

Study of the psychophysiological state of adolescents using the method of gas-discharge visualization

Olga Basarab, Anna Toptun, Yuliia Bondarenko
Cherkasy State Technological University, Cherkasy, Ukraine
julybo110976@gmail.com

Abstract: The article presents the results of development and research of methods and adjustment of modes of operation of the device for gas-discharge visualization for the most accurate and prompt determination of the psychophysiological state of human health in the field of his professional activity. Determining the ability of a teenager to cope with certain intellectual tasks, both at the beginning of the educational task and at the end of the working day, is necessary for the rational use of human labor and to ensure the quality and efficiency of the educational institution as a whole. Factors influencing the quality of the process of obtaining and accuracy of processing information about the psychophysiological state of man with a device for gas-discharge visualization, among which the greatest influence are external factors such as human (correct preparation and conduct of the experiment), climatic (humidity, ambient temperature), guidance of electromagnetic fields from power-operated devices nearby, elimination, or at least minimization of which allows to increase accuracy (by 8-12%), reliability (by 3-5%) and reproducibility (more than 1.8 times) of results diagnosing a device for gas discharge visualization. The daily dependences of the psychophysiological state of the adolescent on mental load were obtained, which showed the following: the best indicators of the psychophysiological state observed in the morning (period from 10-00 to 12-00) in the absence of other physical and intellectual morning load. At the same time it is established that active rest for 40-60 minutes or change of mental exercises by physical (within 60-90 minutes) after mental loading, restores the previous psychophysiological condition of the teenager by 85-90% whereas passive rest within 120-150 minutes, allows you to restore the previous psychophysiological state of the adolescent by only 35-45%.

Keywords: GAS-DISCHARGE VISUALIZATION, PSYCHOPHYSIOLOGICAL STATE OF A PERSON, ADOLESCENT AGE GROUP, DIAGNOSIS, EFFICIENCY

1. Introduction

Human health is one of the problems of the world's population, which are vital both for the individual and for humanity as a whole. An important problem that negatively affects the health of the population, especially young people, is stress caused by significant physical and mental overload. The best mechanism for reducing the incidence is disease prevention, which is the most relevant tool today.

Prevention and prevention of morbidity of the population of any country, and especially the stressful state of people, should be carried out using reliable diagnostic methods and high-precision specialized devices. This research work is aimed at finding out the possibility of studying the psychophysiological state of man (on the example of high school students during the study period) using the method of gas-discharge visualization. The results of analytical and experimental studies presented in this paper can be used to identify the causes and consequences of abnormalities in the psychophysiological state of adolescents and to develop recommendations for eliminating and minimizing these abnormalities.

The aim of the work: improving the methodology of research of psychophysiological condition of adolescents by the method of gas-discharge visualization to increase the accuracy, reliability and reproducibility of diagnostic results

Currently, the method of gas-discharge visualization – GDV (Kirlian effect) is one of the few methods that allows you to quickly, accurately and safely investigate the physical, psycho-emotional and energy state of a person, detect disease and find its root cause, and quickly monitor the dynamics of selected individual treatment methods and recovery [1, 2].

In general, today scientists identify several groups of factors that adversely affect human health [3]:

1. Technopathogenic influence. The source of such influence, scientists identify all technical devices and devices that run on electricity: computers, microwave ovens, refrigerators, televisions, cell and radiotelephones, radios and more.

According to numerous studies conducted in Russia, the United States, France, the negative impact of weak electromagnetic fields of ultra-low and low frequencies on human health [4]. The nervous, immune and reproductive systems especially suffer from their influence. These studies have shown that the main reason for the negative impact of these technical means on their users are the information components of electromagnetic radiation, which are very harmful to human health because they destroy the biofield.

2. Geopathogenic impact. The source of this type of influence are the so-called "destructive" places that are not suitable for human life and activity. According to the hypothesis of the German scientist Hartmann, the earth's surface can be divided into "healthy" and "sick" zones. It is established that the lines of force of the geomagnetic field "stick together in the walls" with a thickness of 20-30 and more centimeters, which is at a distance of 2.5 m from each other in Central Europe in planes perpendicular to the meridian passing from the North to the South. The walls, which are formed by lines of force in the direction of the magnetic meridians, are separated from each other by 2 m. Thus, the "walls" of the magnetic lines of force form regular rectangular cells. "Sick" areas - the intersection of walls - are dangerous to human health. If a person is in such areas for a long time (sleeps, works), he begins to worry about headaches, irritability. In the future, diseases develop quite rapidly (hypertension, coronary heart disease, diabetes, oncology and others). Moreover, these diseases are very difficult to treat and often lead to disability and even death of the patient.

3. Ecopathogenic impact. This type of impact is created by unfavorable environmental conditions in which we live - polluted air, water, food, radioactive radiation of artificial origin and so on.

