



Identification of factors contributing to the appearance of inflammatory periodontal diseases preclinical symptoms in prison persons

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Abstract

AIM. The analysis of the main factors causing bleeding in the oral cavity in persons in places of deprivation of liberty, and the search for ways to eliminate this symptom, considering the limited capabilities of the respondents.

MATERIALS AND METHODS. The study involved 402 prisoners, 330 of whom were men and 72 women. The respondents were divided into age groups, the group of respondents under the age of 18 included 110 people, 18–25 years old – 7 people, 26–35 years old – 127 people, 36–45 years old – 94 people, 46–55 years old – 44 people and the group of 56 years and older consisted of 20 people. The respondents' responses were analyzed using the StatTech v 4.6.1 (developed by Stattech LLC, Russia).

RESULTS. 25 questions were analyzed, among which reliable correlations between bleeding and its development factors were established.

CONCLUSIONS. Based on the analyzed data, bleeding as an objective symptom was noticed by 157 respondents who noted brushing their teeth and eating hard food as factors provoking the development of this pathology. In this regard, it is necessary to develop a program aimed at improving the hygienic status and raising awareness of prisoners about proper oral care, considering their stay in places of deprivation of liberty. Such a program should primarily be based on the motivation of prisoners to adjust and improve their personal oral hygiene. In addition, in addition to preventive conversations, it is necessary to conduct master classes on the technique of proper dental cleaning and the use of additional personal oral hygiene products.

Keywords: bleeding, prisoners, oral hygiene, diabetes mellitus, periodontal diseases, penitentiary institutions.

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Выявление факторов, способствующих появлению доклинических симптомов развития воспалительных заболеваний пародонта у лиц, находящихся в местах лишения свободы

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Резюме

ЦЕЛЬ ИССЛЕДОВАНИЯ. Анализ основных факторов, вызывающих кровоточивость в полости рта у лиц, находящихся в местах лишения свободы, и поиск путей устранения этого симптома с учетом ограниченных возможностей анкетированных.

МАТЕРИАЛЫ И МЕТОДЫ. В исследовании принимали участие 402 заключенных, из которых 330 мужчин и 72 женщины. Респонденты были поделены на группы по возрасту, группа анкетированных

моложе 18 лет включала 110 человек, 18–25 лет – 7 человек, 26–35 лет – 127 человек, 36–45 лет – 94 человека, 46–55 лет – 44 человека и группа категории 56 лет и старше состояла из 20 человек. Ответы респондентов были проанализированы с использованием программы StatTech v. 4.6.1 (разработчик – ООО «Статтех», Россия).

РЕЗУЛЬТАТЫ. Проанализировано 25 вопросов, среди которых были установлены достоверные взаимосвязи между кровоточивостью и факторами ее развития.

ВЫВОДЫ. Исходя из проанализированных данных, кровоточивость как объективный симптом заметили 152 анкетированных, отметивших чистку зубов и прием жесткой пищи как факторы, провоцирующие развитие данной патологии. В связи с этим необходима разработка программы, направленной на улучшение гигиенического статуса и повышения информированности заключенных о правильном уходе за полостью рта с учетом нахождения их в местах лишения свободы. Такая программа в первую очередь должна основываться на мотивации заключенных корректировать и улучшать личную гигиену полости рта. Кроме того, помимо профилактических бесед необходимо провести мастер-классы по технике правильной чистки зубов и использования дополнительных средств индивидуальной гигиены полости рта.

Ключевые слова: кровоточивость, заключенные, гигиена полости рта, сахарный диабет, заболевания пародонта, пенитенциарные учреждения.

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RELEVANCE

In the Russian Federation, as of the beginning of 2024, about 430,000 people are in prison, which is about 300 people per 100 000 population. The penitentiary system in Russia consists of pre-trial detention centers, correctional colonies of various regimes, specialized open and closed type hospitals¹. Maintaining dental health in persons in places of detention is difficult due to living conditions and limited access to dental care, as well as low awareness of proper oral care. The condition of the oral cavity can also be a marker of general health [1]. Bleeding when brushing teeth is an objective symptom that a person can determine on their own.

It is not possible to achieve a good level of oral hygiene in the presence of several lifestyles features of prisoners but following simple and regular measures can significantly contribute to maintaining dental health.

