ORAL HEALTH IN DRUG ADDICT ADOLESCENTS AND NON PSYCHOACTIVE SUBSTANCE USERS

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ABSTRACT

The purpose of this study was to compare oral health between adolescents who are recovering drug addicts and adolescents who report not having used psychoactive substances. A retrospective observational Case-Control study was conducted on 60 subjects per group, aged 15 to 25 years, paired according to sex, age and educational vulnerability. Dental and sialochemical examinations were used to determine oral health/disease/care indicators. Psychoactive substance use habits were obtained from clinical records. DMFT index for Case adolescents was 8.58±4.34, doubling the mean value for the Control group, which was 4.33±4.30. CPI was compatible with gingival-periodontal health in 45% of the Control subjects, but only 20% in the Case group. CPI categories 2 and 3 had different distributions according to the study group, with CPI2=33%, CPI3=0% for the case group and CPI2=57%; CPI3=5% for the control group. Mean values for stimulated saliva for Case and Control groups, respectively, were: salivary flow (ml/min) 1.42±1.08; 0.98±0.41, salivary pH 6.96±0.33¸ 6.86±0.27, and buffer capacity expressed as final pH, 6.73±0.29, 6.61±0.28. Wilcoxon's test for independent samples showed significant differences (p<0.05) between Case and Control for the variables White Spot, Non-Cavitated Carious Lesions, Cavitated Carious Lesions, DMFT, Components D and M, Salivary Flow and Buffer Capacity. There was significant association between the D component in DMFT and use of psychoactive substances, both in single drug and polydrug users. Oral component status was worse in recovering drug addicts than in non-users of psychoactive substances.

Key words: *Dental Caries Susceptibility; Oral Health; Drug users.*

SALUD BUCAL EN ADOLESCENTES DROGODEPENDIENTES Y EN NO CONSUMIDORES DE SUSTANCIAS PSICOACTIVAS

RESUMEN

El propósito de ésta investigación fue comparar el estado de salud bucodental en adolescentes drogodependientes en recuperación y los que no refieren consumo de sustancias psicoactivas. Se realizó un estudio observacional tipo Caso y Control, retrospectivo de 60 adolescentes de 15 a 25 años para cada grupo, apareados según: sexo, edad y vulnerabilidad educativa. A través de examen clínico odontológico y sialoquímico se relevaron indicadores de salud-enfermedad-atención del componente bucal. Los hábitos de consumo de sustancias psicoactivas se obtuvieron de historias clínicas. El índice CPOD en los adolescentes Casos resultó 8,58±4,34 valor que dobla la media que presenta el grupo Control 4,33±4,30. El Índice IPC presentó una situación compatible con salud gíngivo-periodontal en el 45% de los sujetos Control, mientras que sólo alcanzó al 20% en el grupo Caso. Las categorías 2 y 3 del IPC mostraron distribución diferente según el grupo de estudio siendo IPC2=33%; IPC3=0% y IPC2=57%; IPC3=5%, respectivamente para casos y controles. Los valores medios de los registros de saliva estimulada fueron para flujo salival (ml/min) 1,42±1,08; 0,98±0,41, pH de saliva 6,96±0,33¸ 6,86±0,27, y la capacidad amortiguadora o buffer expresada como pH final 6,73±0,29, 6,61±0,28 para el grupo Caso y Control respectivamente. La prueba de Wilcoxon para muestras independientes puso en evidencia diferencias significativas (p<0,05) entre Caso y Control para las variables Mancha Blanca, Caries no Cavitada, Caries Penetrante, CPOD, Componentes C y P, Flujo salival y Capacidad buffer. Se observó asociación significativa entre el componente C del CPOD y el consumo de sustancias psicoactivas tanto para la modalidad de monoconsumo como para la de policonsumo. La situación del componente bucal de los sujetos drogodependientes en recuperación, presenta mayor deterioro, respecto a los no consumidores de sustancias psicoactivas.

