МODEЛИРОВАНИЕ МЕТОДА ЭКСПРЕСС-ДИАГНОСТИКИ НЕГАТИВНОГО ВЛИЯНИЯ КУРЕНИЯ КАК УПРАВЛЯЕМОГО ПРОЦЕССА В ПРАКТИКЕ ВРАЧА-СТОМАТОЛОГА

Еловикова Т. М.1, Карасева В. В.1, Молвинских В. С.2, Скурихина Я. С.1, Кошеев А. С.3

1 ФГБОУ ВО «Уральский государственный медицинский университет» Минздрава России, г. Екатеринбург, Россия
2 ООО «МК «Гелиос», г. Екатеринбург, Россия
3 ФГАОУ ВО «УрФУ имени первого Президента России Б. Н. Ельцина», г. Екатеринбург, Россия

Аннотация
Предмет. Курение табака является распространенной вредной привычкой в мире. Проблема курения затрагивает не только социальные, но и медицинские, в том числе стоматологические, аспекты. Раздражающее действие никотина на слизистую оболочку полости рта и слюнные железы приводит к развитию стоматитов, ксеростомии и галитоза. Профилактика заболеваний полости рта у курящих людей имеет свои особенности в связи с изменениями в зубном налете и ротовой жидкости. В статье представлен опыт проведения экспресс-диагностики негативного влияния курения как управляемого процесса в практике врача-стоматолога.

Цель — оценить эффективность экспресс-диагностики у хронических курильщиков на основании статистического анализа типа микрокристаллизации смешанной слюны (СС).

Методология. Проведено клиническое обследование полости рта 120 добровольцев (58 женщин и 62 мужчин) в возрасте от 18 до 44 лет (средний возраст — 22,50±2,59 года). В основную группу курильщиков вошли 75 человек, в группу сравнения (некурящие добровольцы) — 45. Забор СС и статистический анализ типов микрокристаллизации у курящих и некурящих людей производился дважды: до и через 15 минут после курения.

Результаты. Появление патологических морфотипов микрокристаллизации СС свидетельствует о негативном влиянии курения табака на ротовую жидкость. Получены данные об ухудшении функции слюны у курильщиков, что создает условия для усиления патологических процессов в полости рта.

Выводы. Курение негативно влияет на морфологическую картину — микрокристаллическую структуру СС. Структурные изменения закристаллизованной СС могут служить диагностическими признаками заболеваний и могут быть использованы в диагностике и профилактике заболеваний органов полости рта при курении.

Ключевые слова: микрокристаллизация смешанной слюны, экспресс-диагностика, курение

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MODELING OF THE EXPRESS DIAGNOSTIC METHOD OF THE NEGATIVE INFLUENCE OF SMOKING AS A MANAGED PROCESS IN THE PRACTICE OF A DENTIST

Elovikova T. M.1, Karaseva V. V.1, Molvinskikh V. S.2, Skurikhina Ia. S.1, Koshcheev A. S.3

1 Ural State Medical University, Ekaterinburg, Russia
2 MC Helios, Ekaterinburg, Russia
3 Ural Federal University named after the first President of Russia B. N. Yeltsin, Ekaterinburg, Russia

Annotation

Subject. Tobacco smoking is a common bad habit in the world. The problem of smoking affects not only social, but also medical, including dental, aspects. The irritating effect of nicotine on the oral mucosa and salivary glands leads to the development of stomatitis, xerostomia and halitosis. Prevention of diseases of the oral cavity of smokers has its own characteristics in connection with changes in plaque and oral fluid. The article presents the experience of rapid diagnostics of the negative effects of smoking as a controlled process in the practice of a dentist.

The aim is to evaluate the effectiveness of rapid diagnosis in chronic smokers based on a statistical analysis of the type of microcrystallization of mixed saliva (CC).

Methodology. A clinical examination of the oral cavity of 120 volunteers (58 women and 62 men) aged 18 to 44 years (average age — 22.50 ± 2.59 years) was conducted. The main group of smokers included 75 people, the comparison group (non-smoking volunteers) — 45. SS sampling and statistical analysis of microcrystallization types in smokers and non-smokers were performed twice: before and 15 minutes after smoking.

Results. The appearance of pathological morphotypes of microcrystallization SS indicates the negative effect of tobacco smoking on oral fluid. Data were obtained on the deterioration of the function of saliva in smokers, which creates the conditions for enhancing pathological processes in the oral cavity.

