit, or remove vegetative forms of microorganisms, but not necessarily bacterial spores⁶. Diamond burs should be washed with detergent and asepsol and kept in 70% alcohol. Handpieces should be wiped with alcohol but should not be immersed in a disinfectant. Steam sterilizers are used to sterilize handpieces. However, in routine conditions, it is almost impossible to ensure a sufficient number of them for smooth and continuous work in the dental office.

Tabela 2. Izbor metode dekontaminacije^{21,25}
Table 2. Choice of decontamination method^{1,25}

| Nivo rizika / Risk level | Materijal / Material | Metoda dekontaminacije / Decontamination method |
|--------------------------|--|---|
| Visok / High | instrumenti koji probijaju kožu ili sluzokožu / Instruments that pierce the skin or mucous membrane | jednokratna upotreba / single-use |
| Umeren / Moderate | instrumenti koji dolaze u kontakt sa povređenom ili oštećenom kožom, sluzokožom ili zubima / Instruments that get into contact with injured or damaged skin, mucosa, or teeth | Sterilizacija, iskuvavanje, dezinfekcija / sterilization, boiling, disinfection |
| Nizak / Low | oprema koja dolazi u kontakt sa neoštećenom kožom / Equipment that gets into contact with intact skin | detaljno pranje / thorough wash |

Higijena opreme i stomatološke ordinacije

Deterdžent i vruća voda dovoljni su za rutinsko čišćenje podova, zidova, pločica i toaleta. Neophodno je stalno provetravanje prostorija. Ne preporučuje se upotreba tepiha i itisona u zdravstvenim ustanovama. Mrlje od krvi sa poda treba pažljivo ukloniti materijalom koji dobro upija (papirnatim ubrusima), obavezno noseći pritom rukavice od deblje gume. Mrlje od krvi i pljuvačke na radnim površinama i fontanama pre pranja treba prekriti dezinficijensom. Sve delove stolice i stomatološke mašine treba dezinfikovati posle svakog pacijenta.

Higijena u zubotehničkim laboratorijama

Svi navedeni principi higijene odnose se i na zubotehničku laboratoriju. Radovi koji su došli u kontakt sa krvlju ili pljuvačkom pre slanja u zubotehničku laboratoriju potapaju se u dezinficijens na bazi hlora. Za otiske ZOE-pastom koristi se 2% glutaraldehid¹⁷.

Higijena stomatološkog osoblja

Detaljno pranje ruku neophodno je i pre i posle kontakta sa pacijentom, uz sporadičnu upotrebu dezinficijensatnog sredstva. Ruke treba brisati kompresama za jednokratnu upotrebu ili ih sušiti toplim vazduhom. Obavezna je upotreba rukavica za jednokratnu upotrebu. Rukavice treba, nakon oštećenja, kao i u toku dužih procedura, zameniti drugim parom²⁶. Nikada ne treba prati rukavice umesto ruku, jer to može narušiti njihov integritet.

Dental equipment and dental office hygiene

Detergent and hot water are sufficient for routine cleaning of floors, walls, tiles, and toilets. Constant ventilation of the premises is necessary. It is not recommended to use carpets in healthcare facilities. Blood stains on the floor should be carefully removed with absorbent material (paper towels), wearing thick rubber gloves. Blood and saliva stains on work surfaces and fountains should be covered with a disinfectant before washing. All parts of the chair and the dental machine should be disinfected after each patient.

Hygiene in dental laboratories

All the listed principles of hygiene also apply to the dental laboratory. Works that come into contact with blood or saliva are immersed in a chlorine-based disinfectant before being sent to the dental laboratory. 2% glutaraldehyde is used for ZOE impressions¹⁷.

Dental staff hygiene

Thorough hand washing is essential both before and after the contact with the patient, with sporadic use of a disinfectant. Hands should be wiped with disposable compressed towels or dried with warm air. The use of disposable gloves is mandatory. After being damaged, as well as during longer procedures, gloves should be replaced with another pair²⁶. Gloves should never be washed, as this can damage their integrity.

Primena zaštitnih barijera radi sprečavanja direktnog kontakta sa telesnim tečnostima

Iz higijenskih razloga obavezno je nošenje propisane radne odeće i obuće. Potrebno je često menjati zaštitnu odeću i izbegavati njeno pranje van medicinske vešernice. Ukoliko je kontaminirana, odeća se pre pranja potapa u dezinficijens.

Smeša vode iz irigacionog sistema nasadnih instrumenata, pljuvačke i, neretko, krvi stvara aerosol. Potrebno je sprečiti dodir tog spreja sa sluzokožom usta, nosa i očiju ili kožom lica. Zaštitne maske moraju prekrivati nosnu i usnu šupljinu, a najbolji su prozirni štitičnici koji pokrivaju celo lice. Nošenje zaštitnih naočara sprečava¹² infekciju oka i transmukozni prenos virusa¹².