Palabras claves: *caries; salud bucal; drogadependencia.*

INTRODUCTION

The increasing complexity of the modern world has led to a sharp increase in misuse of psychoactive substances (PAS), which produce severe physical and mental effects, leading to individual, family and social conflict, with serious impact on society. Reliable research is needed to support intervention strategies for regional programs for promotion, prevention and control.

Changes in the interrelationship between human beings and their world include the use of psychoactive substances (PAS)[1]. The analysis and treatment

of PAS addiction disorders are currently tackled from and comprehensive approach which claims that "there is no single factor" leading to the process of addiction, and that different personality subsystems (environmental-behavioral, biological, cognitive, affective, spiritual, unconscious and systemic) may be involved[2-4]. Drug is considered to be any substance whose use/abuse can cause psycho-neuro-bio-socio-toxic consequences[5]. "Drug" is commonly used to refer to chemical substances which can cause dependence. The World Health Organization Expert Committee on Drug Dependence defines drug as a chemical, whether natural or synthetic, which, when introduced into a live organism by any route (inhalation, ingestion, intramuscular, intravenous), is capable of acting on the central nervous system, producing physical and/or psychological alteration, experience of new sensations or modification of a psychological state, i.e. is capable of altering the person's behavior.

Adolescent health is a key factor in the economic, social and political development of Latin American countries, upon which the success, development and competencies of the societies to which they belong depends[6].

Adolescence is considered to be a stage which begins at puberty and lasts until the beginning of adulthood, when the subject becomes autonomous, assumes responsibility for his own life, and achieves his identity. How this process evolves depends on the characteristics of the context (the person's particular situation regarding family, gender, location, social class, education, among others) and the time in history in which the adolescent lives[7]. During the construction of identity, the adolescent endeavors to differentiate him/herself, and this may include attitudes ranging from personal untidiness, lack of interest in cleanliness and neatness, challenging authority, direct provocation of adults, poor school performance, dropping out of school, and sleeping too much or loafing, to behaviors that place him/her at real risk,[8] such as premature sexual activity, running away from home, alcohol and/or drug abuse, eating disorders, and criminal acts, in an attempt to distinguish him/herself clearly from his/her past world and seek limits imposed by adults[9].

One of the systems affected by exposure to PAS is the stomatognathic system. It may be affected by lesions caused by the psychoactive substances themselves, or related to negligence in attention to oral hygiene, e.g. diseases such as gingivitis and extrinsic discoloration[10]. Substance users have many clinical odontological alterations such as xerostomia[11], alteration of saliva flow, reduction in saliva buffer capacity[12], erosion, abrasion, atypical caries and tooth loss[13]. Many factors can reduce saliva flow, including physiological situations with anticholinergic effect, medications[14,15], diseases of the salivary glands or systemic processes affecting them[16]. The reduction in saliva flow is explained in marihuana users as a parasympatholytic effect[17]. Di Gugno[18] considers that there are three main factors causing deterioration in PAS users: reduction in saliva pH and saliva flow, low concentration of inorganic phosphate, which hinders remineralization, and high intake of refined carbohydrates.

Also frequent are changes in the pain threshold and perception of taste, atrophy of salivary glands, erosions and ulcers of the oral mucosa.

Marihuana users have greater deterioration in the oral cavity than non-users, with increased risk of caries and periodontal disease[19]. Smoking marihuana is also carcinogenic and associated to dysplastic changes and precancerous lesions of the oral mucosa, increasing the incidence of squamous cell carcinoma, xerostomia, severe gingivitis, ischemic necrosis of palate, and bruxism[20]. Marihuana users are more prone to oral infections, possibly due to the alteration in oral immunology. Higher DMFT and bacterial plaque indices have been found in marihuana users than in non-users[17,21].

Drug addicts are careless of their general health and have behavioral disorders and infections associated to addiction[22], as well as high incidence of caries and periodontal diesase[23].

