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CHANGES IN DENTAL HEALTH INDICATORS DURING THE PERIOD OF STUDY IN A MILITARY UNIVERSITY

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Abstract. ***Introduction.*** Currently, the Russian Federation and economically developed countries of the world have achieved a high level of development of aviation technology. At the same time, until today there is no data on changes in the dental health of cadets during their studies at the university, taking into account the factors of military labor. ***The purpose*** of the work — to study the change in the indicators of dental health of cadets during their studies at the university, taking into account the factors of military labor. ***Materials and methods.*** The condition of the organs and tissues of the chewing apparatus was studied in 200 1st-year cadets and 185 graduates of combined-arms military educational institutions and 117 cadets and 111 graduates of military educational institutions for the training of flight personnel to determine the degree of influence of flight work on dental morbidity and its structure, for which an in-depth dental examination was conducted according to generally accepted rules. ***Results.*** Cadets of the 1st year, as well as graduates of combined arms and military educational institutions for the training of flight personnel, as representatives of the same population, had almost the same prevalence and intensity of major dental diseases, as well as the structure of pathology of organs and tissues of the chewing apparatus with a satisfactory level of dental care upon admission to university, and a good level of dental care in the final year university, despite a slight increase in the prevalence and intensity of the course of dental caries and periodontal diseases during the training period, which is associated with the planned sanitation of the oral cavity. Taking into account the high prevalence of inflammatory periodontal diseases (gingivitis, periodontitis) among cadets of the 1st and final courses of the higher military educational institutions (HMEI), dentists serving cadets should, in addition to routine preventive examinations, ensure regular (up to 2 times a year) professional oral hygiene and provide training to the entire serviced contingent of the relevant rules of dental care and the organs of the mouth.

Key words: cadets; military educational institutions; dental health; dental caries; non-carious dental lesions; oral hygiene; periodontal diseases; pathology of the oral mucosa; sanitation; medical examination.

ИЗМЕНЕНИЕ ПОКАЗАТЕЛЕЙ СТОМАТОЛОГИЧЕСКОГО ЗДОРОВЬЯ ЗА ВРЕМЯ ОБУЧЕНИЯ В ВОЕННОМ ВУЗЕ

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Резюме. ***Введение.*** В настоящее время в Российской Федерации и экономически развитых странах мира достигнут высокий уровень развития авиационной техники. В то же время до сегодняшнего дня отсутствуют данные об изменении стоматологического здоровья курсантов за время обучения в вузе с учетом факторов военного труда. ***Цель работы*** — изучить изменение показателей стоматологического здоровья курсантов за время обучения в вузе с учетом факторов военного труда. ***Материалы и методы.*** Изучено состояние органов и тканей жевательного аппарата у 200 курсантов 1-го курса и 185 выпускников общевойсковых военных учебных учреждений и 117 курсантов и 111 выпускников военно-учебных учреждений по подготовке летного состава для определения степени влияния летной работы на стоматологическую заболеваемость и ее структуру, для чего проведено углубленное стоматологическое обследование по общепринятым правилам. ***Результаты.*** Курсанты 1-го курса, а также выпускники общевойсковых и военных учебных учреждений по подготовке летного состава, как представители одной популяции, имели практически одинаковую распространенность и интенсивность основных стоматологических заболеваний, а также структуру патологии органов и тканей жевательного аппарата при удовлетворительном уровне оказания стоматологической помощи при поступлении в вуз, и хороший уровень стоматологической помощи на выпуском курсе вуза, несмотря на незначительное нарастание распространенности и интенсивности течения кариеса зубов и болезней пародонта за период обучения, что связано с проведением им плановой санации полости рта. Принимая во внимание большую распространенность среди курсантов 1-го и выпускного курсов высших военных учебных учреждений (ВВУУ) воспалительных заболеваний пародонта (гингивит, пародонтит), врачи-стоматологи, обслуживающие курсантов, должны, помимо плановых профилактических осмотров, обеспечить регулярное (до 2 раз в год) проведение профессиональной гигиены полости рта и осуществлять обучение всего обслуживаемого контингента соответствующим правилам ухода за зубами и органами рта.

