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ROLE OF VISUAL INFORMATION IN MAINTAINING STATOKINETIC STABILITY ON STEADY AND UNSTEADY PLATFORM

Statokinetic stability was studied in 16-year-old boys (37 individuals) on the steady and unsteady platform of the "MPFI stabilograph-1" and the Stabilis software package under the condition of feedback (FB) and closed eyes (CE). Visual deprivation was found to have the same effect on reducing statokinetic stability as unsteady platform. Statokinetic stability significantly decreased on an unsteady platform in conditions of CE that led to the tension of postural mechanisms of regulation. In the conditions of CE on an unsteady platform of the stabilograph in young men, there was a statistically significant decrease in the quality factor of the balance regulation function (KFR,%), an increase in the length of the oscillation trajectory of the pressure center (Length, mm), the average speed of the movement of the pressure center (AvgSpeed, mm/s), the average range of oscillation of the pressure center (Range, mm) and the average frequency of the oscillation spectrum of the pressure center in the mediolateral and anteroposterior plane (wAvgFMA, Hz) than on a steady platform with FB and CE.

The availability of visual information on an unsteady platform allows for significant improvement of statokinetic stability and reduction of the tension on postural regulation mechanisms. The results show that under the condition of the changed platform and visual control, the stabilography indicators change disproportionately. The identified features of changes in stabilographic indicators are stipulated by different contributions to the process of postural regulation of visual and proprioceptive afferentation. It has been proven that under the condition of standing on an unsteady platform, visual afferentation makes a much smaller contribution to the integrative processes of regulation of statokinetic stability than sensory information from proprioceptors of postural muscles.

***Key words**: statokinetic stability; stabilography; sensory deprivation; unsteady platform.*

Researching the regulation mechanisms of human statokinetic stability is an urgent task of physiology and treatment of various disorders of the functions of the central nervous system and motor apparatus [1, 2, 3, 4]. This problem is also relevant for the diagnosis of functional states of a person in various types of work, military and sports activities [3, 5, 6, 7, 8, 9]. Balance is one of the leading coordination abilities for many sports. Therefore, monitoring the ability to maintain balance is critically important both for a comprehensive analysis of the level of sportsmen's preparation and the staffing and selection of teams [10, 11]. A high level of postural stability is also necessary to perform everyday safe actions and to reduce the risk of falling [12, 13].

The vertical position of the human body is not stable due to the high position of the center of gravity from the support. Under any conditions that destabilize the balance of the statokinetic neuronetwork system, the mechanisms that correct the stability of the body are included. In some cases, the contribution of different analyzers to the regulation of statokinetic stability can selectively decrease or increase [14, 15, 16]. When the role of one analyzer is reduced, compensation is provided by greater activity of other systems [17, 18]. Some authors believe that the availability of visual information in maintaining statokinetic stability is not necessary, but its limitation significantly worsens the quality of the regulation of the vertical position of the body [19, 20]. It is also known that the visual system solves the task of stabilizing statokinetic stability by several mechanisms. First, the visual sensory system is involved in estimating the magnitude, speed, and direction of body movement in space [21]. Secondly, it can indirectly affect the quality of the regulation of statokinetic stability through the non-specific effect of the visual analyzer on the tonic contraction of postural muscles or through the vestibular system [22]. Partial or complete dysfunction of visual information causes a decrease in postural stability, which leads to an increase in the speed and amplitude of oscillation of the general center of pressure. In normal standing conditions, the contribution of visual information to the control of statokinetic stability is insignificant [23]. However, the effect of additional load on postural mechanisms caused by limited visual information has not been fully elucidated.

