

**EFFECTS OF INTEGRATED IMPROVING TECHNIQUE PILATES AND BODYFLEX LEVEL OF FUNCTIONALITY ON STUDENTS**

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**Annotation.** *Purpose:* To identify the influence of complex application procedures bodyflex and pilates using information and communication technologies on the students' level of functionality. *Material:* The study involved 46 students. Measured indicators: blood pressure, stroke volume, heart rate at rest and during exercise. Identify indicators of submaximal performance, autonomic balance. *Results:* There was a significant increase in young stroke volume - from 58 ml. to 62.1 ml., the threshold of anaerobic metabolism of 123.4 beats/min to 141.4 beats/min. The girls showed a significant increase in stroke volume - from 58.3 ml to 62.5 ml., the threshold of anaerobic metabolism of 123.7 beats/min. to 143.3 beats/min. Found an increase in performance power supply systems (S.A. Dushanin technique). Marked improvement in efficiency of the cardiovascular system (increased heart rate variability from 322.12 ms to 354.43 ms, reduced mode amplitude values of RR-intervals from 34.09 % to 21.54 %. Submaximal increase of capacity of students. *Conclusions:* complex application systems bodyflex and pilates enhances the functionality students.

**Keywords:** students, preparedness, information, communication, education, culture, health, technology, bodyflex, pilates.

**Introduction**

In physical education of students there is a number of problems, such as low physical fitness of boys and girls, practically complete absence of accomplishment in the sphere of physical culture, need in improvement of students' health, accidents at physical education trainings, demand in creation of differentiated approach to physical education and its individualization, low attendance of physical culture classes and many other. One of the ways of such problems' solution is development and implementation of modern health related systems with using of informational-communication technologies in academic process of physical education at HEE [1, 4, 5, 6, 9, 12, 14].

It is known that at present nearly 90% of youth have health problems and more than 50% have low physical fitness [15, 17, 20, 21, 25, 26, 27]. In opinion of a number of authors [12, 18, 19, 28, 29, 30, 31], most of students have no demand in taking care of own health and have no wish to practice physical exercises, even at leisure time [22, 23, 24, 31]. Students are indifferent to compulsory physical trainings [8].

In this connection implementation of new health related methodic with using of informational-communication technologies in students' physical education is rather urgent and timely.

The research has been carried out in compliance with combined plan of scientific & research works for 2011-2015 by topic 2.4 "Theoretical-methodic principles of individualization in physical education and sports" (state registration No. 0112U002001) and by state financed topic for 2013-2014 "Theoretical-methodic principles of application of informational, pedagogic and medical-biological technologies for formation of healthy life style" (state registration No. 0113U002003).

**Purpose, tasks of the work, material and methods**

*The purpose of the research* is to determine complex influence of bodyflex and pilates methodic, used with the help of informational-communication technologies, on functional abilities of higher educational establishments' students.

*The methods of the research:* physiological methods (determination of BP, blood stroke volume, heart beats' rate in rest and under physical load, capacity of organism's energy supply systems by S.A. Dushanin's methodic, determination of sub-maximal workability, determination of vegetative balance by R.M. Bayevskiy's methodic).

In our research 46 students of Kharkov national pedagogic university, named after G.S. Skovoroda took part (24 students – control group and 22- experimental).

**Results of the research**

As an experimental program of physical education we worked out system of application of bodyflex and pilates with using of informational-communication technologies.

The system consists of author's modification of bodyflex and pilates, their combination and using of informational-communication technologies. [2, 3, 7, 8, 10, 11, 14, 16].

Besides, in connection with necessity in increasing of students' accomplishment in physical education [2, 3, 4, 5, 6, 16, 19] we created internet-blog on server "In contact" in the form of social group, named "Sports and motivations. Nothing personal" (<http://vk.com/club13486191>), in which we placed motivating photos, practical recommendations on

correct diets, information about healthy life style, music for trainings. Besides, in this blog we elucidate some fitness methodic, opened topics for on-line communication of visitors (discussions). Internet blog is a convenient, effective and reliable in using, with simple and clear interface.

