

THE USE OF PHYSICAL FACTORS ON THE PRINCIPLE OF BIOFEEDBACK IN REHABILITATION-DIAGNOSTIC SYSTEM

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SUMMARY. The investigation is devoted to problems of a use of methods of physiopuncture for an estimation of the functional state of persons working under of high psycho-physical stress at example of the sportsmen of high qualification. The criteria of a rating of a functional status and statuses of health of the sportsmen of a different sex, qualification, at different stages of a training year cycle, with different competitive productivity with the help of electro puncture methods of diagnostics (method to I. Nechushkin and research of pain sensitivity and electricity of auricular points) are offered. Is shown, that electricity of auricular points and the parameters of acupuncture diagnosis to I. Nechushkin at the persons working under of high psycho-physical stress have the certain laws and depend on a status of the human or system, change under influence of physical loading and measures of rehabilitation, can be used as a way of an indirect rating of a functional status organism for early revealing both prevention before and pathological changes caused by the high physical loading.

BACKGROUND OF THE STUDY

Special attention to the development of diagnostic systems worth using local representative areas of the human body that are on the hands, feet, iris, face and auricular shell [3,7-15]. These zones can be used to track the immediate changes in the functional state of the person with the following preventive physiotherapeutic correction of feedback [3- 5, 7-10]. From another side the changes in the functional state of people, who work in situation of the high level of stress (sportsmen, pilots) due to its capability to adapt to the maximum physical and mental stress [1-4], which require the full mobilization of reserves [4-6]. Options change the functional state of this contingent can be evaluated by a multi-criteria, physiological systems based on an analysis of their interaction[1, 2, 4-6]. Required informative, economical, easy to use and quick to use diagnostic tools and the following evaluation criteria that would give.

To correct the priority is low-intensity exposure, which can run and adjust processes sanogenesis at the level of the whole organism [3, 4]. Required informative, economical, easy to use and quick to use diagnostic tools and the following evaluation criteria that would give. Coach idea of the individual responses of all body systems in the proposed system of training and monitored widespread among athletes dissimulation and for prevention, coupled highest psychological of physical load, pathological of changes in the body in the early stages of development [4-6, 13].

THE HYPOTHESIS OF THE STUDY

To monitor the functional state of an athlete in an ever increasing volume and intensity of training loads we have selected a diagnostic system that has provided opportunities multifunctional control health with minimum effort and time in the cycle [2-4, 7-10]. For this we used electro diagnostic methods (MED), in particular the method of "riodoraku" I.Nakatani [7], standard electro diagnostic test for vegetative O. Nechushkinym [12] and auricular diagnosis [10-15]. The basis of these methods is the principle of systematic evaluation of states of the organism through reflexogenic zone, which allows to use them to study the processes of adaptation, changes in functional state and health of athletes [9,10,11,12].

THE MAIN AIM OF THE STUDY

Increase the effectiveness of prevention risk pre-and pathological conditions in people under the influence of long-term psychophysical stress, by examining the possibility of application non-invasive methods physiopuncture (standard electro diagnostic test for

vegetative Nechushkinym AI (SVT) (Fig.1), auricular diagnosis (ARD)(Fig.2), electrical - Millimeter wave and electropuncture) for the diagnosis and correction of functional state of the body, the example of sportsmen of high qualification.

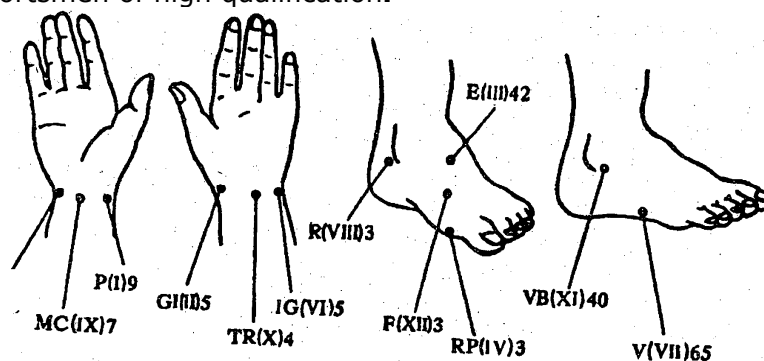


Fig.1



Fig.2

THE AIM OF THIS STAGE OF STUDY

- Investigate the peculiarities of the electrical parameters (EP), pain sensitivity (PS) aurikulyar biologically active points (ABAT), and SVT in athletes by gender, skill level, the period of training, sports performance, the intensity psychophysical load training environment.
- Develop criteria for rapid assessment of the health of athletes combination of standard methods of vegetative test, determination of electrical conductivity and pain sensitivity ABAT and compare them with conventional methods of assessment of functional state of athletes.