Ключевые слова: курсанты; военно-учебные учреждения; стоматологическое здоровье; кариес зубов; некариозные поражения зубов; гигиена полости рта; заболевания пародонта; патология слизистой оболочки полости рта; санация; диспансеризация.

INTRODUCTION

At present, the Russian Federation and economically developed countries of the world have reached a high level of development of aviation technology. New types of airplanes have appeared, they possess not only large payload, high power and capacity, but also high speed, maneuverability, and “high ceiling” [1, 2]. Obviously, such improvement of aviation equipment leads not only to the relief of pilots’ labor and increase of its efficiency, but also to increased neuroemotional and physical stress, which affects their somatic and dental health [3, 4, 11, 12]. That is why the protection and improvement of health of the flight personnel of the Military Space Forces of the Ministry of Defense of the Russian Federation (MOD RF) and civil aviation is relevant. It is associated with high willingness to combat of the country’s air forces and flight safety [8–10]. It is known that dental diseases occupy one of the leading places in the structure of general morbidity of servicemen of all branches of troops and civilian population [3, 4, 6, 11]. At the same time, until now there are no data on the changes in the dental health of cadets during their higher education that would take into account the factors of military labor.

OBJECTIVE OF THE STUDY

To study the changes in the indicators of dental health of cadets during their higher education taking into account the factors of military labor.

MATERIALS AND METHODS

To implement the ongoing research to study the state of organs and tissues of the masticatory apparatus in cadets and to determine the degree of influence of military labor factors on dental morbidity and its structure, there were examined 200 1st year cadets and 185 graduates of general military educational institutions and 117 cadets and 111 graduates of military educational institutions for training flight personnel. The study included men whose age at the 1st year of study at military educational institutions was 17–22 years, and at their graduation — 22–27 years. It should be noted that graduates of militaryflight personnel training institutions were exposed to aviation flight factors to a greater extent than other similar categories of general military cadets during their training, namely, during training flights and flight practice.

To determine the prevalence and intensity of carious process, periodontal diseases, diseases of the mucous membrane of the oral cavity, tongue and lips (SOPR), masticatory muscles, temporomandibular joint (TMJ), an in-depth dental examination of the cadets was conducted. They were examined using a dental mirror and probe, a special graduated button probe to assess the state of periodontal tissues. The intensity of dental caries was assessed by CFU indices (C — carious teeth; F — filled teeth; U — extracted teeth). The prevalence of dental caries, periodontal and SOPR pathology, as well as the need of personnel in oral cavity sanitation was expressed in percentages. The level of dental care was determined according to the generally accepted method [5]. The hygienic state of the oral cavity (hygiene index) was determined according to Y.A. Fedorov and V.V. Volodkina [5]. Volodkina [5]. Pathologic changes in the periodontium were evaluated using the Schiller–Pisarev test, Svrakov iodine number, and the CFI index (periodontal index) [5], which has proven itself in our earlier epidemiologic surveys of Russian army personnel and the civilian population of the Russian Federation [3, 4, 6].

Based on complaints and objective data of clinical examination (pain sensations in the area of masticatory muscles or TMJ, including palpation data, displacement of the esthetic center of the jaws in the position of central occlusion, presence of mandibular deviation when opening the mouth, etc.), the condition of masticatory muscles and TMJ was evaluated [7].

The digital material obtained in the clinical study was processed on a personal computer using a specialized package for statistical analysis STATISTICA 6.0. Differences between the compared groups were considered reliable at $p \leq 0.05$. Cases when the probability values of the p value were in the range from 0.05 to 0.10 were considered as “presence of a trend”.

