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# CHARACTERISTICS OF LABOR PHYSIOLOGY IN PROFESSIONS INVOLVED WITH MENTAL LABOR ACTIVITY

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**Abstract**
This article presents data on the impact of mental work on the cardiovascular and central nervous systems of workers, including changes in blood pressure, PCL, red blood cell count, and the impact on visual response and auditory motor analyzers during various types of mental activity. Comprehensive hygienic and physiological studies enabled the development of measures to improve performance and prevent illnesses in workers in various professions. The results of these studies served as the basis for developing preventive measures.

**Keywords**: Mental work, pulse, arterial pressure, visual motor reaction, drivers, dispatchers.

## Introduction

At the modern stage of society's development, that is, during the period of scientific and technological progress, the flow of incoming information is increasing dramatically [2,4]. This requires a certain intensification of human labor activity in analyzing this information and discovering new research [6,7].

Mental work refers to activities involving the reception and processing of information, requiring intense attention, memory, thinking, and emotional functioning. Scientific and technological progress increases the number of people performing primarily mental work every year. Many professions traditionally dominated by physical labor are now experiencing a steady increase in the proportion of mental work. Most modern professions are characterized by an accelerated pace, a sharp increase in the volume of information, a lack of time for decision-making, and an increase in the social significance of these decisions and personal responsibility. These factors often lead to nervous strain, and consequently, to the development of cardiovascular and nervous system disorders [1,3,5].

**Purpose of inspection: s**tudying the physiological changes affecting the body of workers engaged in mental labor and developing hygienic recommendations aimed at optimizing working conditions.

**Inspection methods:** In our study, 10 workers from each profession were selected, who were healthy and did not have any symptoms of the disease that would not allow any errors in the assessment of the test results. The tests were carried out in the dynamics of the working day (before work, during the working day and at the end of the working day). The functional state of the



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cardiovascular system, heart rate were measured using the palpation method and a pulsatometer, and arterial pressure was measured by tonometry (Korotkov method). The latent periods of auditory and visual reactions were measured using the chronoreflexometry method using a chronoreflexometer. The analysis of the mineral was carried out using laboratory methods.

**The results and their discussion.** Nowadays, there is a lot of evidence to support the distinction between physical and mental labor. We can include operators on automatic lines, operators of power plants and television studio control panels, aviation, railway, and transport dispatchers, accountants working on complex computing machines, directors, designers, researchers, and scientists in the profession of mental labor. These professionals can receive large amounts of information and respond to it instantly.

Any activity - physical or mental - is primarily an activity of the central nervous system. Fatigue resulting from physical and mental labor occurs as a result of inhibition of brain cells. No significant changes are observed in the process of physical and mental labor. However, at the same time, the physiology of mental labor has its own characteristics. Like physical labor, mental labor is accompanied by circulatory changes and metabolic disorders. However, these changes are not permanent and have a low intensity. In mental labor, unlike physical labor, there is a narrowing of blood vessels in the limbs and dilation of blood vessels in the internal organs.

During physical work, pulse rate and blood pressure increase compared to mental work. During both physical and mental work, we can observe a twofold increase in blood pressure and pulse rate. The intensity of muscle tension affects the overall metabolic rate in the body. The greater the number of operations associated with muscle tension, the higher the metabolic rate. For example, when we read a book, our metabolism increases by 16%, when we play chess - by 43%, when we give a report while standing - by 45%, when we give a lecture while standing - by 94%, when we play the violin - by 77%, and when we attend a practical seminar - by 9.9-83.5%.

During mental work, the total metabolism in the body does not exceed 10-15%, but as a result of muscle tension, metabolism increases. However, this does not mean that the metabolism in the brain is at a low level, but rather that the brain's need for oxygen per 100 grams of substance is 15-20 times higher than that of muscles.

If the type of mental work is associated with nervous and emotional stress, then this condition is clearly manifested in changes in somatic functions.

According to the results of the examination of chess players, it was found that arterial pressure increased from the 2nd hour of the game. According to the results of the physiological examination of students during the exam, the pulse is 90-115 beats per minute, the maximum arterial pressure is 30-35 mm sim. above, minimum arterial pressure 14-18 mm sim. it was observed that the body temperature increased, the number of erythrocytes in the blood increased, the amount of sugar in the blood increased, and the number of eosinophils decreased. Such changes were also observed in the professions that perform management work at the remote control. For example, it was observed that during the working day, the operator on duty in the subway had an average increase in blood sugar of 37 mg.%, the amount of sugar in the blood of directors working on television increased by 40-60 mg.%, and the amount of sugar in airport dispatchers increased by 40-50 mg.%.



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When determining the latent period of the visual motor reaction, it was found that the latent period of the visual motor reaction in locomotive drivers was extended by 20-25%, attention, perception of color and sound signals were reduced. At the same time, changes were observed in the electroencephalogram, which means that the body is inhibited due to fatigue.

The changes observed in the central nervous system in remote control operators were manifested in the second phase. In the first phase, an increase in vision analyzer arousal was observed, while in the second phase, a decrease in vision analyzer arousal was observed several hours after the start of work.

In metro drivers, a decrease in vehicle speed and a decrease in response to light were observed starting from 4-5 hours of the working day. At the same time, in 30-50% of cases, a slowdown in the central nervous system and changes in the perception of information were observed starting from the 5th hour of the working day.

The working conditions of airport controllers are considered to be a stressful type of work. In dispatchers who control the landing of aircraft, a sharp decrease in the response to movement, light and sound is associated with the process of inhibition observed in the brain. The physiological changes observed in this profession are associated with the intensity of work. Physiological changes in the work of dispatchers who control aircraft with high traffic intensity, namely an increase in pulse rate, a decrease in maximum arterial pressure, an increase in minimum arterial pressure, are stronger than in dispatchers who control aircraft with low traffic intensity. At the same time, an increase in the latent latency period of visual and auditory analyzers, an increase in the number of errors and re-interrogations were also found in employees of this profession.

According to research, mental and emotional states are observed in professionals engaged in intellectual work. Therefore, it was found that they often have a higher incidence of cardiovascular diseases, such as hypertension, cardiosclerosis, and atherosclerosis, compared to other types of work.

## Conclusion

Thus, it should be noted that workers engaged in mental labor experience physiological changes in the cardiovascular system and central nervous system. Therefore, the goal of our scientific research is to develop and implement hygienic recommendations aimed at improving their working conditions, increasing their working capacity, and preventing fatigue.

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