

ORAL AND PERIODONTAL HEALTH IN CHRONIC USERS OF PSYCHOACTIVE SUBSTANCES

Kosta Todorović^{1,2}, Marija Bojović³, Milica S. Petrović⁴, Radmila Obradović³, Saša Bujanj⁵, Rade Jovanović⁶, Ivan Minić⁴, Ljiljana Kesić^{2,3}

The number of drug addicts increases rapidly, especially among the young. In Serbia, there are about 80.000 drug addicts. Long-term addicts experience changes in the mouth cavity.

The aim of this investigation was to determine the level of oral hygiene among the users of psychoactive substances while them and afterwards.

This investigation was performed on 26 patients of the Addiction Treatment Hospital „St. George“ in Niš. After an oral and periodontal clinical examination, the examinees were asked to fill in the questionnaire concerning the level of their oral hygiene.

Of the total of 26 patients, 24 (92%) were male, aged 27.9 years on the average. They had the history of use of narcotics for 7.38±3.0 years before the start of therapy. Heroin was used statistically significantly more than all other substances ($p<0.001$), while snorting was the most common way to consume it ($p<0.001$).

Clinical examinations confirmed that the majority of examinees had gingivitis - 23 (88.46%), which was a significantly more common diagnosis compared to periodontal disease ($p<0.05$).

While using narcotics, 24 examinees (92.31%) used toothbrushes, versus 26 (100%) in the period of abstinence. Five examinees (19.23%) used some other oral hygiene accessories, while in the period of abstinence 16 (61.54%) examinees used these ($p<0.01$). The daily frequency of tooth brushing increased ($p<0.05$). There were 22 active smokers (84,62%) among the examinees, but this number fell to 16 (61.54%) after giving up narcotics.

The most frequent oral diseases were gingivitis and periodontal disease at the time of drug addiction. Oral health was better in the period of abstinence than in the period of active addiction. It is an important fact that more drug addicts used toothbrushes in the period of abstinence than in the period of addiction. The role of doctors and dentists is very important, especially in the areas of motivation and education of these patients in oral health preservation. *Acta Medica Medianae* 2017;56(2) :64-69.

Key words: head and neck infections, complications, CT

University of Niš, Faculty of Medicine, Department of Oral surgery, Niš, Serbia¹
Clinic of dentistry, Niš, Serbia²
University of Nis, Faculty of Medicine, Department of Periodontology and Oral Medicine, Niš, Serbia³
University of Niš, Faculty of Medicine, Doctoral study student, Niš, Serbia⁴
University of Niš, Faculty of Sport and Physical Education, Niš, Serbia⁵
University of Niš, Faculty of Sport and Physical Education, Doctoral study student, Niš, Serbia⁶

Contact: Kosta Todorović
Boulevard dr Zorana Đinđića 81, 18000 Niš, Serbia
e-mail: kosta_todorovic@yahoo.com

Introduction

The abuse of psychoactive substances is characterized by frequent use of these substances

as the result of social and economic problems, and it is closely related to health problems (1).

In general, the number of abusers of psychoactive substances exceeded 200 million world wide in 2007, which represented 4.8% of the world population; the percentage is probably much higher today. By origin, psychoactive substances can be natural or synthetic. Chronic abuse of these substances causes different changes or modifications in the activity of an organism (2).

Drug addicts come from all socio-economic strata of the society. Both genders are affected equally. The motives for drug abuse are complex and vague (3). Many different types of psychoactive substances are in use today, but the most common are heroin, cocaine, marijuana, morphine, amphetamine and barbiturates (4).

In addition to their diverse harmful effects on overall health, regular (chronic) consumption

of psychoactive substances adversely affects oral health as well. The changes in oral cavity appear as the consequence of both direct adverse effect of the substances and inadequate oral hygiene and dietary changes. Narcotics lead to the constriction of gingival blood vessels and other soft tissues in the oral cavity. Due to an inadequate supply of blood, soft oral tissues and bone are being destroyed. Such a periodontal status rapidly progresses towards a complete damage (5).