To measure various indicators of postural stability, data from various types of balance platforms are most often used. They facilitate the evaluation of postural stability under the condition of displacement of the pressure center on the platform of the stabilograph [24, 25]. Unfortunately, these platforms are usually very large and expensive, and their software is complex [26]. Another group of equipment for balance measurements is Wii Balance Boards [27, 28, 29]. In population studies, balance is tested using various motor coordination tests. The most popular among them is the Flamingo Balance test from the Eurofit Physical Fitness Test Battery [30]. Tests with unstable platform were also used. In some studies, no violation of statokinetic stability was found under the condition of maintaining a vertical posture on an unsteady platform [31]. In other researches, it is shown that in conditions of unsteady platform, the reliability of proprioceptive information from the foot decreases, the efficiency of integration of sensory systems in neural networks of posture regulation is impaired [32]. Under such conditions, the speed and reliability of muscle reactions decreases [33], the value of the visual sensory system increases significantly [5, 34, 35]. However, the role of visual information in the control of statokinetic stability in conditions of unsteady platform has not yet been fully investigated. Maintaining statokinetic stability on a moving platform is distinguished by a number of features. First, in a position on an unsteady platform, the pressure of the foot on the platform decreases, the proprioceptive information coming from the ankle joint is distorted. Second, due to the increase in the speed of body oscillation, the role of the vestibular and visual analyzers in the posture regulation system significantly increases. Third, the role of higher centers of postural regulation, perception, attention, memory, and intelligence increases [36, 37, 38].

Thus, the research material presented above shows that the role of visual information in ensuring statokinetic stability on an unsteady platform is not fully defined. Therefore, the goal of the study is to find out the mechanisms of regulation of statokinetic stability under conditions of load on postural muscles caused by visual derivation and unsteady platform. We try determine the regulation mechanisms of statokinetic stability under the condition of lack of visual information and unsteady platform. To investigate the role of the preserved and limited visual information in postural control, we use the feedback (FB) and eyes-closed (CE) tests on a steady and unsteady stabilograph platform. We choose an unsteady platform based on the results of previous studies [32, 37] that show different dynamics of stabilographic indicators than on a steady platform.

Materials and Methods. Broad implementation of computer technologies, including the development of a system for recording vertical posture, led to the emergence of computer stabilometry. This allows us to make a digital recording of deviations of statokinetic stability under the condition of performing various tests. In addition, this technique can perform a computer analysis of the received data, as well as calculate a number of dynamic indicators, which are important for studying the physiological mechanisms of the interaction of the body's sensory systems. Various damages and functional disorders can be reflected in the quantitative and qualitative indicators of stabilometry. Therefore, the study of the regulation mechanisms of the body vertical position can be performed by the method of stabilography, the main idea of which is to record the amplitude-time characteristics of postural stability on a steady platform [36, 38].

37 practically healthy young men (age = 16.67 ± 0.88 years, body length = 174.82 ± 6.87 cm, body weight = 71.55 ± 7.62 kg) participated in the study. Participation in the experiment was voluntary and complied with the bioethical norms of the Declaration of Helsinki (1964 and all its revisions, including the last one in 2000). Subjects were informed and consented to participate in the study.

Statokinetic stability of the subject was determined on the platform (40x40 cm). The registration of the stabilogram was performed under the condition of 4 tests. First, a test was performed on a steady planform with the FB. On the steady platform of the stabilograph, the subjects arbitrarily kept the vertical position of the body. The toes were spread to an angle of 20^0, and there was a distance of 6 cm between the heels.

In the first test with FB, the subjects visually controlled their body position. For this purpose, a flashlight was attached to the subject's head, with the help of which the subject had to direct the beam into a 10x10 square located at a distance of 1.5 m. The second test was performed by the subjects in the conditions of CE. In the third test, the statokinetic stability was determined on the unsteady platform of the stabilograph with FB. The fourth test was performed on the unsteady platform of the stabilograph in conditions of CE.

Three tests were conducted with each subject, and the best result was chosen. The subjects independently arbitrarily distributed the load for the vertical position. The duration of each test was 60 seconds. The sequence of tests and standing conditions were the same for all subjects.

When performing test tasks in digital mode, a recording lasting 60 s was made. with a discreteness of 25 1 $\Delta\tau$ = c, and the stabilogram signals were processed. Indicators of the functional state of the system and the regulation of statokinetic stability were evaluated by the quality factor of the balance regulation function (KFR,%), the length of the trajectory of the pressure center oscillation (Length, mm), the average speed of the pressure center movement (AvgSpeed, mm/s), the average swing of the pressure center oscillation (Range, mm). In addition, the spectral density of the initial signal in the Fourier series for the anteroposterior and mediolateral planes and the average frequency of the pressure center oscillation spectrum (wAvgFMA, Hz) were determined.