One of the aspects of this internet blog was elucidating of problems, connected with application of modern health related technologies, such as bodyflex and pilates.

For boys of experimental group our methodic resulted in confident increasing of stroke blood volume from 58 ml to 62.1 ml ( $p < 0.001$ ), while at control group such changes were not confident. HBR in rest indicators of experimental group boys reduced from 72.6 b.p.m.<sup>-1</sup> to 63.5 b.p.m.<sup>-1</sup> ( $p < 0.001$ ), while at control group HBR remained 72-73 b.p.m.<sup>-1</sup>. It should be noted that stroke blood volume and HBR in rest are indicators of efficiency of cardio-vascular system's work.

It was also proved by data about increasing of HBR up to threshold of anaerobic metabolism: at experimental group this indicator increased from 123.4 b.p.m.<sup>-1</sup> to 141.4 b.p.m.<sup>-1</sup> ( $p < 0.001$ ). At control group such changes were not confident (HBR before experiment was 128.3 b.p.m.<sup>-1</sup>, HBR after experiment was 127.0 b.p.m.<sup>-1</sup>,  $p > 0.05$ ).

The same changes were in experimental and control groups of girls. Experimental group's girls showed confident increase of stroke blood volume – from 58.3 ml to 62.5 ml ( $p < 0.001$ ), while at control group of girls such changes were not confident. In girls' experimental group HBR of rest reduced from 73.4 b.p.m.<sup>-1</sup> to 61.5 b.p.m.<sup>-1</sup> ( $p < 0.001$ ), while at control group changes of HBR of rest after experiment were unconfident ( $p > 0.05$ ), HBR of control group's girls remained 73 b.p.m.<sup>-1</sup> (see fig.1).

The obtained results witness about improvement of organism's functional systems' efficiency. It was also proved by data about increasing of HBR, at threshold of anaerobic metabolism: this indicator of experimental group's girls increased after experiment from 123.7 b.p.m.<sup>-1</sup> to 143.3 b.p.m.<sup>-1</sup> ( $p < 0.001$ ) (see fig.1). The same changes at girls' control group were not confident (HBR before experiment was 128.3 b.p.m.<sup>-1</sup>, HBR after experiment was 128.9 b.p.m.<sup>-1</sup>,  $p > 0.05$ ). (see fig.1).

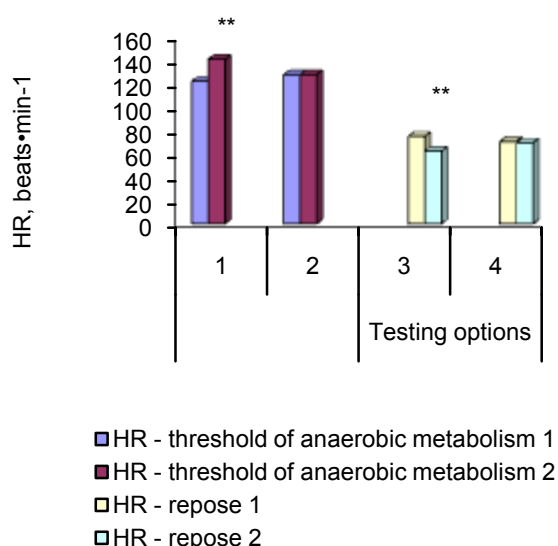


Fig.1. Heart beats' rate in rest and at threshold of anaerobic metabolism at girls' control group ( $n=24$ ) and at girls' experimental group ( $n=22$ ) before and after experiment:

- 1 – experimental group, HBR;
- 2 – control group, HBR;
- 3 – experimental group, HBR in rest;
- 4 – control group, HBR in rest;
- \*\* - differences are confident with  $p < 0.001$ ;

Thus, in our research we obtained results, which witness about positive influence of bodyflex and pilates on functional abilities of students.

In this connection it should be noted that our research corresponded to modern requirements concerning construction of academic process on physical education and to experimental foundation of effectiveness of innovative technologies' application in physical education, which would be attractive for youth, would not take much time and be sufficiently accessible and effective in practice. Bodyflex and piulats are examples of such technologies.