Therefore, it is necessary to develop a set of measures for them, the implementation of which is possible in places of deprivation of liberty. It is also important to inform prisoners about the effectiveness of these manipulations, since it is known from the literature that awareness is an important link in forming a responsible attitude towards one's own health [2; 3].

INTRODUCTION

In this regard, the aim of the study is to analyze the main factors causing bleeding in the oral cavity in persons in places of detention and to find ways to eliminate this symptom, considering the limited capabilities of the respondents.

¹ Federal Penitentiary Service. Brief description of the penal enforcement system of the Russian Federation; 20.12.2024. Available at: <https://fsin.gov.ru/structure/inspector/iao/statistika/Kratkaya%20har-ka%20UIS/> (accessed: 02.03.2025).

To achieve the intended goal, the following tasks were set:

1. To identify the main factors causing bleeding in the oral cavity based on the data obtained from the statistical program.
2. To analyze reliable indicators.
3. Formulate conclusions based on the results of the analysis.

MATERIALS AND METHODS

A survey of 402 prisoners was conducted. The data on the respondents are shown in Table 1.

Table 1. Distribution of respondents by gender, length of stay in a penitentiary institution, age

Таблица 1. Распределение опрошенных по полу, длительности нахождения в пенитенциарном учреждении, возрасту

Parameter	Denotation	
Number of respondents	n = 402	
Gender, people (%)	Male	Female
	n = 330 (82.1%)	n = 72 (17.9%)
Duration of stay in a penitentiary institution, months (Me [Q ₁ –Q ₃] (min/max))	20 [9–39] (0/49)	
Age group, people, (%):		
Under 18 years of age	n = 110 (27.4%)	
18–25 years old	n = 7 (1.7%)	
26–35 years old	n = 127 (31.6%)	
36–45 years old	n = 94 (23.4%)	
46–55 years old	n = 44 (10.9%)	
56 years and older	n = 20 (5.0%)	

The questionnaire was provided in writing, which included 25 questions: 3 questions aimed at collecting demographic data, 2 questions aimed at assessing the general health of prisoners, 6 questions aimed at assessing dental status, 5 questions included collecting information about problems with the mucous membrane in the oral cavity, 5 questions about the presence of problems with periodontal tissues, including the presence of bleeding in the oral cavity under the influence of various factors, 4 issues, including the presence of bad habits and somatic pathology. The survey was conducted voluntarily, at the request of the prisoners. Each respondent was informed about the anonymity of his answers.

The statistical analysis was carried out using the Stat Tech v program. 4.6.1 (developed by Stattech LLC, Russia). The number of answers to each of the questions was calculated in absolute values and percentages. The statistical Pearson Chi-square method was used to determine the presence of correlations between the answers to the questionnaire questions.

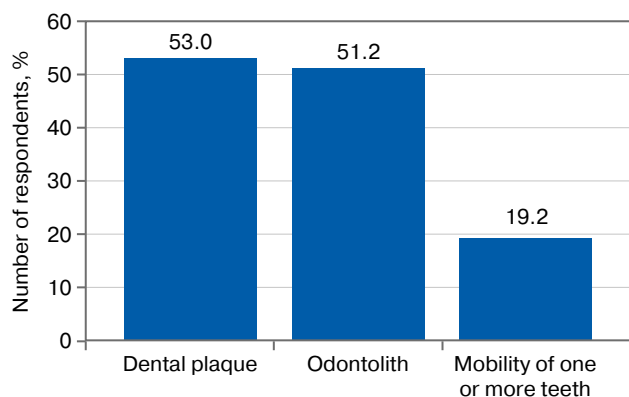


Fig. 1. The condition of the oral cavity according to the respondents

Рис. 1. Состояние ротовой полости по мнению респондентов

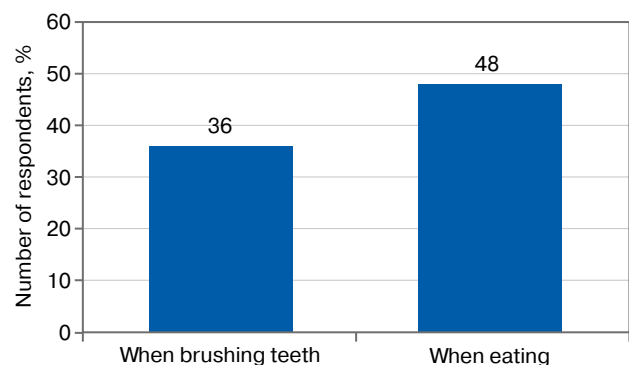


Fig. 2. Characteristics of bleeding when brushing teeth and eating when there is mobility of one or more teeth, according to respondents

Рис. 2. Характеристика кровоточивости при чистке зубов и приеме пищи при наличии подвижности одного или более зубов по мнению респондентов

RESULTS

Among the respondents to the questionnaire, 152 people (37.8%) reported bleeding in the oral cavity and, on the contrary, 250 people (62.2%) didn't experience bleeding.