Experiments were also conducted with cell phones. The results showed [5] that in those who use mobile phones, the area of the glow decreases or disappears completely in the throat and head. And this is not surprising. Now there are many scientific papers that examine the negative impact on humans, especially on the cardiovascular system, electromagnetic fields, especially from household appliances. It should be noted that the stronger the aura (voltage and area), the less affected by any negative impact, including from cell phones. Music has a positive effect, especially classical [6], and the GDV method was one of those that confirmed that music has healing properties. Experiments have shown [7] that listening to your favorite music for one minute not only restores the aura, but also makes it more powerful. Essential oils also have a positive effect. It is enough to inhale the smell of oil several times, as certain energy centers are activated.

The parameters of the gas-discharge image depend on the properties of the object under study and thus, analyzing the nature of the glow induced by the objects, it is possible to judge the energy state of the object at a particular time.

The GDV method has been successfully tested by many years of practice of using the software and hardware complex "GDV Camera" in various institutions. To date, the GDV method has gained worldwide recognition [8].

The GDV method is used to solve the following solutions [9]:

- Mass screening-diagnosis of diseases (preventive rapid diagnostics). Such a diagnosis can be made as part of professional examinations. This method will identify the most affected organs and systems at the time of examination, as well as potentially dangerous areas of the body.
- Express method of syndromic assessment of patients in hospitals, clinics, dispensaries, sanatoriums, which allows you to sharply limit the scope of diagnostic search.
- Selection of individual treatments based on GDV-gram analysis data. Studies before and after exposure of the human body to allopathic, homeopathic remedies, psychotherapy, physiotherapy and others are envisaged.
- Monitoring the patient's condition during treatment (monitoring the condition of patients) and assessing the effectiveness of treatment involves a dynamic assessment of BEO-grams during treatment.
- Primary disease prevention. Assessing the degree of functional stress of the organs, using the GDV method, you can detect disorders at the stage of "pre-disease" and choosing individual methods of correction (change of work, housing, lifestyle, diet, etc.) to prevent disease.

The method of human research allows to obtain images of gas-discharge images from ten fingers (BEO-grams), as well as to conduct automated computer analysis of BEO-grams.

Automated computer analysis of BEO-grams includes sector diagnostics and parametric analysis of BEO-grams [10].

Sector diagnostics is based on a diagnostic table that links the characteristics of the glow of individual areas of the fingers with the functional state of organs and systems of the body [1]. The diagnostic table is based on the ideas of traditional Chinese medicine, the system of meridians and acupuncture points, as well as empirical experience.

Parametric analysis is based on the assessment of BEO-gram parameters (today GDV-Software calculates more than 30 parameters), factor and correlation analysis. The following groups of parameters are considered [10]: geometric, brightness, structural, fractal, probabilistic.

Assessment of the state of the organism by the GDV method is based on the analysis of the obtained images of GDV-grams, processed by a standard software package.

A promising area is the use of the GDV method in spa practice. Currently, doctors of many leading sanatoriums successfully use in their practice the software and hardware complex "GDV Camera". The successful experience of using the GDV method is due to the possibility of objective analysis of the patient's condition, selection of an individual course of treatment, monitoring of the patient's condition throughout the course of sanatorium treatment. A significant advantage is the low cost of the survey itself.

Advantages of the GDV method [4]:

- objectivity of information: independence from the desire and experience of a particular user;
- safety and complete sterility, removal of information only from the extremities of the patient;
- the ability to monitor the development of processes over time, comparing structural, functional and temporal processes in the body;
- methodological simplicity and convenience: the absence of any special requirements for the premises, environmental conditions, qualifications of the performer;
- the use of modern methods of nonlinear mathematics for processing fractal images and obtaining information about the patient's condition;
- clarity and interpretability of the obtained results, convenience of their storage and processing.
- low cost of the survey.

2. Equipment and methods of research

GDV-gram (BEO-gram) is a complex two-dimensional figure, Fig.1, each pixel of which is characterized by its brightness, encoded with an integer ranging from 0 ("black") to 255 ("white").

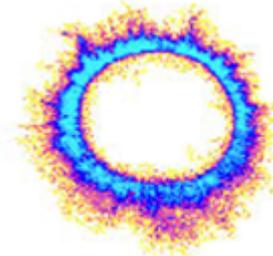


Fig.1. GDV-gram (BEO-gram)

The geometric parameters of GDV are: image area, which is defined as the sum of pixels above a given brightness threshold; width of streamers.

The geometric parameters of GDV-grams carry information about the characteristics of the object. For example, as the concentration of ions in the liquid increases, the illumination area increases and the width of the streamers decreases. To include such data in the structure of a complex biophysical experiment requires quantitative processing of the obtained images.

The principle of image formation is as follows. Between the object under study and the transparent electrode (plate) on which the object is placed, voltage pulses are supplied from the electromagnetic field generator (EMF), for which a transparent conductive coating is applied to the reverse side of the electrode. At high field strength in the gaseous medium of the contact space of the object and the plate develops an avalanche and/or sliding gas discharge, the characteristics of which are determined by the properties of the object.

At the same time, the quality of the GDV-gram spectrum, which, in turn, determines the accuracy of the diagnostic process, is influenced by a number of factors and external factors. The greatest influence is exerted by such external factors as human (correct preparation and conduct of the experiment), climatic (humidity, ambient temperature, guidance of EMF from power devices operating nearby), methodological (incorrectly chosen methods and modes of their conduct) factors.