The aim of this research was to examine the oral health of drug addicts during the substance abuse treatment, and to compare the maintainance of oral hygiene before and during the therapy.

Patients and methodology

The studied group included 26 users of psychoactive substances for the period of one month (from February to March, 2010) and the drug users underwent therapy in the Addiction Treatment Hospital „St. George“ in Niš. The enrolled patients had used different types of psychoactive substances for at least two years, but they were in the addiction treatment program for the minimum of three months. There were two types of inquiries in the questionnaire. The first type were the questions related to the general information about their drug addiction, maintenance of oral hygiene, and questions about the frequency of tooth brushing in the period of active drug abuse and during the treatment they received for the addiction (the moment of interview). The second type was related to the issues of duration of their drug addiction, types of psychoactive substances they used, the way (route) they used them, and their socio-economic status.

The enrolled drug addicts were then clinically examined. The number of lost teeth and prosthetic replacements present at the moment were recorded. Other changes in the oral cavity were evidenced using standard diagnostic methods. The interview and clinical examination lasted for 30 minutes per a patient.

Results

Twenty six drug addicts, aged approximately 27.9 years, took part in the examination (the youngest was 18, and the oldest addict was 39 years old). They had used narcotics for approximately 7.38 ± 3.0 years before the onset of treatment. The shortest usage lasted for 2, and the longest for 15 years. According to the information obtained from the questionnaires, the enrolled drug addicts had used the following substances: heroin, marijuana, cocaine and trodon. The percentage of substance abuse and routes of administration are shown in Table 1.

The majority of patients used heroin, statistically significantly more than any other psychoactive substance ($p < 0.001$), but the most common way of drug administration was snorting a significantly more common route than all the others.

Before the therapy, two patients had not used any toothbrush and one had not used any

toothpaste, but during the therapy of their addiction all the patients used both. During the therapy, a larger number of patients used interdental agents to maintain their oral hygiene, ($p < 0.01$).

Table 1. Types of psychoactive substances and the way of consumption

Psychoactive substance	Heroin	22	84.62%
	Marijuana	3	11.54%
	Cocaine	2	7.69%
	Trodon	1	3.85%
	Opiates	0	0.00%
	Snorting	21	80.77%
Way of consumption	i.v.	9	34.62%
	Smoking	6	23.08%
	Swallowing	1	3.85%

During the therapy, the daily incidence of tooth brushing was increased (Table 2). By compressing the table contingency from 5x2 to 3x2, by summarizing the cases of „do not brush“, „1 time per day“, and „3 and more times per day“, the Pearson's χ^2 test confirmed that there was a statistically significant difference in the distribution of frequency of daily tooth brushing ($p < 0.05$).

There was a considerably larger number of patients who brushed their teeth properly, but it was not confirmed if there was a significant difference between the conditions before and during the therapy. The time used for tooth brushing was prolonged, and the number of patients who brushed their teeth for 3-5 minutes or longer rose as well. Comparing the patients who did not brush the teeth before the therapy to those who were brushing their teeth from 2 to 3 minutes, using the Pearson's χ^2 test, the value of $p = 0.0621$ that was close to the limit of statistical significance of 0.05 was confirmed, although without a statistically significant difference. The number of the patients who changed their toothbrushes more often increased during the therapy, compared to the period before the therapy, but again without any statistical significance.

It could be observed that the prevalence of bad habits such as biting the cheeks and lips was on the same level as it had been before the therapy, while the number of active cigarette smokers decreased, although not significantly (Table 3). During the therapy, the number of patients under the stress who took medications for the condition statistically significantly decreased ($p < 0.05$), especially the number of those who took medication or consumed alcohol.