RESULTS

It was found that the prevalence of dental caries in 1st-year cadets of general military higher military educational institutions (HMEI) (hereinafter cadets) and 1st-year cadets of flight training HMEI (flight cadets) averaged 89.5 and 87.2% (Fig. 1), and the caries intensity index was 4.66 (C — 1.65; F — 2.35; U — 0.66) and 4.82 (C — 1.95; F — 2.44.9; U — 0.43), respectively ($p \geq 0.05$). Non-carious lesions of teeth in the form of erosion, enamel hypoplasia and wedge-shaped defects were equally frequent in both groups of patients, in 11.5 and 7.7% of cases, respectively ($p \leq 0.01$). Pathologic erasability of the hard tissues of teeth was not diagnosed in any of the examined patients. However, while 70% of the cadets needed treatment for dental hard tissue pathology, this figure was 65.0% ($p \leq 0.05$) in the flight cadets, and the level of dental care (LDC) in both groups was evaluated as satisfactory (Fig. 2), and the numerical expression of the LDC index was 55.6 and 51.0% in the above groups, respectively ($p \geq 0.05$).

The hygienic state of the oral cavity assessed by the hygiene index (HI) of Y.A. Fedorov–V.V. Volodkina had no significant differences in all examined groups of 1st year cadets. The level of oral hygiene was considered as unsatisfactory (IG was 1.90–1.91).

When assessing the state of periodontal tissues, gingival bleeding (positive Ainamo test) and positive Schiller–Pisarev test were detected in 66.5% of 1st year cadets and 65.8% of 1st year flight cadets with Svrakov iodine number of 0.83±0.11 and 0.69±0.11 units, respectively ($p \leq 0.05$), which indicated the presence of gingivitis and required mandatory professional oral hygiene.

Supragingival and (or) subgingival tartar deposits were diagnosed in the studied groups in 18.5 and 16.2% of cases, respectively ($p \geq 0.05$). At the same time, periodontal pockets up to 5 mm deep were found in 6.5% of cadets and 5.1% of flight cadets ($p \geq 0.05$). This category of subjects (Fig. 3) certainly needed comprehensive treatment of periodontitis.

It should be emphasized that cadets and cadets of flight in the 1st course were mostly diagnosed with mild (in single cases — of medium intensity) periodontal diseases. The KPI index in the studied groups respectively amounted to 1.91±0.21 and 1.90±0.22 units ($p \geq 0.05$). The dystrophic form of periodontal disease was not diagnosed in any of the examined patients.

In both groups, diseases of the oral mucosa, lips and tongue were rarely detected (Fig. 3), respectively in 2.0 and 1.71% of cases ($p \geq 0.05$). Among these diseases were glossitis (folded, “geographic” tongue), chronic recurrent herpetic stomatitis, and meteoric cheilitis.

In 2.0% of the 1st year cadets and 1.71% of the 1st year PLS cadets various pathological symptoms from the TMJ side were determined, which allowed to diagnose the presence of TMJ dysfunction, and in 50% of them this pathology was combined with parafunction of masticatory muscles (bruxism).

Obviously, from the data obtained, we can conclude that cadets entering military educational institutions, regardless of the military specialty of the higher educational institution, require full-fledged dental rehabilitation, which should and can be realized within the scheduled oral cavity sanation of these groups of servicemen.

The study has shown that caries prevalence in cadets — graduates of general military higher military educational institutions (hereinafter referred to as graduates) amounted to 92.4%, and in graduates of flight training in general military higher military educational institutions (hereinafter referred to as graduates of flight trainig) — 91.0%, the intensity of