Zaštita pacijenta u stomatološkim ordinacijama

Pacijenta u stomatološkoj ordinaciji štitimone samo sprovođenjem dezinfekcije i sterilizacije nego i primenom potrošnog materijala za jednokratnu upotrebu (špricevi, igle, sisaljke, papirnate komprese) tokom kliničkog pregleda ili dijagnostičko-terapijskog postupka.

Bezbedno odlaganje medicinskog otpada

Kontaminirani materijal odlaze se u posebne kese i kontejnere čvrstih zidova i naknadno spaljuje, u skladu sa Pravilnikom o upravljanju medicinskim otpadom²⁷. Svako rukovanje sa otpadnim materijalom podrazumeva nošenje gumenih rukavica i zaštitnih naočara.

Otpadni materijal koji nije kontaminiran telesnim tečnostima odlaze se kao i svaki drugi otpad.

Kontinuirana edukacija

Khanghani i saradnici su u svom istraživanju ukazali na nedovoljnu obaveštenost stomatologa i studenata stomatologije o prenošenju infektivnih bolesti²⁸. Istraživanja su pokazala da se u slabije razvijenim zemljama manje koriste mere lične zaštite; tako u Iranu zaštitne rukavice nosi svega 25% stomatologa, a u Zapadnoj Evropi i Severnoj Americi 90% stomatologa²⁸. Guruprasad i saradnici su ukazali na to da profesionalno osoblje i mediji^{18,24} pružaju slabu podršku edukaciji stomatološkog osoblja o rizicima prenosa infekcije i merama zaštite.

Application of protective barriers to prevent direct contact with body fluids

For hygienic reasons, it is mandatory to wear special clothes and footwear. It is necessary to change protective clothing often and avoid washing it outside the medical laundry room. If contaminated, the clothes are soaked in a disinfectant before washing.

A mixture of water from the irrigation system of handpieces, saliva, and, often blood creates an aerosol. It is imperative to prevent the spray from getting in contact with the mucous membrane of the mouth, nose, and eyes or the skin of the face. Protective masks must cover the nasal and oral cavity, and transparent visors that cover the entire face are the best choice. Wearing protective glasses prevents eye infection and transmucosal transmission of viruses¹².

Patient protection in dental offices

We protect the patient in the dental office not only by carrying out disinfection and sterilization but also by using disposables (syringes, needles, suction cups, compressed paper towels) during the clinical examination or diagnostic-therapeutic procedure.

Safe disposal of medical waste

Contaminated material is disposed of in special bags and containers with solid walls and subsequently incinerated, in accordance with the Rulebook on Medical Waste Management²⁷. Any handling of waste material requires wearing rubber gloves and safety glasses.

Waste material that is not contaminated with body fluids is disposed of like any other waste.

Continuous education

In their study, Khanghani et al. suggested insufficient awareness of dentists and dental students about the transmission of infectious diseases²⁸. Studies have shown that less developed countries use fewer personal protection measures; thus, only 25% of dentists in Iran wear protective gloves, compared to 90% in Western Europe and North America²⁸. Guruprasad et al. indicated that professional staff and the media^{18,24} provide little support for the education of dental staff about the risks of infection transmission and protective measures. Continuous education and short courses on the transmission of infections and measures to prevent the spread of infection should improve the knowledge of dental staff,

Stalna edukacija i kratki kursevi o prenosu infekcija i merama sprečavanja širenja infekcije treba da unaprede znanje stomatološkog osoblja, koje je u svakodnevnom riziku od mogućih oboljenja²⁹. Od posebne je važnosti ukazati na značaj vakcinacije protiv hepatitisa B u smanjenju prevalencije bolesti među stomatološkim osobljem^{9,10}.

Rizik od infekcije COVID-19 u stomatološkoj ordinaciji

Jedan od osnovnih problema u prethodnim godinama predstavljala je pandemija virusa iz grupe koronavirusa SARS-CoV-2 (engl. *severe acute respiratory syndrome coronavirus 2*) ili COVID-19 (engl. *coronavirus disease 2019*), proglašena od strane Svetske zdravstvene organizacije (SZO; engl. *World Health Organization – WHO*)³⁰. Zbog patogenosti virusa i njegovog lakog širenja preko aerosoli pljuvačke³¹, velika zabrinutost u stomatološkoj javnosti je realna. Zbog bliske interakcije sa pacijentom, stomatolozi su izloženi riziku od zaražavanja virusom COVID-19 i drugim respiratornim infekcijama. Standardne mere zaštite u stomatološkim ordinacijama pokazale su se kao neadekvatne u sprečavanju širenja infekcije COVID-19. Naime, zbog prirode stomatoloških tretmana i količine kapljica i aerosoli koju oni mogu proizvesti, izloženost i zaražavanje zdravstvenih radnika na radnom mestu³³ bili su veći, što su potvrdile dosad sprovedene studije. Rad zdravstvenih radnika, uključujući stomatološko osoblje, sa pacijentima zaraženim infekcijom COVID-19, pored pružanja zdravstvenih usluga, podrazumeva učestvovanje u nizu preventivnih mera čiji je cilj spečavanje opšteg širenja infekcije³³.