The majority of patients had gingivitis 23 (88.46%) which was a statistically more common diagnosis compared to periodontitis ($p < 0.01$) and all the other mentioned clinical diagnoses of lower prevalence ($p < 0.001$) (Table 4).

Table 2. Oral hygiene before and during therapy

		Before therapy		During therapy	
Using a toothbrush, toothpaste and interdental means for oral hygiene	Toothbrush	24	92.31%	26	100.00%
	Toothpaste	24	92.31%	26	100.00%
	Interdental means	5	19.23%	16	61.54%
Daily frequency of teeth brushing	Never	2	7.69%	0	0.00%
	1	12	46.15%	6	23.08%
	2	9	34.62%	10	38.46%
	3	3	11.54%	9	34.62%
	Several times	0	0.00%	1	3.85%
Movements of teeth brushing	Never	2	7.69%	0	0.00%
	Vertical	3	11.54%	0	0.00%
	Horizontal	7	26.92%	8	30.77%
	Combined	14	53.85%	18	69.23%
Duration of teeth brushing	Never	2	7.69%	0	0.00%
	2-3 min	11	42.31%	5	19.23%
	3-5 min	10	38.46%	15	57.69%
	Longer than 5 min	3	11.54%	6	23.08%
Period of toothbrush changing	Never	2	7.69%	0	0.00%
	3 months	9	34.62%	9	34.62%
	6 months	6	23.08%	11	42.31%
	One year	6	23.08%	5	19.23%
	Longer than one year	3	11.54%	1	3.85%

Table 3. Bad habits before and during therapy

	Before therapy		During therapy	
Biting cheeks and lips	10	38.46%	10	38.46%
Active cigarette smoker	22	84.62%	16	61.54%
Alcohol consumer	17	65.38%	3	11.54%
Often under the stress	10	38.46%	3	11.54%
With chronic disease	26	100.00%	4	15.38%

Table 4. Frequency of oral diseases

Clinical diagnose		
Gingivitis	23	88.46%
Periodontal disease	16	61.54%
Coated tongue	13	50.00%
Lingua plicata	12	46.15%
Headaches	12	46.15%
Herpes simplex	10	38.46%
Foetor ex ore	9	34.62%
Dry mouth	6	23.08%
Smooth tongue	3	11.54%
Cheilitis	3	11.54%
Oral mucosa lesions	3	11.54%
Lingua nigra	2	7.69%
Candidiasis	2	7.69%
Aphthae	2	7.69%
Burning mouth syndrome	0	0.00%
Leukoplakia	0	0.00%

Discussion

The health-related consequences of drug addiction and drug abuse are very serious and have very adverse oral health effects in any society. The number of drug addicts is on a constant rise world wide. First of all, this is the consequence psychological and emotional instability of an addict, that appears as the fear from dental treatment and negligence of oral hygiene.

The results of this study showed that the drugs most often abused by our examinees were heroin, marijuana and cocaine. Heroin is an opioid drug, the effects of which occur rapidly, especially after an intravenous injection the users report the feeling of euphoria to occur in only 7-8 seconds (6). Abstinence, that may set in only a few hours after the last drug administration in chronic users, may involve restlessness, nervousness, insomnia, aggressive behavior, delirium, loss of common sense and slurred speech. The users also experience pain in their muscles and bones, diarrhea and vomiting, cold flashes, and fever with goose bumps. Loss of appetite and vomiting may lead to a severe anorexia or malnutrition. Regular vomiting is one of the predominant factors that may influence caries and erosion of the oral mucosa (7). In heroin addicts, there is a high incidence of periodontal disease, as well as oral fungal and viral infections.

Heroin can be injected, snorted or smoked (8). According to the results of this study, the most common way of heroin use was snorting. Some recent studies have shown that heroin is more often snorted, either because of its greater purity or because of the misconception that taken this way it does not lead to dependence.