Significant correlations between the presence of bleeding, as well as the degree of its severity, were identified for the following groups of issues:

- the condition of the oral cavity according to the respondents;
- hygiene habits;
- the presence of bad habits at the present time and in the anamnesis;
- several questions related to the overall health of the respondents.

Among the cohort who reported bleeding when brushing their teeth, 111 (27.6%) respondents had it, 25 (6.2%) had it when eating, and 37 (9.2%) respondents had spontaneous bleeding.

It was found that spontaneous bleeding, as well as bleeding when brushing teeth and eating, are significantly more common among the contingent who report poor oral health.

The characteristics of the oral cavity condition, according to the respondents, are shown in Fig. 1.

It was found that among the contingent who noted the presence of tartar, bleeding was significantly more common when brushing teeth and eating, compared with those who did not have bleeding. This may be due both to the presence of periodontal diseases in the respondents and to a disdainful attitude towards the condition of the oral cavity.

The characteristics of bleeding when brushing teeth and eating in the presence of mobility of one or more teeth, according to the respondents, are shown in Fig. 2.

Bleeding during meals is significantly more common among the population who report mobility of one or more teeth (12 (48.0%)), compared with those who experience bleeding while brushing their teeth (40 (36.0%)) ($p \leq 0.001$; $p \leq 0.001$)

The characteristics of hygiene habits according to the respondents are presented (Table 4, Fig. 3).

Table 4. Indicators of hygiene habits according to the respondents

Таблица 4. Показатели гигиенических привычек по мнению анкетированных

Parameter	Categories	People	%
Frequency of brushing teeth	1 time per day	113	28.1
	2 times a day	227	56.5
Frequency of toothbrush change	Once a month	18	4.5
	Regularly 1 time in 3 months	234	58.2
	Once every 6–12 months	150	37.3
Rinsing the mouth with water or saline solution	No	273	67.9
	Yes	129	32.1

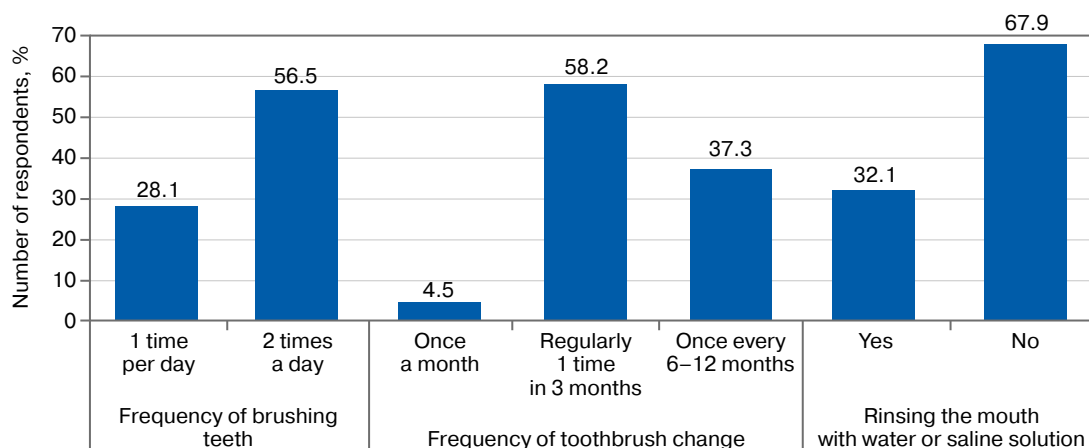


Fig. 3. Indicators of hygiene habits according to the respondents

Рис. 3. Показатели гигиенических привычек по мнению респондентов

There is a significant relationship between the habit of rinsing the mouth with water or saline solution and bleeding, respondents have a lower percentage of bleeding when brushing their teeth (26 (23.4%)) using this habit, compared with those who do not have the habit (103 (35.4%)) ($p = 0.022$).

