

ON IMPROVING EFFECT COMBINING AEROBIC AND ANAEROBIC LOADS OF CHARACTER IN THE CLASSROOM FOR PHYSICAL TRAINING IN UNIVERSITIES

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Annotation. *Purpose:* substantiate the health effects on the body through a combination of students in the classroom for physical training loads of aerobic and anaerobic nature. *Material:* the study involved 174 students of 1-3 courses NIU "BSU." Of these, 90 girls and 84 boys aged 17-20 years. *Results:* the specificity of the health effects of athletic gymnastics as a means of anaerobic training students. The specificity of the health effects of swimming as a means of improving aerobic exercise. Expediency and the method of load combination of aerobic and anaerobic focus on employment in physical education with students. *Conclusions:* results of scientific studies show that the load combination of aerobic and anaerobic characters on physical education classes at the university promotes the significant increase in the level of physical health of students of the basic training department.

Key words: *health, physical training, classes, students, basic training, aerobic, anaerobic, load, athletic, gymnastics, recreation, swimming.*

Introduction

The urgency of this research is conditioned by reducing of health and physical potential of Russian students that has been witnessed by numerous scientific data of recent years [1, 2; et al.]. In specialists' opinion the main reasons of students' increased morbidity, are academic overloads, de-normalization of work-rest regime, stress situations. Long-term and tensed mental functioning in combination with hypo-kinesis and hypo-dynamia condition formation of specific morphological-functional state of organism, characterized by reconstruction of cardio-vascular system's (CVS) functioning and by worsening of circulation system's adaptation to physical load, by significant reduction of physical workability and increasing of energy losses [3]. With it, the mentioned trends are progressing against the background of increased requirements to specialists' fitness and intensification of educational process.

On the contrary, as it is known, regularly physical exercises and sport trainings increase physiological status of organism and its resistivity to unfavorable environmental and professional factors. In this connection main function of HEE physical culture is optimization of students' physical condition, increasing of organism's resistivity to unfavorable factors of intensive educational process, formation of professionally important qualities of future specialists.

Alongside, at present, with it successful realization of main functions of HEE physical education system is directly connected with solution of the following urgent tasks: improvement of somatic health and students' motion functioning, cultivation of their demand in regular physical culture trainings (including independent), determination of effective means of attractive for students, kinds of motion activity's introduction in curriculum. All this actualize need in development of modern health related technologies, including those, which stipulate complex application of different means and their combinations as well as their implementation in educational space of HEEs [4, 5].

The data of special literature witness that health related physical culture trainings of students, as a rule, are based on aerobic loads [6, 7], which facilitate saving character of myocardium's functioning; increasing of capillary quantity in one muscular filament; increasing of lung ventilation and effectiveness of oxygen utilization; reducing of lactate; increasing of myoglobin content in muscles; increasing of size and quantity of mitochondrion [8, 9]. In HEE system of physical culture anaerobic loads are used much rarer and, as a rule, as power trainings [10, 11]. With it, such loads facilitate increasing of inter-muscular concentration of highly energetic substances and glycogen; increasing of muscles' buffer ability; hypertrophy of muscular filaments (including myocardium); increasing of stroke and minute volume of blood; improvement of coordination and strength [8, 12, 9].

Comparison of scientific data about mechanisms of influence of aerobic and anaerobic health related loads, permits to affirm that aerobic training does not noticeably influence on muscular' buffer ability, on inter-muscular high energetic substances' concentration, muscular filament's hyper-trophy, ability to fulfill highly intensive physical work; anaerobic training insignificantly influences on aerobic abilities and causes relatively little adaptation changes in cardio-vascular and oxygen-transportation systems. Such statements permit to assume that for achievement of deeper adaptation changes of functional systems, which are most sensitive to diseases it is necessary to combine means, which would stimulate metabolic processes of aerobic and anaerobic character, because just such combination meets biological laws of organism's functioning.