Cocaine is a powerfully addictive stimulant of the central nervous system. It is most often used orally (by chewing), intranasally (by snorting), intravenously (via injections) and inhalatory (by smoking). It is well absorbed from the nasal and mucous membranes. Cocaine is primarily metabolized via hepatic and plasma esterases into the compounds soluble in water which are cleared out via urine. It reaches its maximal blood concentration in about 30 minutes. Its metabolites can be detected in the blood up to 10 days after the last application (9). The vasoconstrictor effect of cocaine causes various changes in the gingival and periodontal tissues (10). According to the results of this research, the majority of our patients used cocaine intranasally, although this was very often combined with direct rubbing along the gum line which caused the onset of different periodontal diseases, even necrotizing ulcerative gingivitis. Taking into account that cocaine reacts as an acid with $\text{pH}=4$, a direct application of cocaine on the gingiva could cause incurable defects and tissue necrosis. Moreover, gingival bleeding could spontaneously occur in a large number of drug addicts because of the fact that cocaine may lead to thrombocytopenia (10, 11).

Oral manifestations caused by heroin abuse are less common and less specific compared to those

that appear after cocaine consumption. Gingival and periodontal changes appear as the result of poor oral hygiene. They can be explained by a deficient humoral and cellular immune response. Their manifestations are decreasing numbers of T and B lymphocytes, cytotoxic and phagocytic monocytes, and decreasing phagocytic power of polymorphonuclear leukocytes. The presence of specific opioid receptors has been proved on the surface of lymphocytes, monocytes, and thrombocytes (8).

Marijuana is the most frequently used drug and it is most often smoked (11). Tetra hydrocannabinol (THC), the major psychoactive component of marijuana, exerts its immunosuppressive effect on macrophages, B and T lymphocytes, so that marijuana smokers have weaker resistance to bacterial and viral infections. This immunosuppressive effect diminishes the proliferation of lymphocytes and antibodies in an organism. The macrophage function is changed by the removal of released nitrogen-oxide. THC also decreases the secretion of cytokines, such as $\text{TNF-}\alpha$, IL-6 and PGE-2. THC increases the secretion of IL-1 by the macrophages. Those various changes in a host response could explain the development of periodontal lesions encountered in some chronic marijuana users.

A study by Darling has shown that the drug addicts who use marijuana have high values of the plaque index and gingival index. This confirms the notion that marijuana consumption adversely affects the health of periodontal tissue and leads to the development of different types of periodontitis (12).

The main adverse effect of marijuana use is xerostomia. This reduced saliva flow appears mainly in chronic substance addicts. It develops only five minutes after the use of a drug and lasts up to a few hours. THC, that has a parasympatholytic property, is responsible for the development of dry mouth. This involves the changes in the consistency of oral biofilm: it becomes more adherent, less liquid, and more resistant to removal with a toothbrush. Smoking of marijuana can cause many other intraoral diseases, such as gingivitis, leukoplakia, gingival hyperplasia, uvulitis and tongue cancer (8, 13).

Ness et al. have described the appearance of a more severe form of gingivitis, associated with bleeding, with no visible signs of ulceration, in the drug addicts who use, above all, marijuana and heroin (14). Marijuana contains a high percentage of naphthalene and benzopyrene, which are potential carcinogens. It also contains a significant amount of ammonia, benzene, toluene and prussic acid, which are strong irritants that favor inflammatory processes in the gingival and periodontal tissues in drug addicts (13, 15).

Dentists have to take certain precautions in patients who use marijuana. It is highly recommended to start a dental intervention at least a week after the patient has stopped using it, and not to prescribe alcohol-containing mouthwashes because of the presence of xerostomia (16).

The condition of oral health depends highly on the level of personal oral hygiene. According to the results of this study, all the patients started using a toothbrush and toothpaste after the therapy. Most of them started using even interdental accessories to maintain their oral hygiene. During the therapy, the frequency, duration and proper brushing technique have all been markedly improved.