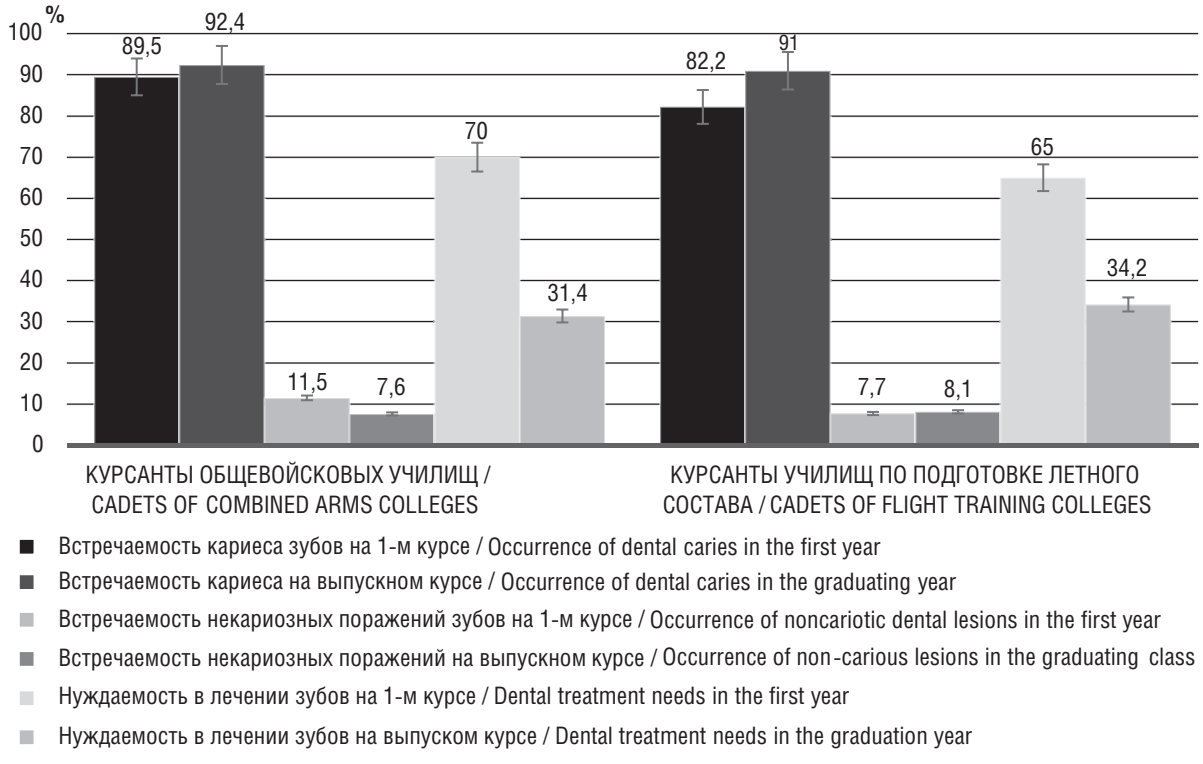

Fig. 1. The occurrence of caries and non-carious teeth and the need for their treatment in those examined in the first and final year of a military educational institution (%)

Рис. 1. Встречаемость кариеса и некариозных зубов и нуждаемость в их лечении у обследованных на 1-м и выпускном курсе военно-учебного учреждения (%)