MATERIALS AND METHODS.

Baseline studies were conducted on groups of athletes and civilian pilots. To achieve the objectives have been identified, the three groups surveyed. The first group ($n = 25$), were highly skilled athletes, and the second (15) - the pilots, the control group (CG) were (25) - practically healthy persons. All subjects performed a standard test of autonomic Nechushkin (SVT), conductivity (EP) and the definition of pain sensitivity (PS) auricular biologically active points (ABAT), a detailed medical examination. Indicators of EP determined the device MIT-ET-11. Performed magnetolaser impact (MLT) MLT-MIT device.

RESULTS AND DISCUSSION.

Analysis of the data shows the average total value of the electrical conductivity ABAT was close in pilots and athletes, and amounted to $10,58 \pm 1.76$ rel. units. in the control group EP ABAT was $15,23 \pm 1,62$ conventional units(c.u.) ($p < 0,05$). The points which correspond somatotopical bodies with chronic pathology in remission or had previously injured in 93% of EP 20 - 55 c.u. warhead and increased in 99% of cases. In acute disease in 95% of the cases - the EP was higher than 50 c.u. and the PS was an increased of 98%. EP ABAT against psychophysical stress increased from 10 to 20 c.u. In athletes with low EP ABAT and the center

line of SVT 20 ± 2.25 c.u., the results were better. After a rest or physical treatment, EP of ABAT decreased, mood, stamina and performance improved too, also were improved those figures of SVT, which were to impact beyond the individual corridor standards, such result we have seen after MLT - all 60% of figures of SVT are belonged to him. It was found that the average standard autonomic tests was significantly higher in the control group, which was dominated by people with low fitness are not involved in sports exercises. Thus the decrease in electrical conductivity is a sign of improvement of the body or in the course of natural recovery, or as the result correct. Also we had seen, that the pilots, as well as in cyclic sports athletes, high-risk systems are the cardiovascular and nervous, which correspond to high points of the electrical conductivity of the heart, brain, and liver, we observed in 90% of the patients, as well as lower high performance SVT-level functional systems of the heart, lung, colon and stomach, and higher rates of high-level WBS functional systems of the liver and kidneys.

After the analyze of the dates of the auricular diagnostic were done, were significant such groups according to our observations of the data (a) indicate the presence of organic changes in certain organs and systems that meet the clinical diagnosis and occur in 80% of athletes. These groups (b) indicate the beginning of a pathologic process or the presence of chronic changes in the system at a certain stage of remission, the data group (c) evidence of functional stress in the corresponding organs. The points which correspond to organs of corresponding with known chronic disorder in remission or damaged due to trauma are at 93% of EP above 20 but low for 50 c.u. and increased PS in 99% of cases. The points which correspond to organs in a state corresponding to an acute disease, or after the disease or injury in 95% of the cases have the highest EP 50 c.u. and increased PS in 98% of cases. The points that are not felt by patients as pain, had a conductivity, on average, between 1 and 20 c.u. (1c.u. corresponds to the 1 mA)

Summarizing the results, we have identified five stages of the reaction of auricular points (ABAT) on the development of the pathological process:

- 1st degree - electrical conductivity of ABAT (EP) - the highest of 70 mA., Pain sensitivity (PS) - unbearable - responsible lesions diagnosed at the time of other methods of investigation and confirmed complaints, and severe pain or injury is not healed;
- grade 2 - EP - 50-70 mA, BS - very strong - is responsible pathology was diagnosed 2-4 years ago, when there is a pronounced load, confirmed complaints and severe pain syndromes including injuries;
- Grade 3 - EP - 20-50 mA, BS - strong - meets Pathology 5 years ago, that concern no more than 1-2 times a year, sometimes supported by complaints or injuries;
- Grade 4 - EP -10-20 mA., BS - poorly expressed - is responsible organs and systems, strained during the training process, other studies of pathological changes do not register;
- Grade 5 - EP to 10 mA., missing warheads, or EP 10-50 mA., BS - no-no complaints, no injuries, functional state - are normal.