Do razboljevanja u stomatološkim ordinacijama dolazilo je zbog nedostatka adekvatne zaštitne opreme i nedovoljne obučenosti osoblja za prevenciju širenja respiratornih bolesti³³. SZO je propisala mere zaštite na radu u cilju poboljšanja fizičkog i mentalnog zdravlja zdravstvenih radnika³⁴.

Prenos virusa COVID-19 u stomatološkim ordinacijama izazvan je upotrebom visokoturažnih nasadnih i ultrazvučnih instrumenata (engl. *high-speed handpieces or ultrasonic instruments*), s obzirom na njegovu izuzetno veliku koncentraciju u aerosolima i kapljicama pljuvačke koje relativno dugo ostaju u vazduhu i mogu kontaminirati radne površine u stomatološkoj ordinaciji³⁵.

who are at daily risk of possible diseases²⁹. It is crucial to point out the importance of vaccination against hepatitis B in reducing the prevalence of the disease among dental staff^{9,10}.

The risk of COVID-19 infection in the dental office

One of the main problems in previous years was the pandemic of the virus from the group of coronaviruses—SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) or COVID-19 (Coronavirus Disease 2019), declared by the World Health Organization (WHO).³⁰ Due to the pathogenicity of the virus and its easy spread via saliva aerosols³¹, there is a great concern among dental professionals. Due to close interaction with patients, dentists are exposed to the risk of contracting the COVID-19 virus and other respiratory infections. Standard protection measures in dental offices have proven inadequate in preventing the spread of COVID-19. Namely, given the nature of dental treatments and the amount of droplets and aerosols they can produce, the exposure and infection of healthcare workers at the workplace³³ were higher, as confirmed by studies conducted to date. In addition to providing healthcare services, the work of healthcare workers with patients with COVID-19 involves the application of a series of preventive measures against the spread of the infection³³.

The lack of adequate protective equipment and insufficient training of staff on the prevention of respiratory diseases account for their spread in dental offices³³. The WHO prescribed occupational safety measures to improve the physical and mental health of healthcare workers³⁴.

The transmission of the COVID-19 virus in dental offices is caused by the use of high-speed handpieces and ultrasonic instruments, given its extremely high concentration in aerosols and saliva droplets that remain in the air for a relatively long time and can contaminate worktops in the dental office³⁵.

At room temperature, COVID-19 is highly infectious on surfaces such as dental chairs, spittoons, and dental instruments. The virus may remain there for up to three days^{35,36}. Coughing and sneezing of patients should not be ignored either. Particles can be retained on metal, plastic, or glass surfaces, which dentists and their assistants frequently touch³⁶.

Na sobnoj temperaturi, COVID-19 je visoko infektivan na površinama kao što su stomatološke stolice, pljuvaonice i zubni instrumenti; tu se virus može zadržati do tri dana^{35,36}. Ne treba zanemariti ni kašalj ni kihanje pacijenata. Čestice se mogu zadržati na metalu, plastici ili staklenim površinama, koje stomatolozi i njihovi asistenti često dodiruju³⁶. Dakle, neophodni su svakodnevna dezinfekcija i čišćenje površina u stomatološkim ordinacijama. Kontaminirani instrumenti predstavljaju potencijalnu pretnju drugim pacijentima^{35,36}.

U toku pandemije, stomatološka udruženja dala su jasnu preporuku: odlaže se lečenje pacijenata sa respiratornim oboljenjima koji nemaju potrebu za hitnim stomatološkim pregledom i elektivnom interencijom³². Pre svakog stomatološkog tretmana, neophodna je procena zdravstvenog stanja pacijenta, što se najjednostavnije čini merenjem telesne temperature i popunjavanjem upitnika. Ukoliko kod pacijenta nema simptoma ili dodatnih faktora rizika, može se obaviti stomatološki tretman, uz korišćenje standardnog protokola. Pranje ruku i pre i nakon tretmana pacijenta sprečava unakrsnu infekciju. Upotreba zaštitne opreme u vidu naočara, štitnika za lice (vizira), hirurških kapa, maski (N-95) i odeće za jednokratnu upotrebu svodi jatrogeno zaražavanje na minimum³³⁻³⁶. Antivirusne vodice za ispiranje usta smatraju se najpovoljnijim rešenjem za smanjenje virusnog opterećenja virusom u pljuvački; tako se smanjuje rizik od prenošenja infekcije na zdravstvene radnike³⁷. Svaki pacijent pre intervencije treba da ispere usta antiseptikom (0,2% vodonik-peroksidom), a u tretmanu treba koristiti koferdam kako bi se izbeglo prskanje³⁸.