Thus, as the *problem of our research* we regard need in solution the following *contradiction*: physiologically conditioned purposefulness of increasing of organism's functional abilities with the help of combining of aerobic and anaerobic loads on the one hand; and absence of scientific-methodic works, devoted to such kinds of trainings of HEE students on the other hand.

The urgency of this problem and demand in searching of ways for its solution conditioned *working hypothesis*, which was built on assumption that combination of aerobic and anaerobic loads at curriculum trainings (CT) will facilitate functional and physical fitness, physical condition and, consequently, general level of students' somatic health.

With it, as effective mean of aerobic training aerobic health related swimming can be used; as anaerobic mean – gymnastic; perspective application of such loads in week cycle can be their equal alternating.

The article has been prepared by results of project, which had received grant of Ministry of education and science of RF: “Development of new health related- physical culture technologies, facilitating improvement of organism’s functional abilities and student education’s effectiveness”, which was fulfilled in the frames of ФЦП “Scientific and scientific-pedagogic specialists of innovative Russia” for 2009-2013.

Purpose, tasks of the work, material and methods

The purpose of the work is to scientifically ground methodic of combination of aerobic and anaerobic loads at physical culture CT.

The tasks of the work:

- 1) Determination of specific features of gymnastic health related influence as an anaerobic mean;
- 2) Determination of specific features of health related swimming’s influence as an aerobic mean;
- 3) To ground purposefulness of combination of aerobic and anaerobic loads at CT;
- 4) To work out methodic of combination of aerobic and anaerobic loads at CT and evaluate its effectiveness.

The researches were carried out from March 2010 to August 2012:

- *at first stage* – theoretical (March 2010 – January 2011) we generalized and analyzed described in special literature experience of application of health related aerobic and anaerobic loads and their combinations;
- *at second stage* – laboratory (February – June 2011) we carried out two-months laboratory experiment on studying of effectiveness of gymnastic as anaerobic training mean (EG1) and health related swimming – as aerobic training (EG2). In experiment 174 students of SRU “BelGU” took part: 1-3 year 90 girl students and 84 boy students of 17-20 years old age; all tested were members of main health groups;
- *at third stage* – experimental (July 2011 – August 2012) we worked out methodic of aerobic and anaerobic means’ combination at CT and with the help of semester pedagogic experiment we estimated its effectiveness. In experiment 136 1-3 year students of SRU “BelGU” (71 girls and 65 boys of 17-20 year old age) took part; all tested were members of main health group.

In the course of the research we applied the following *methods*: theoretical analysis and generalization of special literature data; pulse metering; pedagogic observations; anthropometrical examinations; tests of physical fitness; method of indices; laboratory experiment; pedagogic experiment; methods of mathematical statistics.

Results of the research

Theoretical researches proved that in most regions of RF specialists state noticeable worsening of students’ health [1, 13; et al.]. According to recent data in 2012-2013 by results of medical examinations 35-40% of Russian students have become members of special health groups (SHG) for physical culture trainings [14]. With it the most spread in students’ medium there are disorders of cardio-vascular and respiratory systems, supporting motor system and eyesight [15, 16, 17, 18; et al.]. Such disorders appear, as a rule at senior school forms and at HEE. Their main reasons are: weakening of functional fitness, caused by deficit of motion functioning, psycho-emotional overload, de-normalization of labor and rest regime [19, 20, 3, 13; et al.]. From all listed above reasons, discipline “Physical culture” can to the largest extent influence on the first. Here, in the aspect of increasing of students’ functional fitness the most important is optimal dozing of physical load, intensity of which influences on energy-supply mechanism of muscular functioning.

Analysis of special literature permitted to determine main advantages of aerobic and anaerobic loads in students’ health related trainings (see table 1). By means of comparing of scientific data about mechanisms of such loads’ influencing we made assumption about purposefulness of combining of aerobic and anaerobic physical exercises for achievement of still more adaptation changes in functional systems, which are most sensitive to diseases.

