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Changes of the psychophysiological status at orthodontic treatment

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Abstract

Relevance. It is important to learn the psychophysiological features of the young people, who smother dent alveolar anomalies.

Purpose. The goal of the investigation was the learning of the features of the psychophysiological status of the young people with dent alveolar anomalies, taking into account a method of orthodontic treatment.

Materials and methods. Probands were divided into 4 groups depending on the types of used orthodontic devices. The day stress levels and a quality of the night sleep of the young people smothering dentoalveolar anomalies, taking into account a way of the orthodontic treatment (vestibular or lingual bracket-systems), were investigated. The device, which allowed to analyze the variability of the heart rate, was used for the identification of the features of the psychophysiological status. The indicators of the day stress level and the night sleep quality were examined among all investigated groups. The indicator of the day stress level was taken in percents, and the night sleep quality indicator was taken with the restoration coefficient - in standard units.

Results. Young people, using vestibular bracket-systems, were registered productive psychophysiological status with gratifying and good restoration coefficient scores. People, who received orthodontic treatment with lingual bracket-systems, were noticed the increasing their day stress level and the reducing their night sleep quality during the whole clinical-physiological research.

Conclusion. Collected findings are needed to use choosing the treatment way of dentoalveolar anomalies of the persons, whose professions are connected with their specific living conditions and physical and extreme factors.

Key words: orthodontic treatment, psychophysiological status of the person, day stress level, the night sleep quality, restoration coefficient.

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Изменения психофизиологического статуса при ортодонтическом лечении

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Резюме

Актуальность. У молодых людей, страдающих зубочелюстными аномалиями, представляется важным изучение психофизиологических особенностей личности человека.

Цель. Изучение особенностей психофизиологического статуса молодых людей, страдающих зубочелюстными аномалиями с учетом методики ортодонтического лечения.

Материалы и методы. Обследуемые были разделены на четыре группы в зависимости от использования различных видов ортодонтической аппаратуры. Были исследованы показатели уровня дневного стресса и качества ночного сна у молодых людей, страдающих зубочелюстными аномалиями, с учетом методики ортодонтического лечения (вестибуляные или лингвальные брекет-системы). Для выявления особенностей психофизиологического статуса использовали устройство, позволяющее анализировать вариабельность сердечного ритма. Во всех исследуемых группах были изучены показатели уровня дневного стресса и качества ночного сна. Показатель уровня дневного стресса оценивали в процентном исчислении, а показатель качества ночного сна по коэффициенту восстановления – в условных единицах.

Результаты. У молодых людей, пользующихся вестибулярными брекет-системами, отмечается благоприятный психофизиологический статус при удовлетворительных и хороших показателях коэффициента восстановления.У лиц, пользующихся лингвальными брекет-системами, отмечено достоверное повышение показателя уровня дневного стресса, снижение качества ночного сна на протяжении всего периода исследования.

Заключение. Полученные данные следует учитывать при выборе способа и методики лечения зубочелюстных аномалий у лиц, чья профессия связана со специфическими условиями их жизни и быта, а также физическими и экстремальными факторами.

Ключевые слова: ортодонтическое лечение, психофизиологическое состояние человека, уровень дневного стресса, качество ночного сна, коэффициент восстановления.

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Dentoalveolar anomalies, the congenial and acquired deformations of the facial bones, especially leading to defacing patients' faces, which often arise after car accidents and also the gunshots, affect on the person's mental condition [1, 2, 3]. Specialists notice, that physiognomy and behavior of the person can help us learn his character, temperament, mental development and health [4, 5]. Data that the children and teenagers, who suffer from a posterior bite, are very impressionable, and the persons suffering from an anterior bite are strong-minded and extremely irrestrainable [6, 7], are provided in literature. Therefore that is important for the young people suffering from dentoalveolar anomalies not only finding a contact and sympathy with the patient, but learning psychophysiological features of a human personality for the optimized choice of a way and a method of treatment and also a design of the orthodontic device.

RESEARCH OBJECTIVE

To learn the features of the psychophysiological status of the young people smothering dentoalveolar anomalies, taking into account a technique of an orthodontic treatment.