Sve bolnice, uključujući stomatološke ordinacije, poštuju protokole o dezinfekciji svih površina (stolova, stolica, vrata, ručki), kao i one o izbegavanju dodirivanja dugmadi u stomatološkoj ordinaciji⁵¹. Posebnu pažnju treba obratiti i na propise o pravilnom odlaganju otpada³⁹. ADA je dala jasne preporuke da u slučaju COVID-19 infekcije treba sprovoditi samo hitne stomatološke tretmane^{53,54}. U hitne slučajeve spadaju hemoragija, trauma, jak bol, akutne infekcije, oralne i maksilofacijalne infekcije i oralne lezije koje urgentno treba rešiti³⁹.

Grip (influenca)

Grip je akutno zarazno, visoko-kontagiozno oboljenje respiratornog sistema, koje izaziva virus influenzae.

Therefore, daily disinfection and cleaning of surfaces in dental offices are considered essential. Contaminated instruments represent a potential threat to other patients^{35,36}.

During the pandemic, dental associations gave a clear recommendation to postpone the treatment of patients with respiratory diseases who do not require urgent dental examination and elective intervention³². Before any dental treatment, it is necessary to assess the patient's health condition by measuring body temperature and filling out a questionnaire. If the patient has no symptoms or additional risk factors, dental treatment can be performed using a standard protocol. Washing hands both before and after treatment prevents cross-infection. The use of protective equipment in the form of glasses, face shields (visors), surgical caps, masks (N-95), and disposable clothing minimizes iatrogenic contamination³³⁻³⁶. Antiviral mouthwashes are considered the most favourable solution for reducing the viral load in saliva, thereby reducing the risk of infection transmission to healthcare workers³⁷. Prior to the intervention, each patient should rinse their mouth with an antiseptic (0.2% hydrogen peroxide), and a rubber dam should be used during treatment to avoid splashing³⁸.

All hospitals, including dental offices, follow protocols on disinfection of all surfaces (tables, chairs, doors, handles), as well as those on avoiding touching buttons in the dental office⁵¹. Special attention should also be paid to regulations on proper waste disposal³⁹. The ADA has given clear recommendations that only urgent dental treatments should be performed in the event of a COVID-19 infection^{53,54}. Emergencies include haemorrhage, trauma, severe pain, acute infections, oral and maxillofacial infections, and oral lesions that need to be treated urgently³⁹.

Flu (Influenza)

Influenza is an acute, highly contagious disease of the respiratory system, caused by the influenza virus. It is mostly short-term and does not require special treatment, although in immunocompromised persons it may cause complications⁴⁰. General preventive measures in the dental office do not give satisfactory results in the prevention of airborne transmission via droplets. Wearing protective masks is one of the recommendations, as well as vaccination as a measure of specific protection (every autumn, in accordance with epidemiological recommendations).

Uglavnom je kratkotrajno, samoizlečivo, mada kod imunokompromitovanih osoba⁴⁰ može izazvati komplikacije. Opšte preventivne mere u stomatološkoj ordinaciji ne daju zadovoljavajuće rezultate u širenju ove infekcije kroz vazduh, kapljičnim putem. Preporučuje se nošenje zaštitnih maski, ali i vakcinacija kao mera specifične zaštite (svake jeseni, u skladu sa epidemiološkim preporukama).

Poštovanje komplijanse preporučenih procedura u vezi sa kontrolom infekcije imperativ je za celokupno stomatološko osoblje. Epidemiološka, mikrobiološka i ostala medicinska istraživanja nedvosmisleno ukazuju na to da se pravilnom primenom mera i principa zaštite smanjuje rizik od širenja zaraznih bolesti u stomatološkoj ordinaciji.

Zaključak

Poštovanje komplijanse preporučenih procedura kontrole infekcije imperativ je za celokupno stomatološko osoblje. Epidemiološka, mikrobiološka i ostala medicinska istraživanja nedvosmisleno ukazuju na to da se pravilnom primenom mera i principa zaštite smanjuje rizik od širenja zaraznih bolesti u stomatološkoj ordinaciji.

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Compliance with recommended infection control procedures is imperative for the entire dental staff. Epidemiological, microbiological, and other medical studies unequivocally indicate that proper application of measures and principles of protection minimizes the risk of spreading infectious diseases in the dental office.

Conclusion

Compliance with recommended infection control procedures is imperative for the entire dental staff. Epidemiological, microbiological, and other medical studies unequivocally indicate that proper application of measures and principles of protection minimizes the risk of spreading infectious diseases in the dental office.

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