Statistical data processing was performed using packages for medical and biological research (SPSS, version 21, IBM, USA). Analysis of indicators obtained as a result of stabilogram processing shows that their distribution differs from normal. Accordingly, in the further statistical analysis, non-parametric criteria were used and descriptive statistics (median, error of the median, I and III quartiles) and the Wilcoxon test were applied. Tukey's test with Bonferroni correction was used to determine significant differences ($p < 0.05$) between mean values.

Research results. In accordance with the objectives of the study, we determined the indicators of statokinetic stability of the subjects in different conditions of visual function on a steady and unsteady platform.

The role of visual information in the regulation of statokinetic stability on a steady platform. In the first test, the subject had to maintain a posture on a steady paltform of the stabilograph with FB. While performing the test with FB, the subject maintained static kinetic stability on a steady platform and simultaneously directed the beam of the flashlight into a square located at a distance of 1.5 m. The subjects performed this task without excessive psycho-emotional stress. Statokinetic stability was achieved through the interaction of various stabilogram variables and the participation of integrative mechanisms of the central nervous system, vestibular, visual analyzers, and joint-muscle proprioception.

Performing the second test with CE was more difficult and was characterized by changes in the stabilogram indicators. The results of the stabilography study with FB differed from the indicators in the test with CE. Thus, in the test with CE, the subjects had statistically significantly increased Length and AvgSpeed indicators of the stabilogram, and the decreased KFR in comparison with the values in the conditions of FB (p<0.05 - p<0.001). Although the Range and wAvgFMA indicators in the test with CE increased compared to FB, they did not achieve statistically significant changes (p > 0.05). The results of the stabilogram when performing tests with FB and CE in young men on a steady platform are presented in the Table 1.

Table 1

Stabilometry indicators (Me [25%; 75%]) of subjects (n=32) under conditions of performing tests with open (1) and closed eyes (2) on a steady platform

Stabilogram indicators		Statistics indicators						
		Me±m	25%	75%	Мін.	Макс.	T	p
Length, mm		437.6±21.1	419.2	453.7	396.9	502.8	13.1	p<0.001
		855.3±31.3	823.5	889.2	728.3	1439.4		
AvgSpeed, mm/s	1	8.4±1.2	6.7	9.3	7.5	9.07	4.6	p<0.001
	2	14.1±1.2	12.5	15.9	10.6	16.6		
KFR, %	1	77.6±2.3	74.24	81.8	63.9	95.4	13.1	p<0.001
	2	51.3±1.8	48.2	57.8	46.8	65.8		
Range, mm	1	22.1±1.3	18.7	25.3	17.5	29.7	0.5	p>0.05
	2	23.2±0.8	18.5	25.9	18.6	31.6		
wAvgFMA, Hz	1	0.26±0.01	0.24	0.27	0.22	0.29	0.5	p>0.05
	2	0.27±0.02	0.26	0.32	0.23	0.35		

Note: *1 – open eyes, OE; 2 – closed eyes, CE.*

Table 1 shows that in young men, under the condition of changed visual information, statistically significant changes occurred in the amplitude-frequency characteristics of the studied stabilography indicators Length, AvgSpeed and KFR. Only indicators of the average amplitude of the pressure center oscillation and the average area of the spectral density of the pressure center oscillation under the condition of CE were not marked by higher values, compared to the indicators obtained during registration with FB (p>0.05). Based on the results presented in Table 1 and literature data, we note that the test with closed eyes is informative for assessing postural stability. During its performance, the motor task is implemented under the condition of blocking visual information [5, 39].

The role of visual information in the regulation of statokinetic stability on an unsteady platform. The third and fourth tests were performed in the same way as the first two with FB and CE, but on the unsteady platform of the stabilograph (Table 2).