The method of recording EP and ear points pain sensibility has a high information content (confirmed by medical examination - 85%) and the rate of (5 - 2 min.). In the 7% found the person whom auricular BAT does not detect changes EP and PS in the presence of these deviations in health status. The results of auricular examinations to confirm and complement the results of CBT test.

Concerning the relationship of indicators SVT and health of athletes, they are related as follows:

measurements at the exit of the upper limit of the corridor standards:

- 1-12 units - functional (physiological) arousal, the norm in the preparatory period;
- 12-30 units - hyper functions (hyper) organ system or tissue is in a period of rest;
- 30-45 units - irritation, inflammation or in part, to inflammation, characteristic of the stress in the pre-competition period, and;

- ≥ 45 units - excessive irritation, inflammation, stress, often on the meridians of the F, P, C, MC, RP, R, VB in the competitive period or on a background of psycho-physical stress;

measurements at the exit of the lower boundary of the corridor standards:

- 1-9 units - hypo functions, hypo-secretion, hypotension or inhibition in the relevant organs or tissues, slight fatigue, frequent in the run-up;
- 9-15 units - slight chronic changes, fatigue and stress before, often on the meridians F, P, C, MC, RP, R, VB in front of the competitive period;

- 15-22 units - degenerative processes, chronic irritation of the organ or system, fatigue, and often on the meridians of the IG, GI, V, VB, TR, E, R in front of the competitive period;
- 22 of 45 units - chronic degenerative processes, marked stress, exhaustion, often to the IG, GI, E in the competition period.

Found a significant variation is beyond the physiological corridor, especially during the holidays, and before the competition in the successful athletes, with the beginning of the new year period of training or under the influence of puncture physiotherapy SVT normal. The most frequent variants are a combination of three methods of EPD:

- a) 1 and 2, the degree of PS and EP, MD (meridian diagnostics) - more than 35 c.u. beyond the norm;
- b) 3, 4 degree of PS and EP, MD 15-35 c.u.;
- c) 1 and 2 the degree of EP and PS, MD - within the normal range or up to 15 c.u.;
- d) 3 and 4 degree EP and PS, MD - within the normal range or up to 15 c.u. abroad,
- d) 3 and EP 4 degree and PS, MD - within the normal range or up to 15 c.u. abroad;
- d) 3 and 4 degree EP and PS, MD - within normal limits,
- e) 5, and the degree of EP, PS, MD - within normal limits;
- d) 5 degree PS and EP and MD-35 c.u. abroad the normal range.

According to our observations of any of the groups, in confirming the results of clinical examination data EPD (MLC) and data (a, b) without confirmation of clinical investigations indicate the presence of pathological changes in certain organs and systems that meet the clinical diagnosis and occur in 80% of athletes. These groups (c, d) indicate the beginning of a pathologic process or the presence of chronic changes in the system at a certain stage of remission, and the data of (e, f) indicate the functional power in the relevant bodies; auricular study finds tight bodies, and the method of Nakatani - system communication and strained body systems, the combination of three methods of EPD is an effective tool to identify prepathological and pathological processes in the system and organ levels. Designed by EPD-apartment complex SVT revealed in 65.5% of the athletes symptoms characteristic of the disease with a latent course, and in another 73.5% - prepathological state, 12% - a clinically confirmed pathological conditions and diseases, amid much psycho-physical stress, especially in the competition period lead to premature fatigue and a corresponding decrease in athletic performance.