The aim of this study was to compare the oral health situation of adolescent and young adults who are recovering drug addicts to that of adolescents and young adults who do nor report PAS use.

MATERIALS AND METHODS

A retrospective observational Case-Control study was conducted on adolescents aged 15 to 25 years, of both sexes, paired according to sex, age, and educational vulnerability, following the classification by González, 2007[24,25], who classified the areas in Córdoba Capital district into five levels: cluster 1 – areas with medium high income; cluster 2 – areas with medium income; cluster 3 – areas with low

income and clusters 4 and 5, rural areas with few inhabitants per square kilometer.

The "Case" group was further characterized by considering their use of psychoactive substances based on clinical records prepared by the institution when subjects enrolled at the Recovery Treatment Program.

Pursuant to the Tokyo convention, written informed consent was obtained prior to participation in the study. For adolescents under 18 years old, the informed consent had to be signed by the tutor or guardian.

Inclusion criteria

Adolescents aged 15 to 25 years at the time of the interview. All subjects included in the Case and Control groups were social tobacco smokers and regular alcohol drinkers (at least once a week).

Exclusion criteria

Diagnosis of systemic disease (metabolic, infectious-contagious, autoimmune, HIV, transplanted patients, among others); reporting taking prescribed medication for over 1 year at the time of the interview; wearing orthodontic appliances or having had them removed up to 12 months prior to the interview.

Case group

60 institutionalized drug addict adolescents in recovery period, aged 15 to 25 years, who voluntarily joined the NGO "Programa CAMBIO". As a result of the care system and institutional approach, participants were subjects who had joined the program and undergone not more than one month's treatment to recover from addiction, with a recent history of exposure to PAS from 2007 to 2010. International criteria were followed to determine drug addict status[26], and the psychoactive abuse drugs were classified following the Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association –DSM IV TR[27].

Control group

60 adolescents who during the interview did not freely and voluntarily report PAS use, aged 5 to 25 years, of both sexes, who attended the school Colegio Nacional del Monserrat (formal teaching center) and the Centro de Orientación Vocacional (informal teaching center), both located in Córdoba city. In order to facilitate the validity of the self report on PAS use, a prior instance of personal interrelation was established, at which the subjects felt free from pressure to express their experience of possible exposure to PAS. For the Control group, subjects were paired according to sex, age and educational vulnerability with regard to the subjects in the Case group, which was formed first.

Clinical – odontological assessment

A clinical examination28 was conducted in classrooms assigned by the institutions, using non-conventional simplified methodology with an exploration kit consisting of mirror, tweezers, explorer and periodontal probe, under artificial light (surgical headlight). Observations were recorded on a card designed ad-hoc, which in addition to personal data and general health background, provided space for information on cariogenic-periodontopathic risk categories. For hard tissues: the following were recorded: number of teeth in the mouth, presence of caries (D), discriminating White Spot incipient caries (WS)29 and non-cavitated caries (nCD); fillings (F); extractions (M). WHO criteria were followed to diagnose lesions28. This information as used to calculate the DMFT and DMFS indices30. Considering that the DMFT index provides information limited to cavitated carious lesions, for a more reliable analysis of real conditions of the health-disease process, the variable "total caries" was used, which was the sum of all the evolutionary stages of the disease: WS, nCD and DT (component D in DMFT). Gingival-periodontal tissue was assessed using Löee Silness plaque index (PI)31 and Community Periodontal Index (CPI)28. *Saliochemical assessment*

Sialochemical assessment was performed on total mixed saliva samples, stimulated by chewing a 4cm x 4cm piece of Parafilm. It measured saliva flow in ml/min.; pH; and buffer capacity following Ericsson[32] and expressed as final pH. A portable manual pH-meter with temperature probe was used (Adwa).