Table 2

Stabilogram indicators (Me [25%; 75%]) of subjects (n=32) under the condition of performing tests with open (1) and closed eyes (2) on an unsteady support

Stabilogram indicators		Statistics indicators						
		Me±m	25%	75%	Мін.	Макс.	T	P
Length, mm	1	1039 ± 50.3	981.4	1064.7	852.0	1118.4	12.4	p<0.001
		2033 ± 93.1	1890.59	2132.5	1653.9	2279.5		
AvgSpeed, mm/s	1	17.5 ±2.1	15.7	19.3	14.5	21.0	3.6	p<0.001
	2	29.3 ± 3.2	25.5	34.9	22.6	37.6		
KFR, %	1	42.3 ±4.8	38.4	48.8	33.9	51.4	3.7	p<0.001
	2	24.4 ± 4.6	18.2	32.8	16.8	35.8		
Range, mm	1	35.6±2.6	32.7	38.3	27.5	41.7	4.8	p<0.001
	2	48.5±2.7	45.5	51.9	38.6	53.6		

wAvgFMA, Hz	1	0.35±0.01	0.32	0.37	0.30	0.39	3.0	p<0.001
	2	0.38±0.01	0.33	0.39	0.31	0.41		

During the performance of the third and fourth tests on an unsteady platform with closed eyes, an increase in the wAvgFMA spectral power at frequencies of 0.3-0.4 Hz was found in young men compared to FB (p < 0.05).

Note: *1 – open eyes, OE; 2 – closed eyes, CE.*

The study of stabilometry on an unsteady platform made it possible to establish a statistically significant increase in Length, AvgSpeed and Range and a decrease in CFR in young men under the condition of performing the task with CE, in comparison with the indicators obtained with FB ($p < 0.05 - 0.001$). In addition, in young men, during the test with CE on an unsteady platform, an increase in the power of the spectrum of oscillations at a frequency of 0.4 Hz was found in comparison with FB ($p < 0.05$). This indicates that proprioceptive afferentation is enhanced under the condition of CE on an unsteady platform, as well as the predominance in the structure of movements that support the vertical posture of small high-frequency oscillations.

The role of visual information in the regulation of statokinetic stability on steady and unsteady platform. To determine the role of visual information in the regulation of postural stability on steady and unsteady platform, we calculated the change in stabilography indicators in %. The indicators obtained under the condition of FB on a steady platform of the stabilograph were taken as the initial values (Table 3).

Table 3

Change in stabilogram indicators in % with eyes open and closed on steady and unsteady platform compared to the initial values

Studied indicators	Steady platform Closed eyes	Unsteady platform Open eyes	Unsteady platform Closed eyes
Length, mm	+ 95	+ 137	+ 365
AvgSpeed, mm/s	+75	+112	+162
KFR, %	- 34	- 46	- 68
Range, mm	+4	+63	+ 118
wAvgFMA, Hz	+4	+35	+42

The results show that the reaction of the investigated indicators to postural load in the conditions of normal sensory information and steady platform and in the condition of blocking of visual information and on unsteady platform was different. The limitation of visual information on a steady platform significantly increased the tension of the mechanisms of regulation of statokinetic stability. Blocking of visual information on a steady platform (second test) worsened KFR indicators by an average of 34%. This indicates that the restriction of afferentation from the visual analyzer disrupts integrative processes in the interaction of the higher departments of the central nervous system, vestibular and proprioception. In the case of standing on an unsteady platform (the third test) and maintaining visual control, the CFR decreased by a much larger amount - 46%. The given results demonstrate a greater dependence of statokinetic stability on afferentation coming from postural ligaments and muscles than on the visual sensory system. Whereas, in the case of simultaneous blocking or restriction of visual and proprioceptive control over the vertical position of the body, all studied indicators of the stabilogram significantly deteriorate. This is confirmed by the fact that in the fourth test, the integral indicator of the quality factor of the balance control function decreased by 68%.

Therefore, the results of the study with the successive exclusion of sensory afferentation show that the limitation of proprioceptive information makes much greater corrections in the integrative processes of regulation of statokinetic stability than visual. Simultaneous exclusion of visual information and limitation of proprioceptive afferentation on an unsteady platform with closed eyes leads to a significant strain on the mechanisms of postural regulation.