Conclusions. Smoking negatively affects the morphological picture — the microcrystalline structure of the SS. Structural changes in crystallized SS can serve as diagnostic signs of diseases and can be used in the diagnosis and prevention of diseases of the oral organs during smoking.

Keywords: microcrystallization of mixed saliva, express diagnostic, smoking

Tobacco smoking is the most common bad habit: 44 million adults smoke constantly in Russia, the age of smokers is from 19 to 44 years old [5—11, 19, 21, 22, 24—26, 28]. Russia has made some progress in reducing tobacco consumption due to the adoption of Federal Law No. 15 «on Health Protection citizens from exposure to tobacco smoke and the effects of tobacco consumption» in 2013. However, at present, electronic cigarettes (e-cigarettes) and vapes, electronic devices for simulating tobacco smoking, have become widespread in the world. The number of people who prefer the use of electronic cigarettes is growing steadily, especially among young people. Manufacturers claim that electronic devices are harmless and help get rid of nicotine addiction. In fact, this is not true [15, 18].

According to some authors, smoking and tobacco dependence in the International Classification of Diseases of the 10th revision (ICD-10) are classified, along with drug addiction, to the category of «Mental and behavioral disorders due to the use of psychoactive compounds» [22, 26, 29]. The problem of smoking affects not only social, medical, but also dental aspects [2, 4—11, 19, 21, 22, 27]. With constant use, the irritating effect of nicotine on the oral mucosa and small salivary glands can be affected, which leads to the development of stomatitis, halitosis and xerostomia. Prevention of diseases of the oral cavity of smokers has its own characteristics in connection with changes in plaque and oral fluid that occur when [2, 4—11, 19, 21—23, 27, 29]. In smoking patients, from 5 to 120 days, a significant increase in the destruction index and inflammatory-destructive index of periodontal tissues, peri-implantation zone and other tissues of the oral cavity is observed, which indicates smoking as a pathogenic factor that exerts its effect through the initiation and maintenance of the inflammatory process [2, 25, 28]. Healthy periodontics were three times less likely to occur in young tobacco smokers than in non-smokers [22].

Dentists need to explain to each patient the mechanism of the negative effects of smoking on the whole body, including the organs of the oral cavity, and, in particular, to warn about violations of tissue regeneration, the inability to whiten teeth, and the difficulties of professional hygiene [1, 3—11]. Inadequate load on periodontal tissues, problems with orthopedic constructions, the occurrence of an unpleasant, putrid odor from the mouth (halitosis) and impaired saliva functions are common problems of smokers [2, 3]. Changes that occur in the body under the influence of smoking cannot but affect the state of mixed saliva (MS) — the body’s biological fluid, which plays...
an exceptional role in maintaining homeostasis [5—11]. It has been found that structural changes of crystallized MS can serve as diagnostic signs of various diseases related to failure of protective functions of organism, as well as for assessment of level of enamel permeability [3—11, 16, 17, 23]. If a cariesogenic situation and periodontal tissue diseases occur in the oral cavity, degradation of forms of MS crystals is detected [3—14]. Restoration of dental health of the smoker includes a prevention program, the mandatory condition of which is a complex professional course and, first of all, motivation of the patient to refuse smoking [5—11].

In order to determine the negative impact of smoking on MS, we have proposed a special test for smokers and dental doctors. The level of violations is determined by destructive changes and the structure of the drawing when viewing the whole area of dried MS drops, at the same time, the less clear the structure of the drawing, the greater harm to health caused to the smoker [7]. The test (working with the patient) takes no more than three minutes, the drying time of the sample is 15—20 minutes.

**Purpose** — is to assess its effectiveness as a controlled process in the practice of a dentist based on statistical analysis of the type of MS micro crystallization and simulation of rapid diagnosis of negative effects of smoking chronic smokers and non-smokers.

**Materials and methods of research**

The research involved 120 volunteers (58 women and 62 men) aged 18 to 44. 2 groups of participants have been formed: the main group (75 people) — smokers and the comparison group (45 people) — non-smoking volunteers. Clinical examination included: complaint analysis, anamnestic data, examination, determination of Green-Vermilion hygiene indices, dental caries intensity, gingivitis (Parma), MS microcrystalization type (MCS) study; Filling in the dental examination map [5—7, 9, 10, 14, 20] (fig. 1).