Taking into account the complexity of drug addiction and dependence on psychoactive substances, the degree of improvement of oral hygiene achieved in the study emphasizes the importance of developing an integrated oral health improvement program together with the rehabilitation and resocialization efforts to be undertaken with these patients (12). A high degree of awareness of the consequences of drug addiction on general health, as well as good oral hygiene, would decrease the incidence of various

changes and diseases affecting the oral cavity, and possibly help in the development of a healthier life style.

Conclusions

Based on the aim of the study, results of the interview and clinical examination results, the following conclusions can be drawn:

1. During the consumption of psycho-active substances, the gingiva and periodontal tissues suffer the worst damage either because of direct harmful effects of drugs, or because of very poor oral hygiene during the period of active drug abuse.

2. The results of the interview indicate a higher level of awareness regarding the preservation and maintenance of oral health. In this regard, it is essential to adequately control, motivate, and continually educate drug addicts about the significance of achieving and maintaining a good general and oral health

References

- Braunwald E, Fauci AS, Kasper DL, Hauser SL, Longo DL, Jameson JL, editors. *Harrisons Principle of Internal Medicine. Alcoholism and drug dependency*, Messing RO. 15th ed. McGraw-Hill; 2003: 2557.
- World Drug Report. United Nations Office on Drug and Crime publication. Geneva: 2007: 30.
- Lowe G. Alcohol and drug addiction. In: *Abnormal Psychology*. La Zarus AA, Colman AM (eds) Longman Group Ltd. 1995; 76-94.
- Igbal N. Substance dependence: A hospital based survey. *Saudi Med J* 2000; 21:51-7. [[PubMed](#)]
- McGrath C, Chan B. Oral health sensations associated with illicit drug abuse. *Br Dent J* 2005; 198(3):159-62. [[CrossRef](#)][[PubMed](#)]
- Abalkhail BA. Social status, health status and therapy response in heroin addicts. *Eastern Mediterranean Health J* 2001; 7: 465-72.
- Rosenstein DI. Effects of long-term addiction to heroin on oral tissues. *J Public Health Dent* 1975;35(2);118-22. [[CrossRef](#)][[PubMed](#)]
- Maloney W. The Significance of illicit drug use to dental practice. *Webmed Central Dentistry, drug abuse* 2010;1(7):WMC00455.
- Goldstein FJ. Toxicity of cocaine. *Compendium* 1990; 11:710-716. [[PubMed](#)]
- Brand HS, Gonggrijp S, Blanksma CJ. Cocaine and oral health. *Br Dent J* 2008;204:365-369. [[CrossRef](#)][[PubMed](#)]
- McGrath C, Chan B. Oral health sensations associated with illicit drug abuse. *Br Dent J* 2005;198:159-62. [[CrossRef](#)][[PubMed](#)]
- Darling MR. Cannabis abuse and oral health care: review and suggestions for management. *J South African Dental Assoc* 2003;58:189-90. [[PubMed](#)]
- Versteeg PA, Slot DE, van der Velden U, van der Weijden GA. Effect of cannabis usage on the oral environment: a review. *Int J Dent Hygiene* 2008; 6: 315-20. [[CrossRef](#)][[PubMed](#)]
- Addiction and periodontal health. [Internet]. [updated 2016 Nov]. Available from: <http://allno1blogs.com/other-diseases/periodontal-disease/addiction-and-periodontal-health.html>.
- Cho CM, Hirsch R, Johnstone S. General and oral health implications of cannabis use. *Aust Dent J* 2005;50(2):70-4. [[CrossRef](#)][[PubMed](#)]
- Rees TD. Oral effects of drug abuse. *Crit Rev Oral Biol Med* 1992; 3(3); 163-184. [[CrossRef](#)][[PubMed](#)].