It is established if the methodological factors can be completely leveled by choosing the correct methodology and modes of its implementation, while external and human factors can only be minimized (complete elimination is impossible by the difficulty of maintaining highly stable climatic conditions in the working area without special measures). Limiting such factors allows to increase the accuracy (by 8-12%), reliability (by 3-5%) and reproducibility (more than 1.8 times) of the results of diagnosis by a device for gas-discharge imaging.

A wide range of devices allows the application of GDV-graphy in various fields of human activity - medicine, professional sports and fitness, spa services, beauty industry, various areas of psychology and psychophysiology, as well as basic and applied research.

Thus, as a result of a systematic analysis of the problem of the use of GDV in human life, the following conclusions are made.

One of the most important directions in the development of the GDV method is the development of methods and adjustment of GDV modes of operation for the most accurate and prompt determination of the psychophysiological state of human health in the field of his professional activity. This is one of the most pressing problems faced by all organizations and educational institutions without exception. Determining a person's ability to cope with certain intellectual tasks, both at the beginning of working hours and at the end of the working day, is necessary for the rational use of human labor and to ensure the quality and efficiency of such an institution. Remembering that the GDV method will never replace the methods of traditional comprehensive diagnosis of the human condition, it should be noted that this method allows to obtain additional objective information about the psychophysiological state of a person under stress.

3. Conducting experimental research

The study was conducted using the television system GDV "Stimer" [10] which allows to obtain consecutive GDV-grams of ten fingers with their subsequent mathematical processing in the software package "GDV Explorer", which includes programs for capturing, processing and analyzing images.

The programs allow you to divide the GDV-gram of each finger into sectors corresponding to a specific organ or system of a person, where the parameters of the glow of the gas discharge are analyzed. Here you can quantify the intensity, perimeter and area of the glow in each sector.

The algorithm for implementing the GDV method (Fig. 2) is as follows:

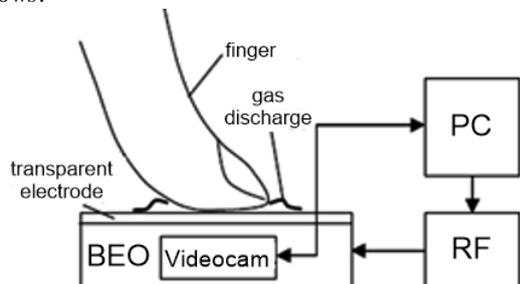


Fig. 2. The scheme of obtaining GDV-grams

- the object under study (finger) is placed on the glass electrode of the device;

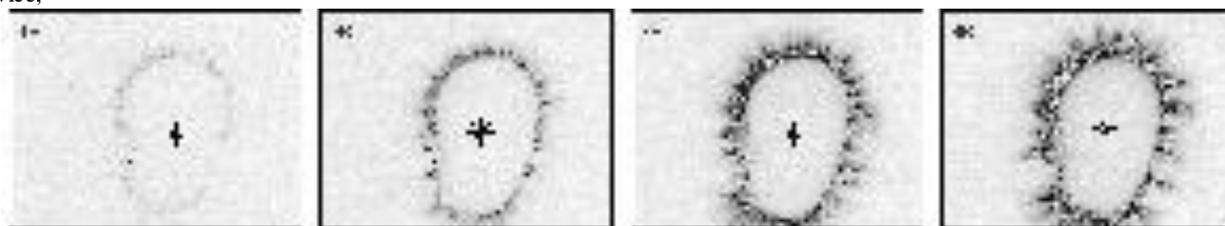


Fig. 3. GDV-gram of the finger at different values of the voltage applied to the electrode (left - right): 107 V; 149 V; 197 V; 219 V

Analysis of GDV-grams of the finger at different values of the voltage applied to the electrode (Fig. 2) showed that at minimum voltage (107 V) the obtained image of GDV-gram has minimal quality, which is due to poor overlap of low-power electromagnetic field (order $B = 9$ mT) on the electromagnetic biofield of man. With increasing voltage, the picture of GDV-gram becomes clearer and more saturated, which is confirmed by the exponential increase in the total induction of the magnetic field (up to $B = 146$ mT).

At the same time, at the highest voltage, a person feels discomfort (tingling in the fingers) at the time of excitation of the gas discharge, which led to the choice of rational operating voltage of the generator, equal to 197 V (Fig. 2, third left image).

- electrical pulses are applied to the transparent electrode of the electron-optical unit (BEO) from the frequency generator (RF), which is controlled by a personal computer (PC);
- at high electromagnetic field strength in the gaseous medium of the contact space of the object and the transparent electrode develops a corona gas discharge, the parameters of which are determined by the properties of the object;
- primary information is obtained in the form of recorded digital images (photographs) of the glow of the fingers, while the emission of photons, electrons and other particles of a biological object stimulated by an electromagnetic field and gas discharge is studied;
- as a result of computer data processing, sector diagnostics is performed, based on a diagnostic table, which connects the glow characteristics of individual areas of the fingers with the functional state of organs and systems of the body and is based on traditional Chinese medicine, meridian system and acupuncture points;
- the brightness of the gas discharge gives an idea of the state of human health in general, and diagnostic information for individual organs and systems are the perimeter (P) and the area of the glow (S).