Statistical analysis

Centralization and dispersion measures were used to describe the behavior of quantitative variables: mean ± SD and median for discrete variables. Non-parametric Mann Whitney-U test was used to assess the significance of the differences in behavior of the variables in the Case and Control groups[33]. Pearson's Chi squared was used to establish differences between proportions or associations among cate-

gorical variables. Contingency 2x2 tables (in dichotomic variables) were used to establish Odds Ratios (OR) and their respective confidence intervals (CI)[33]. Statistical significance was established as p = 0.05 for all cases. Data were processed using Infostat software version 2010[34].

RESULTS

The study was conducted on 120 adolescents, 91% male and 9% female, mean age 19±2 and 18±3 years, distributed in two groups (Case and Control) paired according to sex, age and educational vulnerability. Table 1 shows the distribution according to groups.

Characterization of the "Case" group: Subjects in the Case group began using alcohol at age 13 ± 0.5 years, and PAS at 16 ± 0.3 years, with marihuana being the most frequent substance used first (83%) followed by inhalants (11%) and psychopharmaceuticals without medical prescription (5%). The remaining 1% began directly with cocaine.

In the year prior to joining the Institution, (considered recent use), prevalence of psychoactive substances used (statistically significant, Chi squared <0.000) was: marihuana 58%, followed by a combination of other drugs 28% (polydrug use, including marihuana, cocaine and psychopharmaceuticals), cocaine 10%, and psychopharmaceuticals without medical prescription 4%.

Exposure time to PAS (time between first use reported by the subject and date he/she joined the recovery program), varied significantly (Chi squared <0.000). For adolescents and young adults in the Case group it was 1 to 14 years, with a median of 4 years and a mean of 4.4 ± 2.6 years. Twenty-two (22) (36.6%) subjects had been addicts for 4 or more years and 38 for less than 4 years (63.3%).

Frequency of use in the last year prior to joining the Institution was daily in 70% of the Case group.

Table 1: Distribution of gender and age in Case and Control groups.

GROUP	GENDER	Age Mean±SD
Case	FEMALE	17.83±1.47
	MALE	19.22±2.79
Control	FEMALE	17.83±2.04
	MALE	18.38±3.18

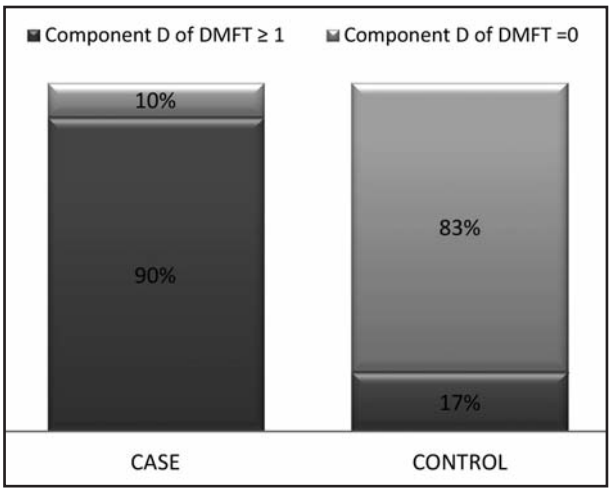

Fig. 1: Distribution of the D component of DMFT in the study groups.

Clinical-odontological assessment: No alteration was found for pain threshold, taste perception, atrophy of salivary glands, erosions and ulcers of the oral mucosa.

Table 2 provides the mean values for tooth status indicators regarding caries experience.

DMFT differed between groups, with the mean and median values for the Case group being twice as high as for the Control group, mainly due to the difference in the D component. Upon considering DMFS, the values were three times as high for the Case group.

Table 2: Central measurements of DMFT and DMFS indices, and their components.

