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Information indicators of assessment of biological objects

The reaction of psychophysiological indicators in the work of the pilot, as well as the entire flight and air composition of the aircraft depends on the type of many factors, both psychological and physiological in nature. The research on the adaptive potential of the organism on the basis of physiological reactions during the training of two different groups with different degrees of informative awareness is carried out.

The reaction of psychophysiological indicators in the work of the pilot, as well as the entire flight and air composition of the aircraft, is very diverse and not only in terms of the degree of influence on the system "pilot - aircraft", but also in its impact on the psychophysiological state of man. brain, which come to the pilot from the moment of ascent into the air. In a flight situation, the pre-adjustment of the body is expressed in the occurrence of an approximate reaction. The biological value of the informativeness of the indicators preceding the oriented reaction lies in the preparation of the organism for further changes in the environment. At the same time, muscle tone increases, blood circulation increases, analyzers are readjusted, so that further changes in circumstances do not affect the cerebral cortex "suddenly" in the biological sense. These physiological responses are biologically appropriate and will always be a major component of the pilot's behavior in any unusual situation. It is equally important for further study of the cerebral cortex to establish the specific qualities of the impact of the extreme situation of flight from a psychological point of view. [1]

Therefore, an important step for the analysis of the decision-making process of the flight crew is the analysis of the psychophysiological component of the actions of pilots in flight. The psychophysiological component consists in the correlation of the mental component and as its reaction - the change of physiological parameters of the organism. To analyze the physiological component as the main informative indicator of changes in the body as a response to stress, it is proposed to use the model of R. Baevsky [3], which allows to analyze the adaptive capacity as a response to compensated effects on stress. Physiological parameters as an information component of such a model are blood pressure, heart rate, systolic and cardiac output, age and weight of the subject.

The adaptation indicator (AP) according to Baevsky RM was chosen as an indicator for assessing the development of diseases. This indicator allows you to assess the adaptive capacity of the organism and determine the risk of disease. [4]

According to the proposed Baevsky RM method, the adaptive potential of the human body depends on its anthropometric data, age and functioning of the vascular system and can be calculated by the following formula:

AP = 0.011 * HP + 0.014 * ATs + 0.008 * ATd + 0.009 * MT + 0.014 * B-0.009 * DT-0.27 (conditional units),

where HP- Heart rate; B - age, years; DT - body length, cm; ATs and ATd - systolic and diastolic blood pressure; 0.011; 0.014; 0.008; 0.009; 0.27 - regression control coefficients.

The adaptive capabilities of the body of pilots during training were calculated in the work. In each of the groups there were 5 participants of different ages. According to the initial data (table 1) we will calculate the adaptation potential of the pilots, determine its regulatory limits and draw appropriate conclusions. The first (experimental) group was not informed about the simulation of failure during training on the simulator, the control group knew about the simulation of failure and was psychologically ready for its occurrence. [2]

Table 1.

№	HP	ATs	ATd	MT	B	DT
1	72	126	80	95,5	42	186
2	75	128	78	80	32	170
3	70	122	75	86	23	176
4	66	125	80	75	28	178
5	74	132	82	85	40	184
Control group:						
1	72	132	80	76	22	183
2	70	126	80	77	33	176
3	72	124	82	91	35	175
4	76	125	75	93	32	189
5	72	120	80	90	42	186

Calculate the adaptation potential of the control and experimental groups
Experimental group:

1) АП = 0,011*72+0,014*126+0,008*80+0,009*95,5+0,014*42-0,009*186-0,27 = 2,7

2) АП = 0,011*75+0,014*128+0,008*78+0,009*80+0,014*32-0,009*170-0,27 = 2,6

3) АП = 0,011*70+0,014*122+0,008*75+0,009*86+0,014*23-0,009*176-0,27 = 2,32

4) АП = 0,011*66+0,014*125+0,008*80+0,009*75+0,014*28-0,009*178-0,27 = 2,311

5) АП = 0,011*74+0,014*132+0,008*82+0,009*85+0,014*40-0,009*184-0,27 = 2,717

Control group:

1) AP = 0,011*72+0,014*132+0,008*80+0,009*76+0,014*22-0,009*183-0,27 = 2,355

2) AP = 0,011*70+0,014*126+0,008*80+0,009*77+0,014*33-0,009*176-0,27 = 2,475

3) AP = 0,011*72+0,014*124+0,008*82+0,009*91+0,014*35-0,009*175-0,27 = 2,648

4) AP = 0,011*76+0,014*125+0,008*75+0,009*93+0,014*32-0,009*189-0,27 = 2,5

5) . AP = 0,011*72+0,014*120+0,008*80+0,009*90+0,014*42-0,009*186-0,27 = 2,566

According to the data, the adaptation potential is up to 2.1. is a satisfactory state of adaptation. AP values from 2.11 to 3.2 indicate a stressful state of adaptation.

We can see that the indicators of adaptation capacity of all participants indicate the intensity of adaptation mechanisms. In this case, it depends primarily on the level of awareness of the occurrence of the refusal and age. That is, we can conclude that with age the body's adaptive capacity decreases. And it depends on the level of informativeness of those signals of the cerebral cortex that come to the pilot in the process of performing professional duties and especially at the time of failure. In the flight situation, the previous awareness of the organism is expressed in the emergence of an approximate reaction. The biological value of this reaction is to prepare the body for further changes in the environment. At the same time, muscle tone increases, blood circulation increases, analyzers are readjusted, so that further changes in circumstances adapt the body to an abnormal situation. [5]

Conclusions

The analysis of the results of the study showed the presence of certain variations in the structure of the mechanisms of heart rate regulation depending on the informative awareness of different groups of subjects (blood pressure) on dosed exercise also had some differences during the year. Thus, the use of adaptive potential as an informative indicator of the body's ability to establish a characteristic relationship of autonomic balance with circulatory reserves, which opens the possibility for understanding the new mechanisms of adaptation in different flight situations.

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