MS sampling was carried out twice: in smokers — before and 15 minutes after smoking, in non-smokers — study; Filling in the dental examination map [5—7, 9, 10, 14, 20] (fig. 1).

**Results of the research and their discussion.**

Analysis of the results showed: morphological signs characterizing crystalline MS aggregates in smokers are presented by five types (fig. 2).

The first type of MCS MS is characterized by a clear pattern of large elongated crystalloprysmatic structures, which have joined each other and have a tree and ferric shape, which are mainly in the center of the drop; Organic substance is located in small amount around periphery (protective potential 100%). The second type of MCS MS is the presence of separate dendritic crystalloprysmatic structures in the center of the drop of smaller size than in the first type; along the periphery located crystal structures of irregular shape (initial violation of MCS). The third type of MCS MS is in the field of view crystals of different shapes, arranged evenly throughout the field in the form of a net; There is a lot of organic matter around the periphery of the drop (moderate disruption of the MCS). The fourth type of MCS MS — over the entire area of the drop there is a large number of isometric structures of irregular shape (pronounced violation of MCS). The fifth type of MCS MS is the complete absence of crystals in the field of view (the MCS estimate is negative).

Analysis of MCS results of MS samples showed that in smokers the protective potential of MS is on average: before smoking 60.25±5.85%, after — 30.25±5.75%. In 25% of cases in smokers the protective potential of MS is negative (0%). Morphologically, this is characterized by a complete absence of crystals in the field of view (MS degradation in 100% of cases). In non-smoking patients, the protective potential of MS was 83.75±6.5%.

The appearance of pathological morphotypes of the MCS MS, 3rd, and especially 4th and 5th, which are not characteristic of the norm, testifies to the negative impact of tobacco smoking on oral fluid — formation of unfavourable conditions for processes of repair of inflamed gum and development of possible clinical complications. Saliva functions deteriorate and conditions are created for the occurrence and development of various pathological processes in the oral cavity. Increased epithelium desquamation, due to tobacco smoking, increases the content of horny flakes in the oral fluid, which disrupt the normal structure of mixed
saliva, becoming additional centers of MCS MS.

Structural changes of crystallized MS can serve as diagnostic signs of various diseases arising from tobacco smoking, and transformation of types of MCS MS can be used in diagnosis and prevention of diseases of oral organs, and, above all, periodontal tissues, in smoking.

**Conclusions**

1. Smoking negatively affects the morphological pattern — microcrystalline structure of MS. It has been found that structural changes in crystallized MS can serve as diagnostic signs of various diseases and disorders arising from smoking.

2. When smoking, saliva function is deteriorated, and conditions are created to exacerbate pathological processes in the oral cavity (caries, periodontitis, xerostomy and halitosis). The use of an affordable, low-cost and informative MCS method is useful as an auxiliary objective test for early diagnosis of various oral diseases.

3. It has been found that 92% of smokers and 97% of non-smoking patients positively assess the use of the method of rapid diagnosis to assess the negative impact of smoking on the state of MS; 100% of smokers who participated in the study expressed a desire to reduce the number of cigarettes smoked; According to 87% of smokers, this test is one effective way to convince against the harmful habit.

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Активные проблемы стоматологии (Россия)

Татьяна Михайловна ЕЛОВИКОВА
д.м.н., профессор кафедры терапевтической стоматологии, Уральский государственный медицинский университет, г. Екатеринбург
угма-elovik@yandex.ru

Вера Васильевна КАРАСЕВА
к.м.н., доцент, кафедра травматологической стоматологии и стоматологии общей практики, Уральский государственный медицинский университет, г. Екатеринбург
vevaska500@mail.ru

Ольга Васильевна ЛОМОВА
д.м.н., профессор кафедры онкологической стоматологии, Уральский государственный медицинский университет, г. Екатеринбург
olga_lamo@bk.ru

Анатолий Семенович КОЩЕЕВ
к.ф.-м.н., доцент кафедры моделирования управлениям систем, Уральский федеральный университет имени первого Президента России Б.Н. Ельцина, г. Екатеринбург
askoshcheev@yandex.ru

Вера Сергеевна МОЛВИНСКИХ
к.м.н., врач-стоматолог, ООО "МК «Гельос», г. Екатеринбург
oo0_gelios@mail.ru

Яна Сергеевна СКУРИХИНА
ассистент кафедры анатомической стоматологии и стоматологии общей практики, Уральский государственный медицинский университет, г. Екатеринбург
de-nika@bk.ru

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