Experiment resulted in increasing of indicators of organism's energy supply systems. For example experimental group's boys showed increase of capacity of creatine-phosphate energy supply system from 27.2 conv. un. to 31 conv.un. ( $p < 0.001$ ); capacity of lactate energy supply system increased from 28.5 conv.un. to 31 conv.un. ( $p < 0.001$ ). In boys' control group there was no such improvement: capacity of creatine-phosphate energy supply system

remained equal to 28.5-28.9 conv.un. ( $p>0.05$ ); capacity of lactate energy supply system remained at level 28.6-28.7 conv.un. ( $p>0.05$ ).

The same changes took place in experimental and control groups of girls. In girls' experimental group capacity of creatine-phosphate energy supply system increased from 27.0 conv.un. to 30.5 conv.un. ( $p<0.001$ ); capacity of lactate energy supply system increased from 27.3 conv.un. to 29.5 conv.un. ( $p<0.001$ ). In girls' control group we didn't notice any such changes: capacity of creatine-phosphate energy supply system remained at level of 28.4-28.6 conv.un. ( $p>0.05$ ), capacity of lactate energy supply system remained at level of 28.2-28.4 conv.un. ( $p>0.05$ ).

Results of PWC<sub>170</sub> test witness about increase of sub-maximal workability of experimental group's students-boys. For example indicators of PWC<sub>170</sub> test increased from 705.5 kg.m.min<sup>-1</sup> to 790,4 kg.m.min<sup>-1</sup> ( $p<0.001$ ). Indicators of relative PWC<sub>170</sub> values increased from 10.9 kg.m.min<sup>-1</sup> to 12.0 kg.m.min<sup>-1</sup> ( $p<0.01$ ). The same indicators of control group's boys decreased, by the end of experiment, from 705.3 kg.m.min<sup>-1</sup> to 695.0 kg.m.min<sup>-1</sup> ( $p>0.05$ ). The same concerns relative values of PWC<sub>170</sub>. The obtained data witness that without influence of purposeful training aerobic endurance reduces that is negative for students.

The same changes were characteristic for girls' PWC<sub>170</sub> relative indicators. In experimental group there was registered a trend for increase of PWC<sub>170</sub>, relative indicators. As a result of our methodic this indicator increased by 2.23 kg.m.min<sup>-1</sup>.kg<sup>-1</sup> ( $p<0.01$ ). In control group indicator of relative PWC<sub>170</sub> reduced by 3.68 kg.m.min<sup>-1</sup>.kg<sup>-1</sup>.

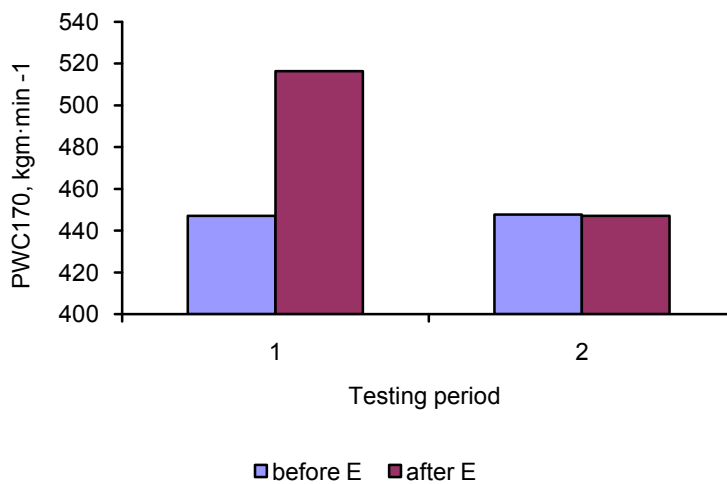


Fig.2. Indicators of workability of control ( $n=24$ ) and experimental ( $n=22$ ) girls' groups before and after experiment:

- 1 – experimental group;
- 2 – control group;
- \* - differences are confident with  $p<0.05$ ;
- before E – before experiment;
- after E – after experiment.