It was also revealed that among those who brush their teeth once a day, bleeding occurs in more than half of the population, which is significant (43 (38.0%) versus 70 (24.1%)) ($p = 0.008$).

It was found that prisoners who could change their toothbrush regularly have a lower percentage of bleeding (9 (36.0%)), compared with those who change their toothbrush once every six months or less (16 (64.0%)) ($p = 0.014$), which may be due to the difficulty of regular change of toothbrush and lack of such.

The characteristics of the oral mucosa are presented in Table 5.

It was revealed that the studied contingent, who noted problems with the mucous membrane in the lip area, significantly more often noted bleeding when brushing their teeth (9 (8.1%)), compared with those who did not have bleeding (9 (3.1%)) ($p = 0.030$).

It was also revealed that bleeding during meals is significantly more common among prisoners who have problems with the mucous membrane in the lips, cheeks and tongue. (4 (16.0%)), (9 (36.0%)), (6 (24.0%)) accordingly, compared to those who have no bleeding (14 (3.7%), 10 (2.7%), 16 (4.2%) respectively) ($p = 0.004$; $p \leq 0.001$; $p \leq 0.001$, respectively). The same trend can be observed with spontaneous bleeding in the oral cavity. These indicators may be associated with chronic inflammation of the mucous membrane in the oral cavity, as a result, as well as due to malocclusion, poor-quality fillings with overhanging edges, together these causes may contribute to the development of chronic injury to the oral mucosa, and under the influence of external factors of its bleeding.

It was found that among the contingent noting the presence of an unpleasant taste in the mouth, bleeding is significantly more common when brushing

teeth (37 (33.3%)), compared with those who do not have bleeding (41 (14.1%)) ($p \leq 0.001$), this may be due to poor oral hygiene, mouth problems, as well as the presence of bad habits, as well as suppuration from periodontal pockets.

The characteristics of the general state of health and the presence of somatic pathology of the respondents are presented in Table 6.

Table 5. Indicators of the state of the oral mucosa

Таблица 5. Показатели состояния слизистой оболочки полости рта

Parameter	Categories	People	%
Problems with the oral mucosa	Lips	18	4.5
	Jowls	19	4.7
	Tongue	22	5.5
	The bottom of the oral cavity	8	2.0
	Unpleasant taste in the mouth (sour, bitter, metallic, sweet, etc.)	78	19.4

Table 6. Indicators of the general state of health and the presence of somatic pathology of the respondents

Таблица 6. Показатели общего состояния здоровья и наличие соматической патологии анкетированных

Parameter	Categories	People	%
Assessment of the general condition	Very bad	5	1.2
	The bad	32	8.0
	Satisfactory	148	36.8
	Good	156	38.8
	Very good	61	15.2
Symptoms	General weakness	296	73.6
	Malaise	36	9.0
	Reduced working capacity	47	11.7
Diabetes mellitus	Availability	21	5.2

It was also revealed that spontaneous bleeding and bleeding during meals are significantly more common among the contingent who report malaise. (9 (24.3%); (7 (28.0%) respectively), compared to those who do not have bleeding (27 (7.4%); (29 (7.7%) accordingly) ($p \leq 0.001$).

It has been established that spontaneous bleeding and bleeding during meals are significantly more common among the contingent noting a decrease in their working capacity. (8 (21.6%); 6 (24.0%) respectively), compared with those who have no bleeding (39 (10.7%); 41 (10.9%) accordingly) ($p = 0.049$; ($p = 0.048$), respectively).

It was also found that among prisoners who reported spontaneous bleeding, it was significantly more common to indicate the presence of general weakness (22 (59.5%)), compared with those with no general weakness (15 (40.5%)) ($p = 0.040$).

Analyzing the relationship between the presence of somatic pathology and bleeding, it was found that respondents with diabetes mellitus were significantly more likely to indicate the presence of bleeding during meals (4 (16.0%)), compared with those without bleeding (17 (4.5%)) ($p = 0.012$).

Analyzing the relationship between the presence of somatic pathology and bleeding, it was found that respondents with diabetes mellitus were significantly more likely to indicate the presence of bleeding during meals (4 (16.0%)), compared with those without bleeding (17 (4.5%)) ($p = 0.012$).

The characteristics of the presence of bad habits of the respondents are presented in Table 7.