STANJE ORALNOG ZDRAVLJA KOD HRONIČNIH UŽIVALACA PSIHOAKTIVNIH SUPSTANCI

*Kosta Todorović^{1,2}, Marija Bojović³, Milica S. Petrović⁴, Radmila Obradović³,
Saša Buban⁵, Rade Jovanović⁶, Ivan Minić⁴, Ljiljana Kesić^{2,3}*

Univerzitet u Nišu, Medicinski fakultet, Departman za oralnu hirurgiju, Niš, Srbija¹

Stomatološka klinika, Niš, Srbija²

Univerzitet u Nišu, Medicinski fakultet, Departman za parodontologiju i oralnu medicinu, Niš, Srbija³

Univerzitet u Nišu, Medicinski fakultet, Student doktorskih studija, Niš, Srbija⁴

Univerzitet u Nišu, Fakultet sporta i fizičke kulture, Niš, Srbija⁵

Univerzitet u Nišu, Fakultet sporta i fizičke kulture, Student doktorskih studija, Niš, Srbija⁶

Kontakt: Kosta Todorović

Klinika za stomatologiju, Služba za oralnu hirurgiju

Bulevar dr Zorana Đinđića 52, 18000 Niš, Srbija

E-mail:kosta_todorovic@yahoo.com

Sve je veći broj uživalaca psihoaktivnih supstanci u svetu, a i kod nas. Učestalo korišćenje ovih supstanci izaziva različite promene ili modifikacije živog organizma. Pored mnogobrojnih štetnih efekata na opšte zdravlje, dugotrajno korišćenje psihoaktivnih supstanci ostavlja različite posledice i na oralno zdravlje.

Cilj rada bio je da se ispita stanje oralnog zdravlja uživalaca psihoaktivnih supstanci u toku lečenja bolesti zavisnosti, kao i komparativno upoređivanje održavanja oralne higijene pre i u toku terapije zavisnosti.

Ispitivanje je sprovedeno na 26 ispitanika u Specijalnoj bolnici za lečenje zavisnosti Sveti Đorđe u Nišu. Posle oralnog i parodontološkog pregleda, ispitanici su popunili anketu o održavanju oralne higijene. Svi ispitanici su bili korisnici različitih psihoaktivnih supstanci najmanje dve godine, dok su na terapiji lečenja bolesti zavisnosti bili minimalno tri meseca.

Na osnovu podataka iz anketnih upitnika, utvrđeno je da su ispitanici koristili heroin statistički značajno više nego sve ostale supstance ($p < 0,001$), dok je ušmrkavanje daleko najčešći način konzumiranja i statistički je signifikantno češći od svih ostalih načina konzumacije ponaosob ($p < 0,001$). U toku terapije je statistički značajno veći broj korisnika koristio pomoćna sredstva za održavanje oralne higijene i njihov procenat je sa 19,23% porastao na 61,54% ($p < 0,01$). U toku terapije povećana je dnevna učestalost pranja zuba ($p < 0,05$). Na osnovu kliničkog pregleda, najveći broj ispitanika je imao gingivitis 23 (88,46%), što je statistički značajno češća dijagnoza u odnosu na parodontopatiju ($p < 0,05$). Dobijeni rezultati ukazuju na to da kod korisnika psihoaktivnih supstanci najviše stradaju gingiva i tkiva parodonta, dok se sa početkom lečenja bolesti zavisnosti povećava i svest o važnosti očuvanja oralnog zdravlja.

Oboljenja Gingive i parodonta su najčešći oralni nalaz kod ispitanika. Oralno zdravlje je bilo bolje u periodu apstinencije, nego u toku uzimanja droga. Korisnici droga su koristili zubnu četkicu češće u toku apstinencije, nego u toku bolesti. Stomatolog ima veliku ulogu u motivaciji i edukaciji ovih pacijenata u očuvanju oralnog zdravlja. Acta Medica Medianae 2017;56(2):64-69.

Ključne reči: psihoaktivne supstance, oralno zdravlje, oralna higijena, oralna patologija