Since the object of study is a living person, it is very necessary to create an electromagnetic field of a certain intensity, so that its intensity at the same time allows to obtain a clear GDV-gram and does not harm the health of the subjects. Thus, (Fig. 3) shows the GDV-grams of the same finger, obtained at different voltages.

Thus, the most rational mode of operation of the GDV device is the following: operating voltage at the electrode: $U = 197$ V; magnetic field in the working area: $B = 21$ mT (direct polarization); time of action of the magnetic field on the biological object: $t = 1.25$ s.

Analysis of the problems that arise when collecting and interpreting research data with specific recommendations for improving the methodology of research by GDV for adolescents are given in the following table:

Type and brief description of the problem	Recommendation for troubleshooting
Improper orientation of the fingers when receiving the initial information (GDV-images) leads to distortion of diagnostic information	<ol style="list-style-type: none"> 1. Strict observance of the requirement to place your finger in the center of the screen so that the image does not go beyond the window (tilt angle 10-30°), the direction of installation of the finger should be perpendicular to the front wall of the device. 2. Refixing incorrect images 3. Additional correction at the stage of preparation of images for analysis by their forced centering
The use of variable range parameters in the processing and analysis of data of an individual subject at different times leads to distortion of diagnostic information	The parameters of the optimal range vary from person to person, but for a particular subject should be a constant value to ensure the reliability of the study, and therefore should be recorded in the personal files of the subject.
Changing the brightness of the glow GDV-grams of the subject under the influence of external factors that influenced it, complicates the interpretation of diagnostic information	To resolve this issue, it is recommended to increase the display range of the images to the level that will provide the necessary contrast to complete the centering, perform analysis, and to compare the results of earlier studies return the display range to a constant level for this study level. or excitation of body systems.
The dependence of the received information on the physiological state of the patient on his psycho-emotional state leads to distortion of the picture and complicates the interpretation of diagnostic information (especially adolescents in transition, who are often in a state of psychological disharmony and emotional arousal, which, in turn, leads to excessive sweating palms and image distortion)	<ol style="list-style-type: none"> 1. Keeping the patient's palms clean and dry throughout the study. 2. Degrease the hands and surface of the measuring electrode with a solution of medical alcohol for all patients before each measurement. 3. For psychologically unbalanced subjects with wet hands use special filters. <p>A series of studies have shown that excessive sweating cannot be avoided by using medical gloves or plastic wrap.</p>

4. Discussion of research results

The object of the study was a group of teenagers consisting of ten boys and ten girls aged 15-18.

Measurements were taken at the end of the school week, twice a day: at the beginning and end of classes. During the day, adolescents were engaged mainly in mental work, namely, to listen to or analyze theoretical material and perform calculated practical tasks. The research aimed to record the accumulation of short-term fatigue during the school day and to accumulate information about the formation of long-term overexertion over several months.

According to the results of the research, both individual health problems and common symptoms were identified, which, in the researcher's opinion, may be directly related to the type of activity. It should be noted that due to different temperaments, the subjects' response to mental stress was different.

Study of the impact of mental work in the third week of study. As can be seen from Fig. 4, all subjects from the first group did not show changes in the emotional sphere, and almost no serious physiological changes were recorded. The problem areas in both subjects were the detection of the endocrine system, coronary vessels, and kidneys. By the end of the lesson, there are changes in the spine, and a slight increase in stress in problem areas, although the overall characteristics of the energy sector is quite positive and has only slight deviations from the spectrum. Therefore, for all subjects during the first month of training no significant changes are observed.

Regarding the research of a group of girls, according to Fig. 5, it is possible to diagnose emotional instability and greater sensitivity to mental load and intellectual work. The problem areas in the heart, coronary vessels, liver and intestines recorded at the beginning of the day were exacerbated, and problems with the genitourinary system were added to them.