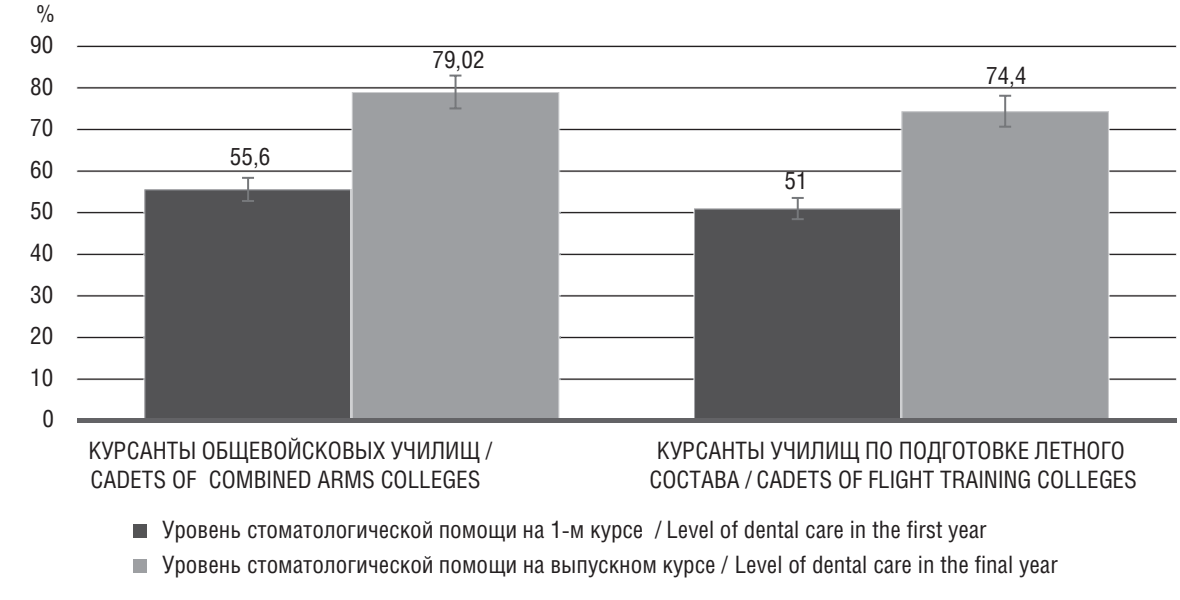

Fig. 2. The indicator of the level of dental care for those examined in the first and final year of a military educational institution (%)

Рис. 2. Показатель уровня стоматологической помощи у обследованных на 1-м и выпускном курсе военно-учебного учреждения (%)

caries — the CFU index — was 6.2 (C — 0.9; F — 4.7; U — 0.6) and 6.34 (C — 1.12; F — 4.6; U — 0.62), respectively. According to the World Health Organization (WHO) grid, the caries incidence in graduates, as well as in 1st year cadets, should be assessed by prevalence as massive, and by intensity as high. The study of the caries course dynamics during the period of training in the HMEI allowed to reveal some increase in the prevalence and intensity of the

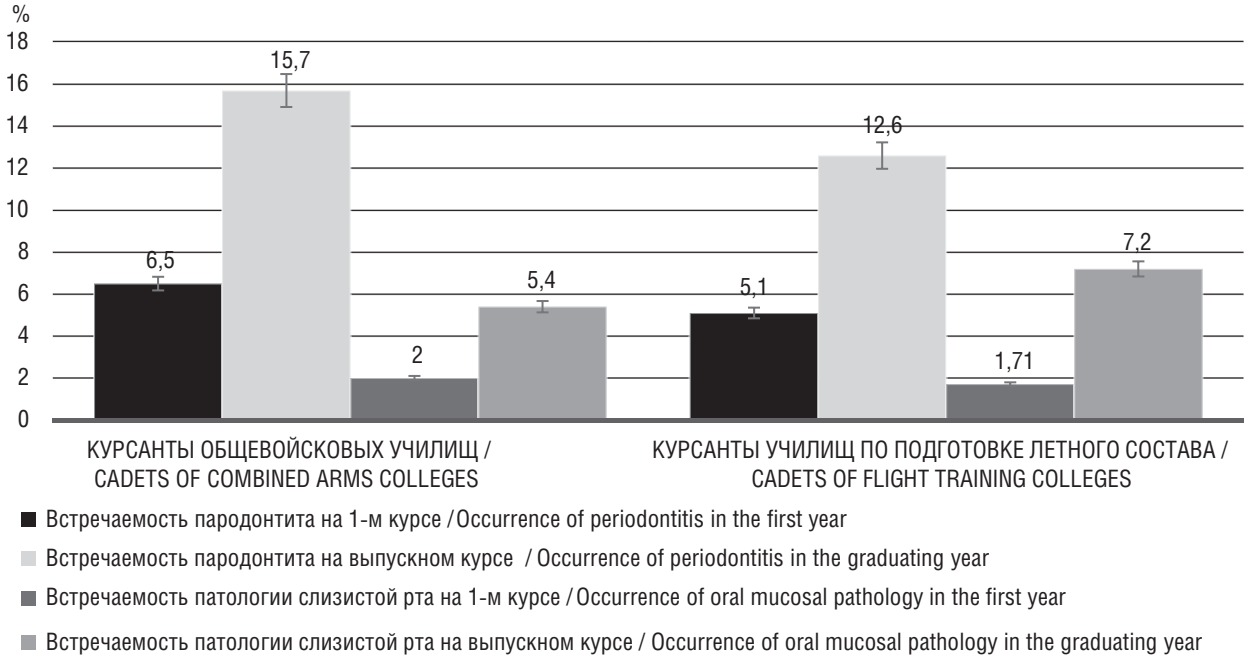

Fig. 3. Occurrence of periodontitis and pathology of the oral mucosa in the examined (%)
Рис. 3. Встречаемость пародонтита и патологии слизистой оболочки рта у обследованных (%)