In girls' experimental group increase of PWC<sub>170</sub> indicators was more expressive than in boys group. For example, absolute indicators of PWC<sub>170</sub> in girls' experimental group increased from 445.8 kg.m.min<sup>-1</sup> to 517.2 kg.m.min<sup>-1</sup> ( $p<0.001$ ), while in girls' control group the same indicator remained practically unchanged ( $p>0.05$ ) (see fig.2). PWC<sub>170</sub> relative indicator in girls' experimental group increased from 8.2 kg.m.min<sup>-1</sup>.kg<sup>-1</sup> to do 9.7 kg.m.min<sup>-1</sup>.kg<sup>-1</sup>, and it was confident change ( $p<0.01$ ). In control group change of relative values of PWC<sub>170</sub> was unconfident ( $p>0.05$ ).

The obtained data witness about positive influence of created by us methodic of interactive technologies' application for formation of students' healthy life style as far as improvement of sub-maximal workability is one of the basic indicators of organism's functional state.

As a result of our experiment experimental group's boys showed reduction of systolic and diastolic BP in rest up to normal: from 129.5/84.1 mm.merc.col. to 125.7/78.7 mm.merc.col. ( $p<0.001$ ) (bphys) and from 133.7 / 86.2 mm.merc.col. to 122.2/77.4 mm.merc.col. ( $p<0.001$ ) (girls).

In control groups BP indicators changed unconfidently ( $p>0.05$ ).

As a result of experiment in boys' experimental group the level of sympathetic imbalance also increased.

Improvement of cardio-vascular system's efficiency in rest in experimental boys' group was witnessed also by increasing of variability of heart rhythm (from 322.12 m.sec. to 354.43 m.sec.), by decreasing of amplitude of RR-intervals' modes (from 34.09% to 21.54%) ( $p<0.001$ ), by decreasing of HBR in rest (from 72.00 b.p.m.<sup>-1</sup> to 63.52 b.p.m.<sup>-1</sup>) ( $p<0.001$ ).

In control group such changes were not practically expressed ( $p>0.05$ ).

**Conclusions:**

1. We have proved positive influence of bodyflex and pilates in author's modification on students' functional abilities and it was witnessed by confident increasing of stroke blood volume ( $p < 0.001$ ), by reducing of HBR indicators in rest ( $p < 0.001$ ), by increasing of HBR at threshold of anaerobic metabolism ( $p < 0.001$ ) in boys' and girls' experimental groups. We found reduction of systolic and diastolic BP up to normal value of experimental groups' boys and girls ( $p < 0.001$ ). We registered increasing of efficiency of cardio-vascular system's work in rest of experimental groups' students and it was witnessed by increasing of variability of heart rhythm, by reducing of amplitude of PR-R intervals' modes ( $p < 0.001$ ) of experimental groups' students. In control groups such changes were not confident ( $p > 0.05$ ).

2. We have determined that experiment resulted in increasing of experimental groups' students of energy supply systems' indicators, which were registered by methodic of S.A. Dushanin. We have found increase of sub-maximal workability of students, which resulted from the applied by us methodic: in boys' experimental group  $PWC_{170}$  test results increased from  $705.5 \text{ kg.m.min}^{-1}$  to  $790.4 \text{ kg.m.min}^{-1}$  ( $p < 0.001$ ); in girls' experimental group – from  $445.8 \text{ kg.m.min}^{-1}$  to  $517.2 \text{ kg.m.min}^{-1}$  ( $p < 0.001$ ); indicators of relative values of  $PWC_{170}$  in boys' experimental group increased from  $10.9 \text{ kg.m.min}^{-1} \cdot \text{kg}^{-1}$  to  $12.0 \text{ kg.m.min}^{-1} \cdot \text{kg}^{-1}$  ( $p < 0.01$ ); in girls' experimental group – from  $8.2 \text{ kg.m.min}^{-1} \cdot \text{kg}^{-1}$  to  $9.7 \text{ kg.m.min}^{-1} \cdot \text{kg}^{-1}$  ( $p < 0.01$ ). In control groups such changes were unconfident. ( $p > 0.05$ ).

The prospects of further researches imply improvement of health related technologies' systems, oriented on development of students' functional abilities.

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