Table 1

Advantages of aerobic and anaerobic loads (by results of theoretical analysis of special literature)

Advantages of aerobic loads	Advantages of anaerobic loads
<ul style="list-style-type: none"> - effectiveness of oxygen utilization system increases; - quantity of capillary in one muscular filament increases; - quantity of lactate reduces; - lung ventilation improves; - myoglobin content in muscles increases; - utilization of fats as source of energy improves; - HBR in rest becomes slower that witnesses about more efficient myocardium’s work. 	<ul style="list-style-type: none"> - Inter-muscular concentration of ATP, EC, glycogen increases; - Hypertrophy of muscular filaments, including myocardium, takes place; - Coordination and strength indicators improve; - Buffer abilities increase; - Stroke and minute volume of blood increase.

We found that the most accessible for using in HEE physical education system kinds of motion functioning, characterized by, mainly, anaerobic energy supply mechanisms, are *athletic gymnastic*, which is a system of gymnastic exercises with weights and is oriented on strengthening of health, development of strength, shaping. At present time there are many experimental works devoted to athletic gymnastic trainings of senior form pupils and students [10, 11, 21, 22; et al.]. However, these works, as a rule, give effective methodic of strength development and correction of constitution. There are some data about influence of athletic gymnastic on organism's functional reserves in works by V.V. Kim, I.E. Yudenko [23] N.P. Gorbunov, G.A. Gavronina [24], addressed to SHG students. Besides, in scientific literature there is information about influence of athletic gymnastic on functional fitness of mature men [25, 26] and women [27, 28]. In our opinion increment of functional abilities can be connected with specific influence of anaerobic load.

In specialists' opinion highly effective mean of aerobic cyclic training is *health related swimming*, which is characterized by different swimming styles. With it in scientific literature there equally reflected both variety of means of swimming loads' dozing and positive influence of water medium on organism [29, 30, 31, 32, 33]. In the whole, health related swimming, by its dynamic characteristics, is considered to be the most accessible and effective means of physical education of persons of different age and levels of fitness [31, 34]. The main its attributes are: practically weightless state of body, hardening thermal and massaging influence of water, development of respiratory muscles, normalization of blood bio-chemistry, improvement of CVS functioning. Health related swimming in aerobic mode of training is applied rather extensively in students' physical education and it is witnessed by works of T.Yu. Karas [35], A.N. Usatova [20], V.V. Drogomeretskiy [33] et al. The authors note increasing of functional fitness and physical condition as well as improvement of indicators, which characterize supporting motor system and psycho-emotional state of trainees.

In order to experimentally test effectiveness of health related swimming's influence as aerobic mean and athletic gymnastic influence as anaerobic mean of training on students' somatic health we carried out *laboratory experiment* (in period from February 7th to April 17th, 2011).

During experiment we used *athletic gymnastic* means at CT twice a week as anaerobic (power) load; they consisted of alternating (in weekly cycle) of basic and auxiliary (isolated) exercises:

- Basic exercises were used for increasing of muscular mass and general strength's progressing; we used method of moderate loads (by S.M. Voytsekhovskiy, A.P. Kiseliyov (weight- 60-80% from maximal); every exercise included 3-4 fulfillments, every fulfillment – 8-10 repetitions with rest between fulfillments – 1.5 minutes;
- Auxiliary (isolated) exercises were used for development of power endurance and correcting of constitution; we used the method of little loads (weight – 30-50% from maximal); every exercise included 3-4 fulfillments, every fulfillment – 12-15 repetitions with rest between fulfillments – 1 minute; finalizing part of training consisted of exercises for stretching and relaxation.

Every power complex ensured consequent work of muscles-antagonists and included nine exercises (3-4 fulfillments each of them), oriented on development of main muscular groups. At every training we applied method "to the full" as per the following schema: first fulfillment is warming up, then two fulfillments not "to the full" and last stage – "to the full".