		DMFT	D	M	F	DMFS	D	M	F
Case	MEAN±SD	8.58±4.34	4.42±3.38	0.69±1.5	3.48±3.64	15.4±10.4	6.87±6.81	3.33±7.4	5.2±5.38
	MEDIAN	9	4	0	2	14	5	0	3 a 4
Control	MEAN±SD	4.33±4.3	0.33±1.05	0.25±0.89	3.77±4.35	5.1±4.7	0.4±1.17	0.45±1.37	4.3±4.66
	MEDIAN	4	0	0	3	5	0	0	3 a 4
Wilcoxon's test (significance p<0.05)		p<0.0001	p<0.0001	p=0.0100	p=0.9957	p<0.0001	p<0.0001	p=0.0036	p=0.4445

With regard to the D component in DMFT (Fig. 1), 83% of the subjects in the Control group (n: 50) had D = 0 and 90% of the subjects in the Case group (n: 54) had D ≥ 1, with OR=45; CI 95% [15.74%; 128.65].
Table 3 shows dental status, with statistically significant differences between Cases and Controls.
CPI was compatible with gingival-periodontal health in 45% of the subjects in the Control group and 20% in the Case group. The distribution of CPI categories showed differences in frequencies: **CPI 2**=33%; **CPI 3**=0% for the Control group and **CPI 2**=57%; **CPI 3**=5% for the Case group (Fig. 2).
Mean PI values were 0.97±0.83 for the Case group and 0.8±0.52 for the Control group, Wilcoxon test p=0.4910 (significance p<0.05). Although the mean value for both groups reflected low risk (PI <1), it should be noted that BP plaque index indicated at risk (>1) for 33% of the Control group and 47% of the Case group.

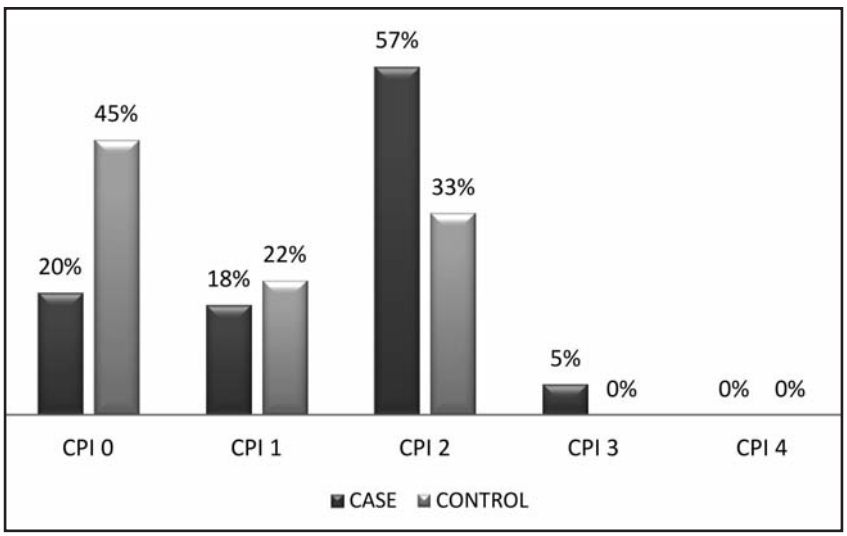

*Fig. 2: Distribution of Community Periodontal Index *categories in the study groups.*

Saliochemical assessment
Table 4 provides the mean values for the variables recorded in stimulated saliva: saliva flow, pH, and buffer capacity expressed as final pH[32].
Even though the mean value in both groups is compatible with health, 41.6% of the Case group and 50% of the Control group were assessed as at risk (salivary flow < 1 ml/m).
Wilcoxon's test for independent samples showed significant differences (p<0.05) between Case and Control for the variables Saliva Flow and Buffer Capacity, with no statistical significance for saliva pH between groups.

DISCUSSION

Drug addiction is a complex issue in the sphere of Public Health, because it is associated with a series of pathologies. This study found more males (91%) than females in the group of drug addicts undergoing recovery. Many studies conducted at different places and times[35-37] agree that addiction to psychoactive substances is more frequent in males, except for use of anxiolytics, sedatives and tranquilizers, which are more frequently used by females[38]. Considering that the participants in our study are undergoing recovery, we should take into account that several factors may influence their interest or decision to join a process to recover from addiction; thus, based on our study, we cannot state that addiction is more frequent in males.