carious process regardless of the HMEI profile (p ≥0,05). The prevalence of non-carious tooth lesions in both groups of graduates was 7.6 and 8.1%, respectively (p ≥0.05). It is important to emphasize that due to medical examination and dental therapeutic and preventive measures in HMEI, 31.4% of graduates and 34.2% of PLS graduates needed treatment of dental diseases, and the level of dental care (LDC) in both groups was assessed as good. The LDC index scores were 79.03 and 74.4%, respectively (p ≤0.01, compared to those in the 1st year of HMEI).

There were significant changes in the state of periodontal tissues in graduates of both groups. The incidence of periodontitis increased according to age in both groups. The level of oral hygiene remained unsatisfactory (HI was 1.9). When evaluating the condition of periodontal tissues, gingival bleeding and positive Schiller-Pisarev test were detected in 40.2% of graduates and 44.9% of flight graduates, respectively. The Svrakov iodine number in these groups were 1.21±0.11 and 1.31±0.17 units, respectively (p ≥0.05). Dental tartar deposits (supragingival and/or subgingival) were diagnosed in 46.5 and 38.7% of the examined graduates and flight training graduates, respectively. At the same time, periodontal pockets up to 5 mm deep were found in 15.7% of graduates and 12.6% of PLS graduates (p ≤0.05). It should be emphasized that all graduates of both study groups were mostly diagnosed with mild intensity of periodontal diseases — CFU index = 1.64±0.22 (CPU index ranged from 1.2 to 2.4). The dystrophic form of periodontal disease was not diagnosed in any examined person.

The diseases of the oral mucosa, tongue and lips also became more frequent in graduates and PLS graduates — in 5.4 and 7.2% of cases, respectively. Among this pathology, herpetic stomatitis, cheilitis, fissure of the red border of the lower lip and glossitis (folding and desquamative tongue) were more frequent.

The prevalence of TMJ disorders in graduates was 2.1% and 1.8% in PLS graduates who simultaneously suffered from masticatory muscle pathology, namely teeth grinding (bruxism).

DISCUSSION

Graduates of general military higher military educational institution (HMEI) and HMEI flight trainig graduates represent the same population and have similar prevalence and intensity of major dental diseases. We could not notice any influence of flight work factors on the masticatory apparatus of flight trainig graduates of HMEI. Despite the insignificant increase in the prevalence and intensity of dental caries during the period of training at HMEI, both groups have a good indicator of dental care level, which can be explained by the most advanced form of dental care (medical checkup) used in the Armed Forces of the Russian Federation for all groups of servicemen. At the same time, periodontal diseases are more frequent and intensive in HMEI graduates, which requires their complex treatment. The unsatisfactory hygienic condition of the oral

cavity of cadets and graduates of the HMEI, regardless of their specialty, plays a certain important role in this, which determines the high prevalence of inflammatory periodontal diseases (gingivitis, periodontitis) among them. It also requires regular training of the entire institution body under examination in the appropriate rules of dental and oral cavity care and professional oral hygiene.

CONCLUSIONS

1. As a result of the planned sanation work in HMEI, the 1st year cadets, as well as graduates of general military and flight schools, as representatives of one population, have practically the same prevalence and intensity of the main dental diseases, as well as the structure of pathology of organs and tissues of the masticatory apparatus, with a satisfactory level of dental care on admission, and a good level of dental care on graduation.

2. The volume and quality of dental work among young people of pre-conscription and conscription age does not correspond to the modern requirements. In this regard, we can predict a sharp change in the structure of dental morbidity among military personnel towards increasing the intensity of caries and its complicated forms, as well as increasing the prevalence and intensity of inflammatory periodontal diseases. This should be taken into account when drawing up the sanation calendar plan in HMEI.

3. The implementation of regular (up to 2 times a year, combined with preventive examinations) professional controlled oral hygiene and dental hygiene training in the structure of dental care will reduce the prevalence of inflammatory periodontal diseases (gingivitis, periodontitis) among cadets and trainees of HMEI.

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