In the course of *health related swimming* we took as the basis "breast stroke" and "front crawl" styles. Theoretically we determined that these styles first, have great applied importance; secondly – they are accompanied by forced exhales in water (compulsory condition with swimming on breast) and condition improvement of cardio-respiratory system's functional abilities [36, 33]; thirdly, combination of such means permits successfully control intensity of trainings by increasing and reducing of HBR. Training were conducted in 50 meters swimming pool of Khorkina's STC of "BelGU". Preparatory part of CT included general exercises out of water from different initial positions. In main part of CT we applied low-intensive interval training, in which 25 meters' "front crawl" swimming with HBR 130-140 b.p.m. were followed by "breast stroke" for reducing of intensity up to HBR of 100-110 b.p.m. After 50 meters' swimming, breathing exercises, as forced exhales in water, were used. Load was dozed by increasing of total length of swimming during one training; by the end of experiment it was 700-900 meters. At finalizing part of CT we used games in water, diving with picking up of objects from swimming pool bottom, jumps in water from swimming pool skirts and from diving tower (3-5 meters) that were also means of active rest, rising of mood and increasing of interest to trainings in swimming pool.

CG students were trained as per traditional program of physical culture department No.1 of SRU "BelGU", which was worked out in compliance with requirements of Exemplary program for HEE on discipline "Physical culture" (2000). According to this program, for the passed period CG students mastered volleyball, basketball, track and field sports.

Objectiveness of final conclusion about effectiveness of application of aerobic-anaerobic load's combination in health related trainings of students was ensured by comparison of testing results of EG and CG groups and this testing was carried out by the following indicators:

- *Functional fitness* – we used: evaluation of HBR in rest, BP, COK, MOK, Shtange's, Genchy's, ruffiet's tests, ortho-test, 30 seconds, modified Harvard step-test, indices of Kerdo and Skibinskiy;
- *Physical condition* – we used: measuring of height, weight, circumferences of waist and hips, expansion of chest, VCL, hand dynamometry;

- *Physical fitness* – we used: pressing ups, chin ups, lifting of torso in lying on back position, keeping half-squatting posture with support, long jump from the spot, 60 meters run, 10 squatting for quickness, cross country (2000 meters for girls and 3000 meters for boys), forward from sitting on bench position, tests of Firiliova and Yarotskiy, 50 meters swimming;
- *General evaluation of somatic health* – we used methodic of Apanasenko, which was based on the following indices: Kettle’s index, vital index, Robinson’s index, power index, time of HBR restoration after 20 squatting during 30 seconds.

All listed above indicators were measured twice: before experimental trainings (in February 2011) and after them (in April 2011).

Generalization of laboratory experiment results witness about positive influence of experimental trainings on many indicators of somatic health of the tested. With it the most noticeable *effect of anaerobic training* was registered in improvement of myocardium’s function, in normalization of diastolic BP, increasing of organism’s aerobic abilities, in stabilization of vegetative indicators, increasing of strength of different muscular groups, improvement of quickness and coordination, correction of the trainees’ constitution. *Effect of aerobic trainings* was the most noticeable in improvement of myocardium’s efficiency, BP normalization, increasing of organism’s aerobic abilities and energetic potential, in increasing of physical workability, stabilization of vegetative indicators, general improvement of cardio-respiratory system’s efficiency, in improvement of flexibility, quickness, coordination, in increasing of general level of all physical qualities. In combination, all mentioned changes conditioned general increasing of somatic health of both EG groups’ students that witness about purposefulness of introducing of athletic gymnastics and health related swimming in CT on discipline “physical culture” with students of main health group.

In the process of *comparing of two variants of students’ health related trainings* – anaerobic and aerobic – we made vivid dynamic of health key indicators (see fig. 1-4).