Table 3: Situation of developmental status of caries in Case and Control groups.

		WS	nCD	DT	Total Caries
Case	MEAN ±SD	3.83±4.83	4.22±2.85	4.42±3.38	12.47±3.2
	MEDIAN	1 a 2	4	4	12
Control	MEAN±SD	2.43±4.57	2.08±2.87	0.33±1.05	4.84±2.83
	MEDIAN	0	1	0	4
Wilcoxon's test (significance p<0.05)		*p=0.0386*	*p<0.0001*	*p<0.0001*	

Table 4: Sialochemical variables in Case and Control groups.

		Saliva flow Vol/ min SE	Initial pH SE	Final pH SE
Case	MEAN±SD	1.42±1.08	6.96±0.33	6.73±0.29
	MEDIAN	1.24	7	6.75
Control	MEAN±SD	0.98±0.41	6.86±0.27	6.61±0.28
	MEDIAN	0.99	6.89	6.61
Wilcoxon's test (significance p<0.05)		*p=0.0449*	*p=0.0542*	*p=0.0151*

Because alcohol use is associated as a necessary antecedent to PAS use[39], in our study, all subjects had used alcohol, at least as weekend users. The starting age for alcohol use in the Case group was 13 years, significantly lower than the age provided in the latest national survey on PAS use conducted by SEDRONAR (Secretariat of Planning for Prevention of Drug Addiction and Trafficking) in 2010, which reports 16 years as the starting age for alcohol use[40]. Our results are closer to a study conducted in Córdoba city by Godoy J 2009[41], where use is "anticipated" in 11-year-old children.

Studies in other countries assessing the prevalence of caries in alcoholics report different results[42,43]. These are due to factors such as duration and type of alcohol abuse, oral hygiene, smoking, time since last visit to the dentist, sugar intake, and abnormal liver function, among others. Dasanayake 2010[44] concludes that the group "alcohol and drugs" was at greater risk of caries (38%) than the "alcohol only" group, concluding that the risk of caries among "alcohol only" abusers is significantly lower than among "alcohol and drug" abusers. That study suggests that alcohol needs to be taken into account with regard to caries evolution conditions, based on the biological model that would explain the association between alcohol and caries. Microbial oxidation of ethanol in the saliva of alcohol abusers would produce acetaldehyde[45], which can also alter cariogenic flora by reducing levels of Streptococcus[46]. Warnakulasuriya[47] has demonstrated that certain alcoholic beverages in the United Kingdom contain high levels of fluoride and people who drink three cans of beer per day receive the upper limit of daily fluoride recommended. In Argentina there are no available data on fluoride content among the components of alcoholic beverages.

Starting age for PAS use in the Case group was 16 years, marihuana being the preferred first substance, followed by inhalants and psychopharmaceuticals without medical prescription. Prevalence of PAS use in the past year in the Case group was Marihuana 58.32%, polydrug 28.33%, cocaine 10% and psychopharmaceuticals without medical prescription 3.33%, with oral intake as the most frequently used route of administration. Studies conducted in Spain at hospital detoxification centers [48] found that the variety of routes of administration has increased over recent years. The polydrug use detected matches data in the literature reporting that patients who are addicted to substances are not usually purists either with regard to the substances or to the form of taking them, and they combine different substances and alternate nasal, oral and more rarely, venous routes [49], in agreement with our results.