Among the contingent who noted the presence of bad habits in the past, 273 (67.9%) of respondents were smokers, 21.1% of respondents had abused alcohol, and 89 (22.1%) of respondents had taken narcotic substances in the past.

It was revealed that among smokers, the vast majority noted bleeding in the oral cavity when brushing their teeth (89 (80.2%)).

It was also found that the studied population, who noted the use of alcoholic beverages and narcotic substances in the past, significantly more often indicated the presence of bleeding when brushing their teeth (35 (31.5%); 32 (28.8%) respectively), compared with those who have no bleeding (50 (17.2%); (57 (19.6%), respectively) ($p = 0.002$; $p = 0.046$), respectively).

It was established that the studied contingent, who noted the use of alcoholic beverages and narcotic substances in the past, significantly more often noted bleeding during meals (12 (48.0%)) and (10 (40.0%)) accordingly, compared to those who have no bleeding (73 (19.4%); 79 (21.0%) accordingly) ($p \leq 0.001$ and $p = 0.026$, respectively).

It has been revealed that prisoners who have reported the use of alcoholic beverages and narcotic substances in the past are significantly more likely to report spontaneous bleeding. (16 (43.2%); (17 (45.9%) respectively), compared with those who have no bleeding (69 (18.9%); (72 (19.7%) accordingly) ($p \leq 0.001$).

Table 7. Indicators of the presence of harmful habits of the respondents

Таблица 7. Показатели наличия вредных привычек анкетирруемых

Parameter	Categories	People	%
Bad habits	Smoking	273	67.9
	Alcohol consumption	85	21.1
	Drug use	89	22.1

DISCUSSION

The problem of poor hygiene among persons in institutions of the federal Penitentiary Service can be traced not only in Russia, but also abroad, depending on the level of economic development of countries and the social status of prisoners.

In 2017, a study was conducted in Finland among prisoners of the Pelso correctional colony, during which a qualified dentist examined 100 prisoners: 89 men and 11 women, with an average age of 35 years. According to the survey results, it was found that half of the subjects had periodontal diseases, the maximum value of the general periodontal index or the periodontal disease needs index (CPI) among people under the age of 30 was 3 points (removal of dental deposits, curettage, hygiene, conservative therapy). in 33.3%, 2 points (removal of dental deposits, hygiene) in 67.7%, among people over 30 years of age, the maximum score corresponded to 4 points (removal of dental deposits, conservative therapy, flap surgery, orthopedic treatment, hygiene) in 9.1%, only 2.9% of subjects under the age of 30 had a healthy periodontal [4].

A 2014 study conducted in the Nigerian city of Enugu was also analyzed. This state is considered socially disadvantaged, which is attributed to the low level of medical care. To conduct the study, a questionnaire was compiled, and an examination of the oral cavity was performed by a specialist to assess the condition of the teeth and periodontal tissues. The study involved 230 prisoners, among them 5.2% of the surveyed had a CPI = 0 (12/230), 94.8% (218/230) had a CPI = 1/2/3/4. According to the results of the examination, more than half of the prisoners had caries with complications [5].

The data obtained by the authors during the survey of prisoners demonstrate a similar relationship, namely, based on the results of the analysis of respondents' responses, it can be concluded that in Russia the situation with the dental health of prisoners is comparable.

Patient awareness is achieved through preventive interviews, as well as the development of a program that includes sanitary and educational work with prisoners, training in dental cleaning techniques and quality control of oral hygiene, oral sanitation, and follow-up for the timely detection and treatment of dental diseases. An important aspect of the program should be the development of motivation among prisoners, since their interest in treatment contributes to the improvement of the oral cavity. There is a positive experience in the scientific literature with the development and implementation of a program based on the motivation of prisoners [4].

CONCLUSION

As a result of the analysis of the presence of bleeding in prisoners, which manifests itself under the influence of external stimuli or spontaneously without any prerequisites, reliable correlations between the presence of bleeding and the provoking factor of its development were revealed. This may be due to both the presence of periodontal diseases in the respondents and the neglect of the oral cavity. It may also be due to the inability

to regularly perform proper oral hygiene, as well as poor hygiene habits. Of course, the low awareness of prisoners about the importance of oral hygiene plays a key role here. Therefore, it is necessary to develop and implement a program that includes both preventive conversations with prisoners, their motivation, and master classes on brushing teeth, proper use of toothbrushes, mouthwashers, dental floss, and other additional personal oral hygiene products.

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