Discussion of results. In this study, it is important to find out how effective the contribution of visual information is to the regulation of statokinetic stability under the condition of a changed structure of the platform surface under the foot. Changed conditions of sensory information were modeled by sequentially excluding or limiting afferentation from the visual analyzer and postural receptors of ligaments and muscles. First, the subjects performed the task of maintaining the vertical position of the body on the stabilograph with FB, then moved on to the test with CE. Changed conditions of sensory information from foot mechanoreceptors were achieved by standing on a steady and unsteady support of the stabilograph.

It was found that in the process of maintaining the vertical position of the body with the FB on a steady platform (the first test), the subjects reacted by slightly increasing the speed of body oscillation and increasing the length of the oscillation trajectory of the pressure center. Under such conditions, the indicator of the quality factor of the balance regulation function, KFR, was 77.6%. (Fig. 1).

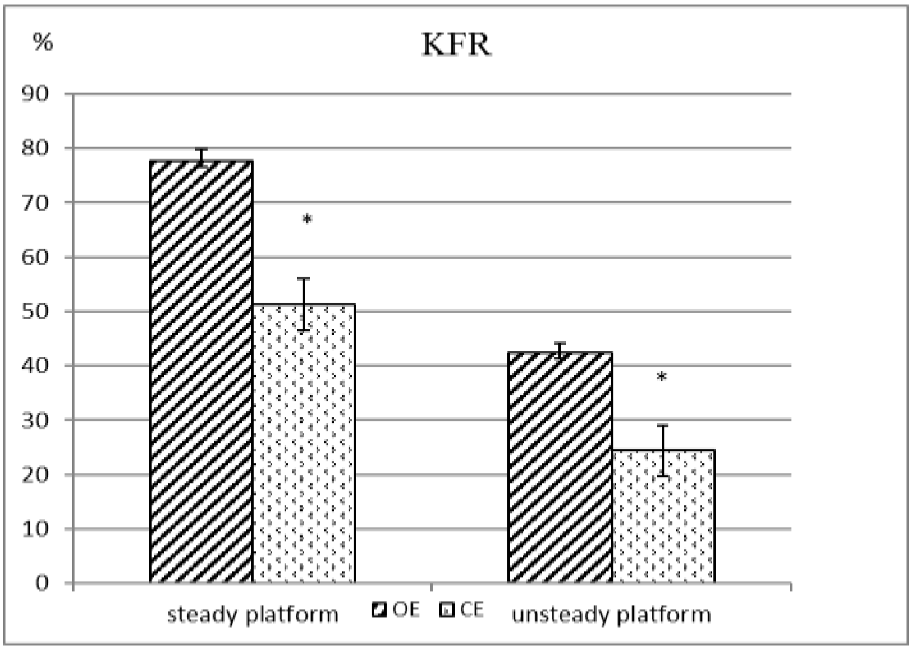

Fig. 1. Change in the quality factor of the balance control function (%) of the subjects (n=32) with open and closed eyes on the steady and unsteady platform of the stabilograph
Note: * - statistical probability of difference at the $p < 0.05$ level

There was no visual signaling in the second test. Under these conditions, the subjects could not compensate for the statokinetic stability. The lack of visual information was manifested in a reduced KFR up to 51.3% and a statistically significant increase in Length, AvgSpeed, Range and spectral power area at frequencies of 0.3 - 04 Hz. in comparison with similar indicators in the test with FB ($p < 0.05 - 0.001$). An increase in the length of the stabilogram when testing with closed eyes can be considered as a fact of deterioration of the statokinetic stability of the subjects. The results can be explained from the point of view that the visual sensory system in the vertical position of the body plays a dual role. Firstly, it informs the neural network of statokinetic stability about body oscillations relative to the external environment, and secondly, it evaluates the degree of stationarity of the environment itself [40]. Obviously, the statokinetic stability with CE is regulated by the action of feed-back mechanisms [41]. Posture maintenance under the condition of FB is provided by open-loop control mechanisms, which includes the interaction of higher departments of the central nervous system, vestibular and visual analyzers, joint-muscle proprioception and other functional systems [42].

Since stabilography is an indicator of changes in several variables, it can be assumed that the role of visual signaling in the regulation of statokinetic stability on an unsteady platform will be different than on a steady one.