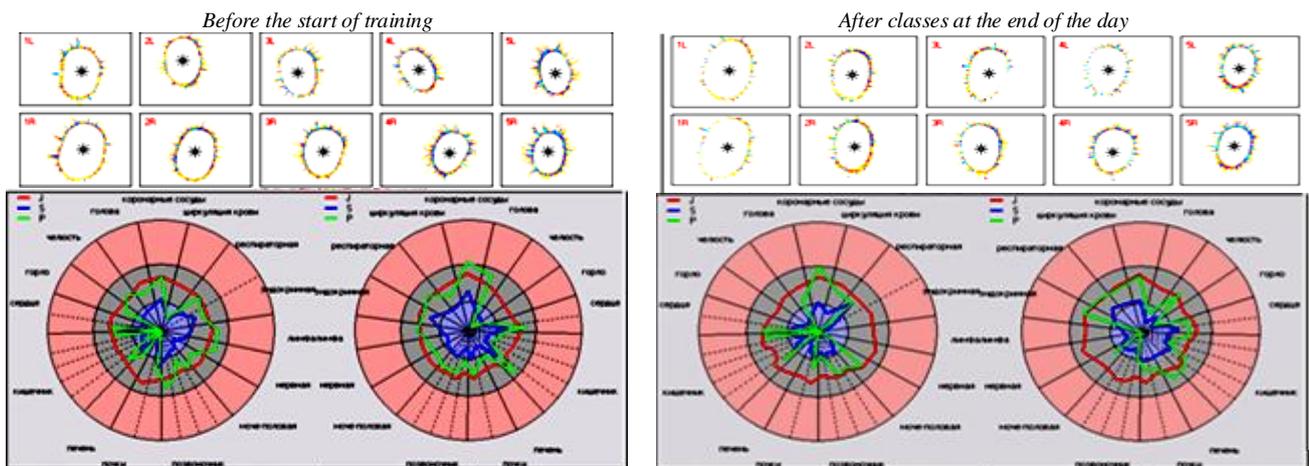


Fig. 4. The results of studies of young men in the third week of training

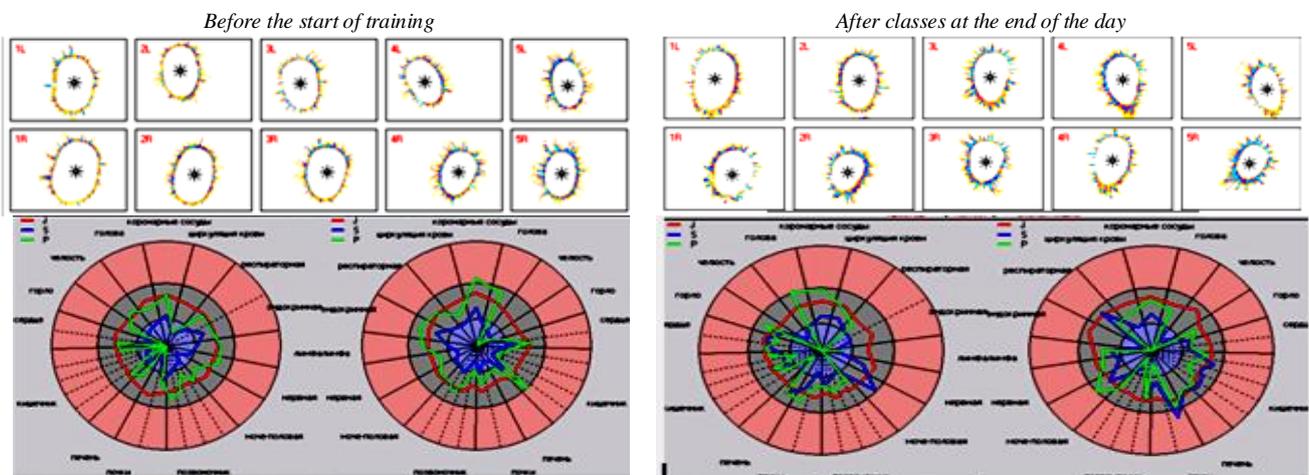


Fig. 5. The results of a study of a group of girls in the third week of training

Studies conducted during the first month of training showed that after a long vacation, mental work and emotional load during classes during the first weeks of training had little effect on the psychophysiological state, both at the beginning and end of the working day for most subjects.

In the energy field, all subjects recorded insignificant loss of spectra, which indicated a certain accumulation of fatigue and the first signs of further depletion of the body.

Study of the impact of mental work in the seventh week of study. According to Fig. 6, it can be stated that the experimental boys were recorded tense states in the liver, respiratory and genitourinary systems, as well as in the circulatory system, which intensified after exercise. The energy field is relatively flat, but at the end of classes there are gaps in the spine, which indicates an increase in stress and fatigue.