MATERIAL AND RESEARCH METHODS

The study involved 48 young people aged from 17 to 25 years. The choosing aged people for the study allowed us to ensure the homogeneity of the investigated material [8,9] according to the psychophysiological status, as well as the mode of work and rest, physical fitness and nutrition. Just the men were investigated. Experimental subjects were divided into 4 groups. The first one consisted in 11 people, who had no dentoalveolar anomalies (control group). 2-nd group consisted in 11 people, who had dentoalveolar anomalies of the I-II degree, but didn't receive an orthodontic treatment. The 3-rd group consisted in 15 people who had received orthodontic treatment of dentoalveolar anomalies using vestibular bracket-systems not less than 3 months. The 4-th group consisted in 11 people who had received orthodontic treatment of dentoalveolar anomalies using lingual bracket-systems not less than 3 months (pic. 1).

As a method for identification of the features of the young people's psychophysiological status, who received orthodontic treatment, the device, which allowed to analyze the variability of the heart rate, was used. This device helped to learn the indicators of the day stress level and quality of the night sleep by A.K. Iordanishvili and co-authors technique in all investigated groups.

The investigation of young people was performed once and constantly during a week (from Monday till the next Monday). The indicator of the day stress level was rated in percentage terms, and the quality of the night sleep indicator was rated with restoration coefficient, in conventional units, according to K. Martinmäkietal recommendations [11]. Quality of the night sleep was rated as unsatisfactory, if the restoration coefficient indicator was less than 80 c.u.; from 80 to 100 c.u. – satisfactory; and if it was higher than 100 c.u. – the healthy one [10].

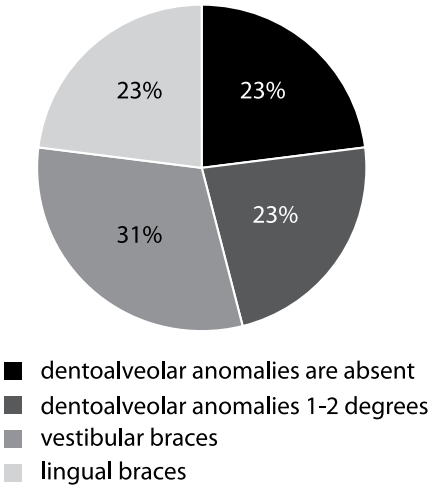
The explored indicators in this work were learned in the form of selective average value and a standard error of average size. The reliability of distinctions of average sizes of independent selections was rated by means of nonparametric criterion of Mann-Whitney with the difference from normal distribution of indicators. A check on normality of distribution was estimated by means of Shapiro-Wilks's criterion. Pearson's criterion χ^2 was used for statistical comparison of shares with assessment of reliability of distinctions taking into account Mantel-Henzel's amendment on credibility. The reached level of significance (p) was counted at all statistical analysis procedures; the critical level of the importance was equal 0.05 at the same time.

RESULTS AND DISCUSSION

We couldn't find reliable distinctions on indicators of level of a day stress and quality of night sleep among young people of the first and second groups ($p \geq 0.05$) during the conducted research and the statistical data processing.

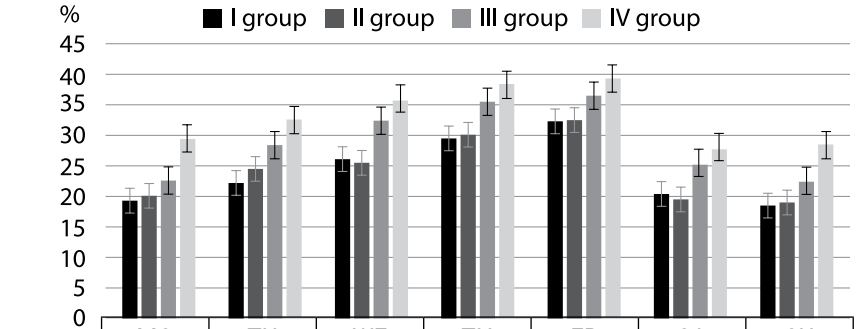
The examined persons of the first and second groups had low values of indicators of level of a day stress and quality of night sleep during all week (pic. 2, 3), despite high intensity of an academic and exercise stress in connection with their professional activity.