Although the literature reports frequent findings of variations in pain threshold,[50] taste perception, atrophy of salivary glands, erosions and ulcers of the oral mucosa[51-53], our study found none of those alterations. Incidence of lesions in the gingival-periodontal tissues increases with modality, duration, frequency and intensity of PAS use, together with lack of oral hygiene[54,55], as reflected by the fact that 47% of the Case group had at risk plaque index (PI> 1), in contrast to 33.33% of the Control group, although mean PI for both groups did not indicate risk. This may be due to the fact that the patients are institutionalized, and have therefore recovered more regular hygiene and diet habits. The risk shown by plaque index associated to gingival alteration detected in almost 50% of the Case group, it matches reports in the literature about the frequency of chronic gingivitis in patients who are addicts[56]. According to one study[57] the type of brush, and frequency and way of brushing differ significantly between drug users and controls without exposure to PAS. This variable was not considered in our study.

With regard to periodontal status, in our study, CPI was compatible with gingival-periodontal health in 45% of the Control group and 20% of the Case group, with different distributions: CPI^2=33%; CPI^3=0% in the Control group and CPI^2=57%; CPI^3=5% in the Case group. Considering that grade 2 reflects the presence of dental calculus and not necessarily the evolution of gingival-periodontal disease, there is lack of evidence to suggest a link between PAS use (primarily marihuana) and periodontal disease in the adolescent population in the Case group exposed to PAS, in agreement with studies conducted in Chile[58].

Persons who are still cannabis smokers can be classified as ''long-term users, and thus at amotivational risk" as described in Schwartz syndrome[59], characterized by lack of concern for personal hygiene and appearance, suggesting self-abandonment. In our study we may infer that the periodontal effects of short-term exposure to cannabis (participant ages in this study were 15 to 25 years)

may differ from the more serious effects of long term exposure to it in an older population.

With regard to dental disease, specifically caries prevalence, in the drug addict group, our research found similar results to studies conducted in Spain[60,61], Italy[62], Denmark[63], United States[64], France[65] and Australia[23].

It has been reported that caries experience in marihuana addicts is high[17,19,21]. In our Case group, DMFT showed a mean value of 8.58 ± 4.34 teeth with caries history, notably lower than values reported in other papers, such as DMFT = 18.3 in Aarhus, Denmark[63], 16.9 in Holland among addicts aged 20-40 years[50], 12.9 in Mercato San Severino (Salerno), Italy, for addicts aged 18 to 34 years[62], 12.8 in Barcelona, Spain in addicts aged 17 to 40 years[60], 13.03 in another group in Spain[61], among various other studies conducted in Australia[23], United States[64] and France[65]. Nevertheless, upon considering "total caries" in the Case group, which also includes cavitated caries, incipient lesions (WS) and non-cavitated caries (nCD), the mean value is closer to the values mentioned above.

A paper by Reece 2007[66] reports a cross-sectional study of 280 subjects aged 19 to 45 years, divided into a group of drug addicts and another group of non-drug addicts, showing that the addicts had a higher percentage of decayed and missing teeth than the non addicts. The pathology developed at an earlier age in addicts. Among subjects younger than 35 years old, 56.8% of addicts had the pathology compared to 5.4 % of the non-addicts. This agrees with our findings, in which the Case group had greater number and severity of caries (reflected by the higher number of caries with pulp complication) than the Control group.

Szymaniak 1990[67] studied tooth status in 30 drug addicts aged 21-34 years (duration of addiction 3 to 16 years) and compared the results to those from a similar group of subjects of the same age who were not drug addicts. The study found that drug addicts had twice as many decayed and missing teeth and four times fewer fillings than the controls. It concludes that drug addiction activates the carious process and the tendency to mutilation of the stomatognathic system.

Another study on addicts (mainly intravenous route users) in India[57], aged 18 to 48 years, found mean DMFT 4.84 for addicts and 3.73 for controls, which are lower than the values found in our study, possibly related to the type of use.

Our study found no significant difference in the F component between groups, so it is assumed that there has been adequate dental care availability, possibly before Case group subjects became addicted, since there is a marked difference in the D components and severity of lesions between groups.