Before the start of training

After classes at the end of the day

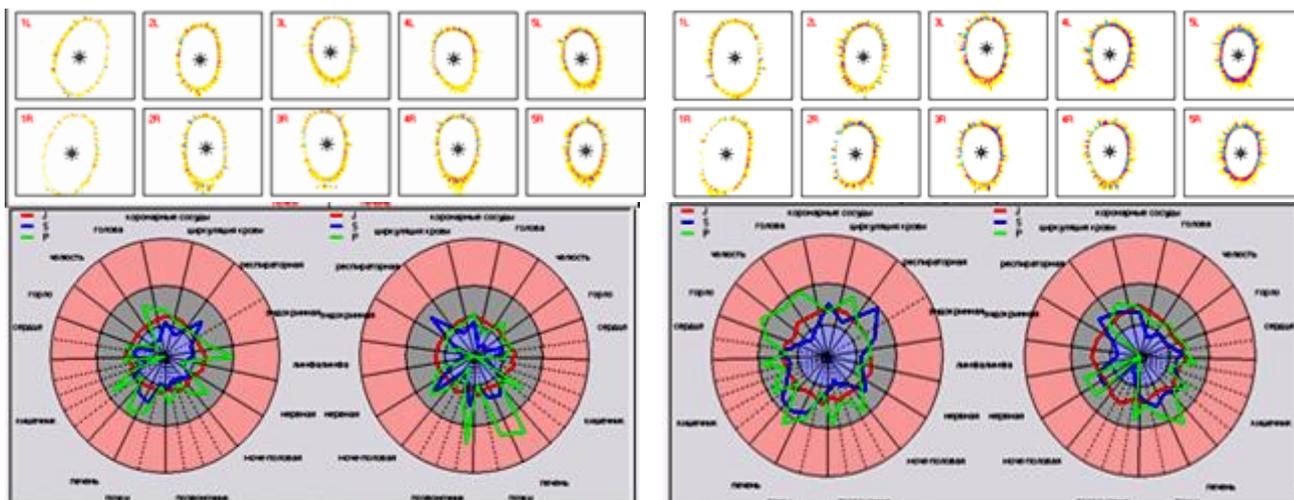


Fig. 6. The results of the boys' research in the seventh week of training

The results of the diagnosis of the condition of the girls are shown in Fig. 7. From these results it follows that all experimental girls at the first measurement already have signs of accumulated fatigue, which are manifested by tension of the coronary vessels, genitourinary system and cardiovascular system. Under the influence of mental loads, the problem indicators identified at the beginning of the day at the end of the day increased to critical values, and in some cases exceeded the critical values. All the girls

had separate breaks in the energy field and aggressive glow streamers.

The results showed the accumulation of fatigue caused by mental stress. Data obtained at the beginning of the school day - the tension of the coronary vessels, cardiovascular system, at the end of the day increased to critical values, and for the intestine, kidneys and genitourinary system even exceeded them.

Before the start of training

After classes at the end of the day

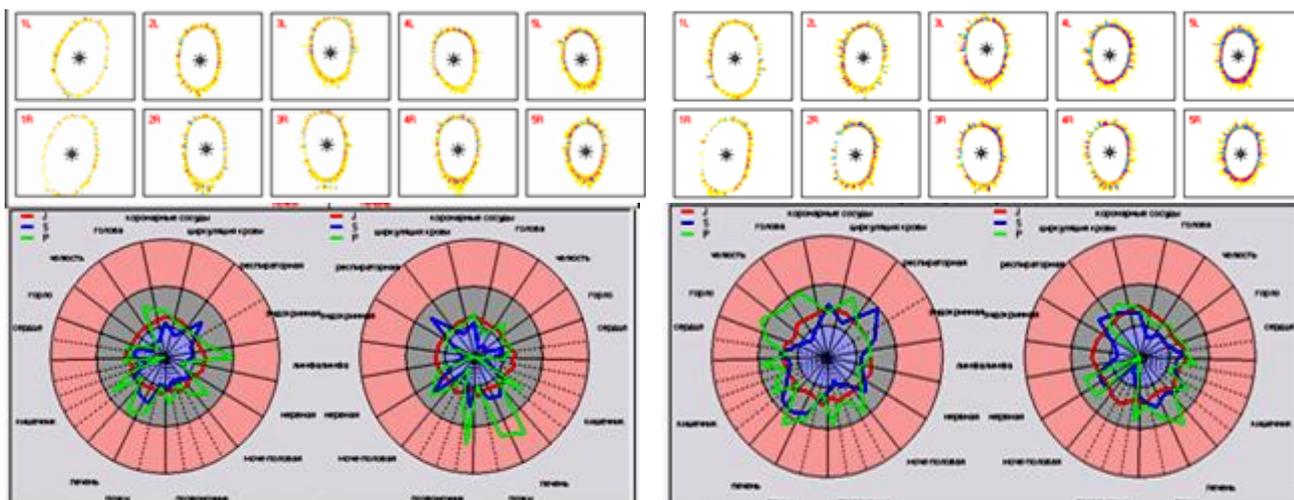


Fig. 7. The results of studies of girls in the seventh week of training

Study of the impact of mental work in the ninth week of study. The results show that the effect of the load associated with mental work, at this stage, leads to greater changes in the psycho-emotional state of the subjects (recorded an increase in aggressive bursts on the brightness chart, and its contour is distorted). The physiological and energetic state of organs and systems, on the other hand, is depressed compared to previous research periods and data obtained at the beginning of this week's classes.

increase in the level of psychological arousal. The energy field at the end of the school month is partially absent.

The results of research obtained for the female part of the group illustrates Fig. 9. The data obtained during this period indicate an even greater increase in emotional and physical stress. Some indicators of the system voltage are outside the permissible norms, and significant gaps are recorded in the energy field, which confirms the initial assumptions. At the end of the school month, the energy field is almost absent, which confirms the increase in fatigue and exhaustion of the body.