On the basis of factor analysis of the results of the research, was defined set of integrative indicators EPD (average values of electrical conductivity and the level of pain sensitivity auricular BAT, the value of CBT with the meridian, MS, P, RP, R, F) is called, the potential electropunctural EPD (EPEPD), which has three degrees of severity:

The low EPEPD - increased sensitivity of the auricular points of the heart, kidneys, liver, and their total electrical conductivity (SLSN) 48.2 ± 6.4 mA, SVT meridians of the heart, pericardium, lung, pancreas, spleen, kidneys and liver - to 7.2 ± 0.04 cu corridor above the norm.

The middle EPEPD - the meridians of the heart, pericardium, lung - within the rules, SVT pancreas, spleen, kidneys and liver - above the norm 15.3 ± 3.2 cu point of the heart, kidneys, liver, lungs - sensitive painful SLSN 34.3 ± 7.5 mA.

The high EPEPD - ABBAT in heart, kidney, liver, lungs felt severe pain on palpation, SLSN - 25.4 ± 3.6 pA, the meridians of the heart, pericardium, lung following passage rate, and the meridians of pancreatic, spleen, kidneys and liver - a corridor above the norm by 25.2 ± 2.2 cu

CONCLUSIONS.

Studies show us the EPD performance data obtained from outpatient charts of athletes, the results of the inspection specialists and general medical examination, which proves the validity of EPD to assess the functional status of athletes in order to express pre-nosological diagnosis during the medical examination, during training, and at all stages of medical of control. EPD-designed apartment complex SVT, allowing to identify athletes with 65.5% the symptoms characteristic of the disease with a latent course, and in another 73.5% - prepathological state, 12% - a clinically confirmed pathological conditions and diseases. Medical rehabilitation and correction of functional state of athletes should be clarified in view of the course of disease with a latent or prepathological state, as well as violations identified in the functional systems of the developed technique of electro-diagnosis, which is a rapid and

objective means to identify and monitor mental and physical status, and allows differentiation of physiotherapy in athletes.

The results of the EPD in athletes supported by clinical data that reflect the functional state of the organism, organ or system, the effect of exercise and rehabilitation activities, act as a rapid method for assessing the functional state of the organism, for early detection of diseases, including dissimulation, monitoring the adequacy of the functional changes problems in the body of the training process. Evidence of research can be classified as 1A, externally valid to the category of reliability 1a.

Investigation of the EPD-CBT, psychological, biochemical parameters, showed that the increase in electrical rates and the meridians of the ABAT and of CBT associated with a reduced efficiency of work, the impact of competitive athletes, the development of fatigue or stress, is accompanied by an increase in lactate and uric acid blood results, psycho test deterioration, functional tests, ECG, RVG. Reducing EPD showed an improvement in the function of parasympathetic system, increasing adaptive mechanisms and has a direct connection to a power endurance, tone of vegetative nerves system, with the function of the hard system and the effectiveness of competitive performances. It is proved that the conductivity decreases under the influence on the BAP physiotherapy, psycho, recreation, is a signal of better psychosomatic condition, optimizing recovery processes.

Identified and described in athletes integrative indicator EPD (EPEPD), which reflects primarily metabolic and functional changes that occur during exercise and reflects the relative bradycardia at rest, "physiological" hypertrophy of the left ventricle of the heart, changes in autonomic adaptation, increasing the frequency of GM is associated with the experience of work and sportsmanship. High EPEPD respond best competitive results on an electrocardiogram - a high voltage teeth R, T, reduced the interval QT, a high level of physical state (PWC 170), at the ECHO CG - hypertrophy and ventricular dilatation, a larger stroke volume, lower rate of myocardial relaxation and reduced . The level EPEPD correspond to changes of other functional parameters, and significantly increases with increasing skill athletes.

PROSPECTS

We offer a mobile system that is accessible and efficient with the use of biofeedback. The system includes monitoring and correction of violations, and provides additional opportunities for management of human health, working in extreme conditions. We have proved the reliability of the indicators elektropunkturny diagnostic methods, which are due to the effects of low-intensity physical therapy allow control of the human body at high psycho-physical activities are encouraged to use methods for assessing the adequacy of the functional state of the national team of Ukraine. The results can be used as a normal limit deviations electric performance of athletes of various qualifications and criteria for the psychological state of readiness and competitive athletes.

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