The results we obtained while maintaining a posture on an unsteady platform in conditions of preserved visual signaling (the third test) showed a significant increase in the fluctuation of the center of gravity. Preservation of visual control on an unsteady platform reduced the KFR to the value of 46%, against the indicator on a steady platform with FB - 77.6%. The results show that when maintaining the vertical position of the body on an unsteady platform, the statokinetic stability deteriorates compared to a steady platform. It was established that the indicators of the length of the oscillation trajectory of the pressure center and the movement speed of the body mass center on the unsteady platform of the stabilograph in the subjects were statistically significantly higher, and the KFR lower than on the steady platform ($p < 0.05 - 0.001$).

The results obtained above can be explained by the fact that standing on a movable platform worsens statokinetic stability. It is known from the literature that foot receptors are an important source of information about the change in the position of the pressure center [43]. In conditions of unsteady platform, the activity of foot mechanoreceptors decreases, and the activity of body movement increases [32]. Under these conditions, due to the lack of pressure on the platform, the foot does not create compensation for the moment of forces and does not allow obtaining the necessary afferent information about the deviation of the body from the equilibrium support position [44]. Another explanation is related to the fact that the movable platform affected not only the force interaction between the foot and the platform, but also created ambiguous information about the position of the body in space. Under such changed conditions of proprioception, the significance of the afferent flow of information from the visual and vestibular sensory systems and the integrative functions of the higher departments of the central nervous system increased. It may also be plausible that the mechanisms of regulation of statokinetic stability were more stressed on an unsteady platform. The results of statokinetic stability, which we obtained under the condition of FB on an unsteady platform, were probably associated with a greater sensory deficit and less possibility to compensate them from the side of other afferent systems. As already shown above, our results with FB demonstrate that statokinetic stability is impaired on an unsteady platform compared to postural control on a steady platform. The Length, AvgSpeed, Range and wAvgFMA indicators on the unsteady platform with the FB increased, and the KFR decreased, respectively, by 137, 112, 63 and 46%% compared to the indicators obtained in the first test.

Therefore, under the condition of maintaining a posture on an unsteady platform with FB, we obtained differences in the participation of mechanisms of regulation of statokinetic stability in comparison with the test on a steady platform of the stabilograph. The above results demonstrate the dependence of statokinetic stability on afferent information from the support surface of the foot.

Thus, according to our results, statokinetic stability on an unsteady platform differs in a number of functional features. First, on a moving platform, the proprioceptive information received in response to a decrease in foot pressure compared to a solid support is distorted. Second, on an unsteady platform, the oscillation rate of the general center of the foot pressure increases that leads to a significant increase in the role of the vestibular and visual sensory systems in posture regulation. Third, it can be assumed that the control of statokinetic stability on an unsteady platform may involve mechanisms connected with higher departments of the central nervous system [32, 45, 46].

It was assumed that some stabilization of posture under conditions of unsteady platform was associated with partial ignoring of signals from the visual system and would be compensated by an increase in the contribution to the regulation mechanisms of other sensory systems, not related to visual information, including proprioception. Our assumption was confirmed by the results of the fourth test. In this test, subjects maintained a posture on an unsteady platform with CE. Under such conditions of standing on an unsteady platform, in case of exclusion of visual control and altered proprioceptive afferentation from the supporting surface of the foot, the studied parameters of the stabilogram significantly deteriorated. Thus, the KFR indicator in the fourth test decreased by 68%. Such a result was somewhat unexpected for us and therefore, was not easy to interpret. An increase in the length of the stabilogram compared to the FB was found on an unsteady platform with CE, which can be regarded as a feature of the functional state and the predominance of a large number of high-frequency oscillations in the structure of movements. Our results confirmed the validity of the opinion that the regulation of the vertical position of the body under the condition of conducting tests on an unsteady platform with CE was mainly carried out due to an increase in the power of the spectrum of oscillations at high frequencies of 0.4 Hz.

Our research shows that the lack of visual information in standing on a steady and, especially, on an unsteady platform significantly increases the tension of mechanisms of translational control regulation. The results of Table 3 shows that the lack of visual information cannot be fully compensated by other sensory systems. Thus, the lack of visual information on a steady platform caused changes in the reduction of KFR by 34%, and the Length, mm indicator by 95% relative to open eyes. Changes in the indicators of statokinetic stability under the condition of limited visual information also occurred in the indicators of AvgSpeed, mm/s (- 75%), but Range almost did not change (- 4%). These results are consistent with the results of works [47], which showed a significant, but not complete, compensation of postural balance disturbance caused by visual derivation.