Thus, according to Fig. 8, the experimental boys were recorded significant suppression of the whole organism with increased load on the heart and coronary vessels, as well as an

Before the start of training

After classes at the end of the day

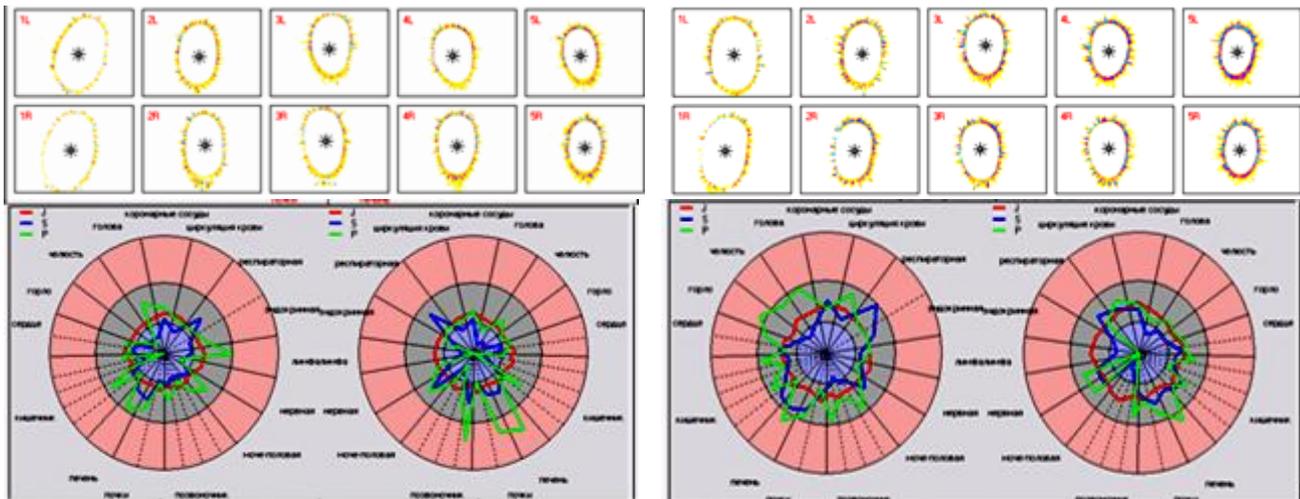


Fig. 8. The results of the boys' research in the ninth week of training

Before the start of training

After classes at the end of the day

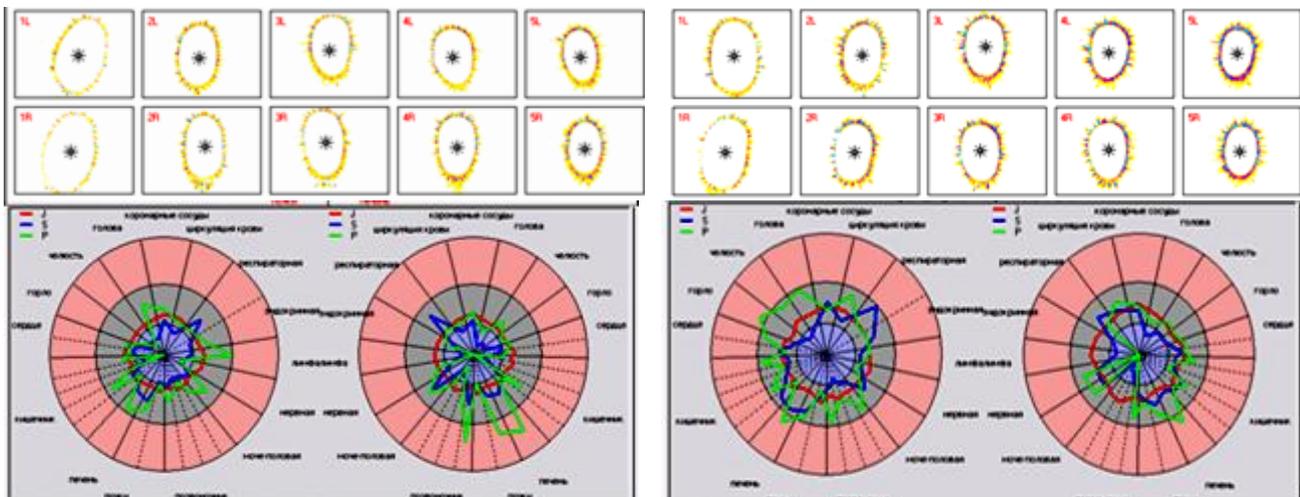


Fig. 9. The results of studies of girls in the ninth week of training

Summarizing the general results of this study, it can be stated that mental work for a long time leads to a certain psychological imbalance of objects (all subjects were diagnosed with stress) and causes problems not only at the psychosomatic level, but also affects the overall physical condition of objects, because the common problems of all subjects were problems with the cardiovascular system, as well as with various parts of the spine and organs of the gastrointestinal tract.

The last two problems, according to the researcher, may also be related to the fact that people who are engaged in mental work, most of the time are in a sitting position in the workplace, which, in combination with not always a comfortable place to sit and work posture, leads to deformation of the spine and additional pressure on the internal organs located in the lower torso.