Their level of the day stress depended on the day of the week, and it had been rising from Monday to Friday and then it went down, as all working people's level did. Inverse relationship of the restoration coefficient and the indicators of the night sleep of people of the first and the second groups was marked too. The quality of night sleep had been decreasing from Monday to Friday and restoring for Saturday and Sunday. The indicators of people of the first two groups during all investigation period we can rate as satisfactory and healthy. It allowed us to conclude, that those dentoalveolar anomalies, which young people from the second group had, affected their psychophysiological indicators negative. This thing confirmed the correctness of the results of the earlier medical examination of these citizens. People of the third group, who used vestibular bracket-systems, were noted the difference ($p \leq 0.05$) of the indicator of the day stress level (since the forth investigation day till the seventh one)



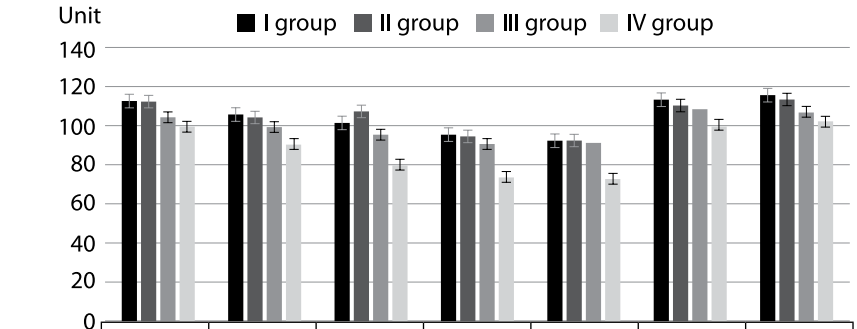
Pic. 1. **Distribution of young people on the research groups taking into account their dentoalveolar anomalies and a type of the orthodontic device, %**

and the quality of the night sleep (on the forth and the seventh investigation days) between people of the first and the second groups (pic. 2, 3). However the examined indicators (the day stress level and quality of the night sleep) of the third group didn't go beyond satisfactory characteristics. It meant that people of the first three groups had stabile psychophysiological status. At the same time, people of the fourth group, according to data of the day stress level indicator and quality of the night sleep, with the same dynamics of the specified indicators during a research (a week), were educed the essential differences from the similar indicators (p≤0,05), which were received while investigating people of the first three groups during all examination period (a week), but that indicators were rated as unsatisfactory – restoration coefficient fluctuated from 73.7 c.u. to 79.7 c.u. from the third day till the fifth day of the investigation (pic. 2, 3). Obviously, that people of the fourth group, who received orthodontic treatment with lingual bracket-systems, which disturbed their activity and emotional sphere more than the others, were prone to perceive the big circle of situations as menacing and to show the conditions of tension, concern, nervousness, that increased their day stress level and reduced the quality of the night sleep and also adversely affected the changes of indicators of restoration coefficient during the clinical-physiological research.



	MO	TU	WE	TH	FR	SA	SU
	Days						
I group	19.3	22.2	26.1	29.5	32.3	20.4	18.5
I group	20.1	24.5	25.5	30.1	32.5	19.5	19.0
I group	22.6	28.4	32.4	35.5	36.5	25.2	22.4
I group	29.4	32.6	35.7	38.4	39.3	27.7	28.5

Pic. 2. **Day stress level, %**



	1	2	3	4	5	6	7
	Nights						
I group	112.6	105.7	101.4	95.4	92.3	113.3	115.6
I group	112.3	104.2	107.3	94.5	92.4	110.3	113.4
I group	104.3	99.3	95.4	90.6	91.2	108.4	106.7
I group	99.5	90.3	79.7	73.5	72.7	99.6	102.2

Pic. 3. **Quality of a night sleep, c.u.**

CONCLUSION

The conducted clinical investigation among the young people suffering from dentoalveolar anomalies and receiving orthodontic treatment with bracket-systems allowed to recognize that, despite slightly increased the day stress level and decrease of quality of the night sleep, the persons using vestibular bracket-systems were noted the stabile psychophysiological status with the satisfactory and healthy indicators of restoration coefficient. At the same time, the persons using lingual bracket-systems for treatment of dentoalveolar anomalies are noticed increasing of the day stress level indicator and also declining of quality of the night sleep during all research period, especially from the fourth to the sixth day of the research (Thursday through Saturday). It can testify of hyperactivity of a sympathetic nervous system (a low-speed component of a range of variability of a heart rate) to its general power of a range of the young people with lingual bracket-systems and also of adverse influence on quality of the night sleep and normalization of restoration coefficient indicators. Summing up the results of that investigation, we can conclude, that the obtained data should be considered while choosing a way and technique of treatment of dentoalveolar anomalies of the persons, whose profession is connected to specific conditions of their life and also physical and extreme factors.

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