For the M component, the Case group had higher frequency, which may be evidence of lack of timely dental care for restoration, conversely to what happens with the F component.

Drug abuse may reduce pain associated to dental caries, thus by the time PAS users are examined they are late in the process of the disease, in agreement with Charnock 2004[54].

In our study, the mean value for decayed teeth with cavitated carious lesions (D) and missing teeth (M) were higher in the Case group (5.11) than in the Control group (0.58), reflecting access to dental care and low self esteem during the addiction process in the Case group, in agreement with studies conducted in Spain[60].

Addiction to PAS may thus be considered to act at least as a factor which, from the socio-cultural to the individual psychological, has negative influence on timely visits to the dentist and thus, on receiving early care for the pathology.

In our study, the Cochran-Mantel-Haenszel test shows the variable Gender influenced behavior of presence of caries in both groups.

Sialochemical assessment showed that saliva flow differed significantly between Case (1.42 ml/min) and Control (0.98 ml/min) groups. The value for drug addicts was similar to those found in other studies in Brazil[68] in similar conditions on a population exposed to PAS under study, who were found to have mean values of 1.13 ml/min. It should be noted that in this population in Brazil, 64% had saliva flow >1, whereas in our study, only 41.1% did. Although various studies mention dry mouth as an effect of drugs[18,69,70], it was not observed in our study. Salivary glands might have normalized their functioning after PAS use stopped, restoring the salivary flow. Moreover, due to regulations at the institution "Programa Cambio", it was not always possible to know what type of medication the patients were using in order to make a more specific analysis of the effects of each drug prescribed by the physician at the institution. It is worth highlighting that because the institution is coordinated by psychologists, its therapy minimizes the psychiatric

medication administered to institutionalized patients, in contrast to other therapeutic communities where there is a tendency to substitution therapy with regard to psychiatric medication, which may substantially modify saliva flow rates.

The pH was similar in both groups (Case group: 6.96; Control: 6.86), with no statistically significant difference between groups, in a range compatible with health, in agreement with other studies on drug addicts in Spain,[60] where pH was 6.80.

Buffer capacity in both groups was compatible with healthy values (Δ pH 0.23 for the Case group and 0.25 for the Control group) in contrast to studies in Brazil[12,68] which found alterations in buffer capacity.

Although according to a study by Kumar in 2006 on 220 institutionalized psychiatric patients[71], caries index increases with age, our study did not analyze the age factor as predictive, as being a PAS addict was more important.

Some authors[50,62,72] have suggested that in this type of patients the degree of dental pathology is directly related to poor oral hygiene and the years of actively using psychoactive substances. The literature in general reports data on oral use of marihuana and cocaine in relation to lesions found in the oral component[19,21].

In our study, adolescents in the Case group reported that they use marihuana, usually smoked, together with alcohol and tobacco, which makes it impossible to discern whether the oral-dental component status in the Case group can be attributed exclusively to PAS.

There is not enough evidence of association between PAS addiction and caries. In our study, the conditions of oral deterioration in the Case group compared to the Control group cannot be attributed exclusively to exposure to PAS. PAS use is a complex phenomenon in which the psychological-emotional factor has an impact on personal care, including hygienic-dietary habits, generating an unfavorable context which makes it difficult to identify which effects on the oral component are attributable to PAS use. Further studies are needed on other therapeutic communities for drug addicts, and which look in greater depth at other socio-cultural aspects not considered in this study, in order to identify the factors that have the greatest incidence on the development of caries in drug addicts.

There is a wide gap between the oral-dental health status of drug addict adolescents undergoing recovery and adolescents who do not report use of psychoactive substances. Worldwide, there are few reliable epidemiological data on dental caries in alcohol and drug users, even though both alcohol and drug abuse, whether individually or combined, have harmful effects on health. Further research is needed to understand the true nature of the effect of these damaging exposures on various components of caries experience.

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CORRESPONDENCE

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