For all subjects, a certain pattern of fatigue accumulation was recorded, which consisted of minor psycho-emotional shifts at the beginning of the study, exacerbation of psycho-emotional state and gradual deterioration of physiological state in the middle of the study and sharp suppression of both psycho-emotional and physiological state in the last third semester.

The energy field of all subjects gradually and steadily deteriorated. There were first single, and then systematic loss of luminescence spectra from the whole energy picture. Moreover, for male subjects, this dependence was more significant over time, i.e. the loss of energy protection in boys is more rapid, and its recovery is longer than in girls.

At the same time, additional daily dependences of the adolescent's psychophysiological state on mental load were obtained, which showed the following: the best indicators of the psychophysiological state are observed in the morning (period from 10-00 to 12-00) in the absence of other physical and intellectual morning load. At the same time, it was found that active rest for 40-60 minutes or change of mental exercise (for 60-90 minutes) after mental load, restores the previous psychophysiological state of the adolescent by 85-90%, while passive rest for 120-150 minutes, allows you to restore the previous psychophysiological state of the adolescent by only 35-45%.

5. Conclusion

In the process of scientific work the method of conducting research of psychophysiological condition of adolescents with the help of a device for gas-discharge visualization by taking into account the psychological characteristics of adolescents with simultaneous adjustment of the device, which allowed to increase accuracy, reliability and reproducibility of diagnostic results by gas-discharge imaging:

1. The features of the study of physiological and psychological state of man, including the characteristics of adolescents, as well as ways to implement such research by gas-discharge imaging, which allowed to establish a number of factors that affect the accuracy of diagnosis by this method.

2. It is established that the most rational mode of operation of the device for gas-discharge visualization is the following: operating voltage at the electrode $U = 197$ V; magnetic field in the working zone $B = 21$ mT (direct polarization); the time of action of the magnetic field on the biological object $t = 1.25$ s, which increased the efficiency of the results of diagnosis by such a device.

3. The ability of a person to perform certain intellectual tasks, both at the beginning of working hours and at the end of the working day, which is necessary for the rational use of mental work and to ensure the quality and efficiency of this work.

4. The factors influencing quality of process of reception and accuracy of processing of the information on a psychophysiological condition of the person by the device for gas-discharge visualization among which the greatest influence are such external factors, as human (correctness of preparation and carrying out experiment), climatic (humidity, temperature) are established and investigated. environment, guidance of electromagnetic fields from power devices operating nearby), elimination, or at least minimization of which allows to increase accuracy (by 8-12%), reliability (by 3-5%) and reproducibility (more than 1.8 times) the results of diagnosing the device for gas-discharge imaging.

5. It has been experimentally established that mental work for a long time leads to a certain psychological imbalance of objects (stress was diagnosed in all subjects) and causes problems not only at the psychosomatic level, but also affects the general physical condition of objects, because common problems of all subjects were problems with the cardiovascular system, as well as with various parts of the spine and organs of the gastrointestinal tract.

6. Problems with various parts of the spine and organs of the gastrointestinal tract, in the opinion of the researcher, may also be due to the fact that people who are engaged in mental work, most of the time are in a sitting position in the workplace, which, in the complex with not always a comfortable place to sit and working posture, leads to deformation of the spine and additional pressure on the internal organs located in the lower torso.

7. For all subjects a certain pattern of accumulation of fatigue was recorded, which consisted of minor psycho-emotional changes at the beginning of the study, exacerbation of psycho-emotional state and gradual deterioration of physiological state in the middle of the study and sharp suppression of both psycho-emotional and physiological state in the last third semester.

8. The energy field of all subjects gradually and steadily deteriorated. There were first single, and then systematic loss of luminescence spectra from the whole energy picture. Moreover, for male subjects, this dependence was more significant over time, ie the loss of energy protection in boys is more rapid, and its recovery is longer than in girls.

9. At the same time, there were additional daily dependences of the psychophysiological state of the adolescent on mental load, which showed the following: the best indicators of psychophysiological state are observed in the morning (period from 10-00 to 12-00) in the absence of other physical and intellectual morning load. At the same time, it was found that active rest for 40-60 minutes or change of mental exercise (for 60-90 minutes) after

mental load, restores the previous psychophysiological state of the adolescent by 85-90%, while passive rest for 120-150 minutes, allows you to restore the previous psychophysiological state of the adolescent by only 35-45%

10. The expediency of using the method of gas-discharge imaging for the purpose of preliminary diagnosis of adolescents is confirmed, which will allow timely preventive measures aimed at preventing and preventing the disease, to adjust their physical and intellectual load in the educational process.

11. Specific guidelines are provided to eliminate problems that may arise during the collection and interpretation of experimental data, which in combination with the simultaneous adjustment of the operating modes of the device formed the basis for improving research methods by GDV and increased accuracy, reliability and reproducibility of gas discharge diagnostics. visualization.

12. Research has also shown that certain subjects (topics) had a positive effect on subjects and did not depend on the time and types of mental stress associated with these subjects (topics). According to the author, such influence is subjective, associated with a special commitment of the subject to the subject (topic) or teacher (teacher). This issue is highlighted as promising and needs further study.

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