Comparison of final indicators of EG1 and EG2 students’ *functional fitness*, witnesses about more positive changes in EG2. The students of EG2 practiced health related swimming, while in EG1 students practiced athletic gymnastics. For example, EG2 girls showed more favorable ($p \leq 0.05$) values of systolic and diastolic BP, orthostatic test, Ruffiet’s test, Skibinskaya’s index; EG2 boys showed more favorable ($p \leq 0.05$) HBR in rest, values of systolic and diastolic BP, orthostatic test, Ruffiet’s test, step-test, Skibinskaya’s index. In general it means that health related swimming influenced more positively on BP, vegetative indicators, physical workability, general efficiency of cardio-respiratory system.

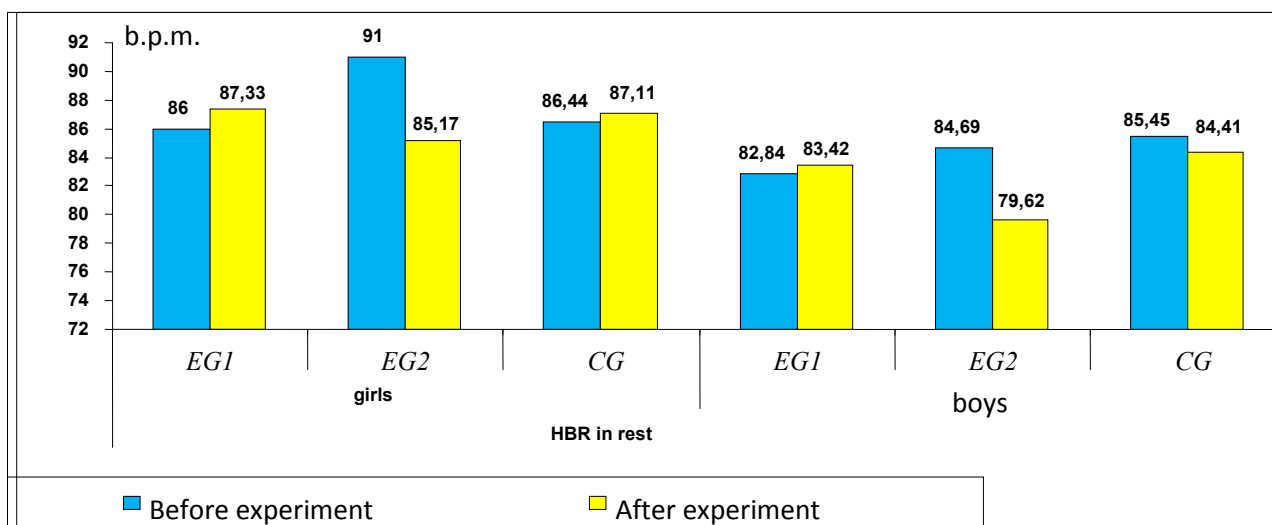


Fig.1. HBR indicators in rest of EG1, EG2, CG students before and after laboratory experiment