We predicted that the visual derivation on an unsteady platform would lead to an even greater increase in body oscillations and a decrease in statokinetic stability than in conditions of FB. Violations in the integration of sensory information become especially important in case of simultaneous visual and proprioceptive deprivation. The results obtained in the fourth test showed that the most significant changes in the tension of the regulation mechanisms for maintaining statokinetic stability occured in the test with CE on an unsteady support. Stabilography indicators under these conditions decreased the most in relation to the similar characteristics obtained in the conditions of FB on a steady platform. Thus, Table 3 and Fig. 1 show that the indicators of the length of the trajectory of the center of pressure, the speed of movement of the center of mass of the body, Range and KFR deteriorated on the unsteady platform of the stabilograph with CE by 365, 162, 68 and 118%, respectively, compared to the results on a steady platform with FB. Therefore, the limitation of visual and proprioceptor information under the condition of unsteady support creates an additional effect on postural regulation mechanisms. It is plausible that under such conditions, violations of the sensory integration of the higher, central level of control are of particular importance. We note that the functioning of the regulation mechanisms of statokinetic stability in conditions of a lack of visual information on an unsteady platform creates an additional deficit on the part of proprioceptive information, which plays a key role in reducing postural control that is consistent with the results of other authors [47]. Based on our results, we can generalize that proprioceptive afferentation makes much larger corrections to statokinetic stability and integrative processes of regulation than the visual sensory system.

Thus, the indicators of stabilography, which reflect the process of maintaining statokinetic stability under the condition of limited visual and proprioceptive information on steady and unsteady platform, did not change proportionally. Some considerations for understanding the mechanism of regulation are provided by our results and modern studies by other authors, which relate to stabilographic indicators under conditions of FB and CE on a steady and unsteady platform. It has been shown that in conditions of unsteady platform, when the reliability of proprioceptive information coming from foot receptors is reduced and the efficiency of the integration of sensory systems in neural networks of posture regulation is impaired [32], the speed and reliability of muscle reactions decreases [33], the value of the visual sensory system increases significantly [35, 47, 48]. Whereas, according to our results, the non-proportionality of the participation of the two sensory systems in the mechanisms of statokinetic stability has been established. In conditions of unsteady platform and CE, statokinetic stability is the result of a greater contribution of proprioceptive information to regulation mechanisms than visual afferentation.

The experimental material we received brings us closer to the understanding of the mechanisms of regulation of statokinetic stability under conditions of additional load on postural regulation caused by visual deprivation and unsteady platform. The results we obtained, in part, contradict those researchers who speak in favour of the fact that changes in statokinetic stability under changed conditions of visual afferentation can be explained quite simply. We believe that the obtained results also require further experimental research and generalization.

Conclusions

1. Blocking of visual information significantly worsened statokinetic stability on both steady and unsteady platform of the stabilograph. With the eyes closed, the KFR indicators decreased, and the Length and AvgSpeed characteristics increased statistically significantly.
2. It was established that the limitation of visual afferentation exerted a noticeable influence on the reduction of statokinetic stability in young men, both on steady and unsteady platform. It was proved that changes in KFR on an unsteady platform with closed eyes were statistically significantly higher than on a steady platform with artificial feedback.
3. The availability of visual information makes it possible to significantly improve the statokinetic stability and reduce the tension of the regulatory mechanisms of the statokinetic stability on the unsteady platform of the stabilograph.
4. The lack of visual information makes much smaller corrections in the integrative processes of statokinetic stability regulation than proprioceptive afferentation.
5. The limitation of proprioceptive information makes much greater corrections in the integrative processes of regulation of statokinetic stability than visual afferentation.
6. Simultaneous exclusion of visual afferentation and limitation of proprioceptive information on an unsteady platform with closed eyes significantly impairs statokinetic stability and leads to significant tension of postural regulation mechanisms.

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