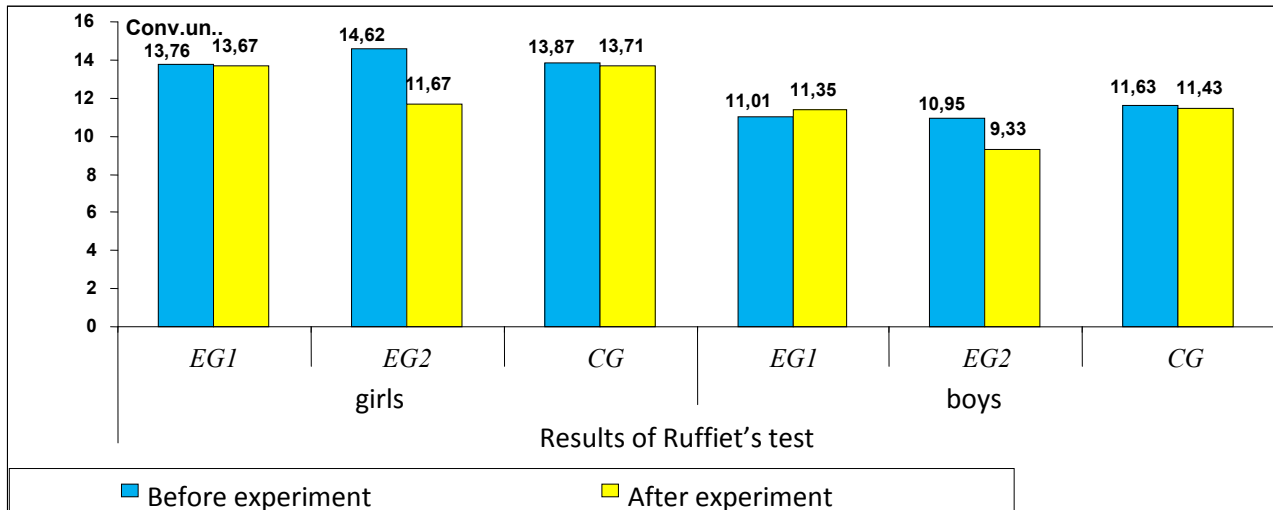


Fig.2. Results of Ruffiet's test of EG1, EG2, CG students before and after laboratory experiment

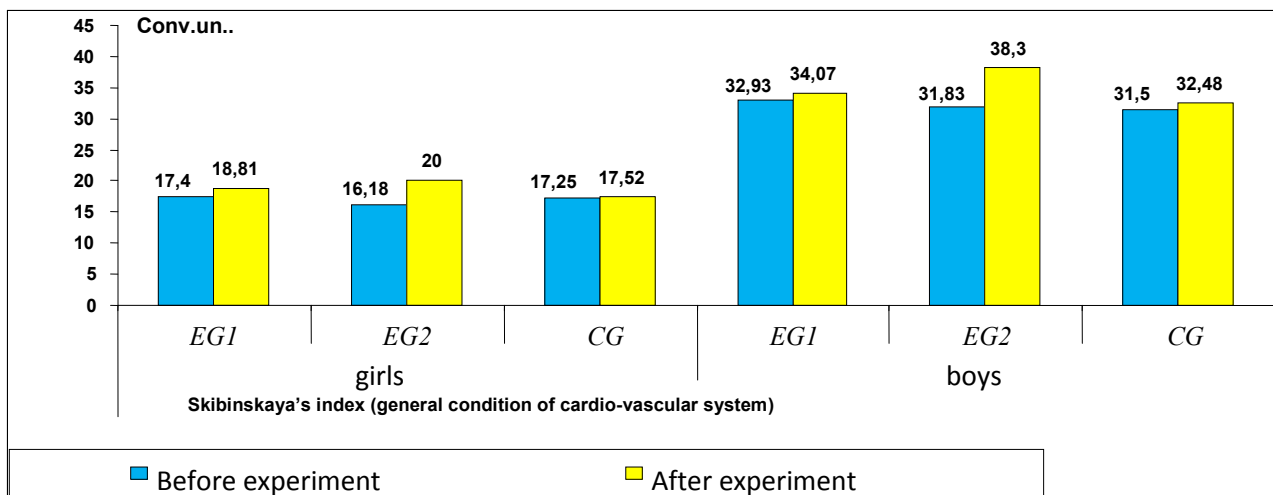


Fig.3. Skibinskaya's index of EG1, EG2, CG students before and after laboratory experiment

Comparison of final indicators of EG2 and EG1 students' *physical condition and fitness* witnesses that more expressive correction of constitution was facilitated by athletic gymnastics' training ($p \leq 0.05$): among girls of EG1 we found less values of weight and circumferences of waist and hips; among EG1 boys – less values of waist circumference. Besides, in EG1 (girls) we registered higher indicators of movements' frequency; EG1 boys demonstrated higher indicators of limb girdle strength. In Eg2 (girls) we determined more favorable ($p \leq 0.05$) indicators of legs' static strength, flexibility, general endurance; boys demonstrated increment of abdomen muscles strength, legs' static strength, static-kinetic balance, general endurance, time of 50 meters' distance swimming.

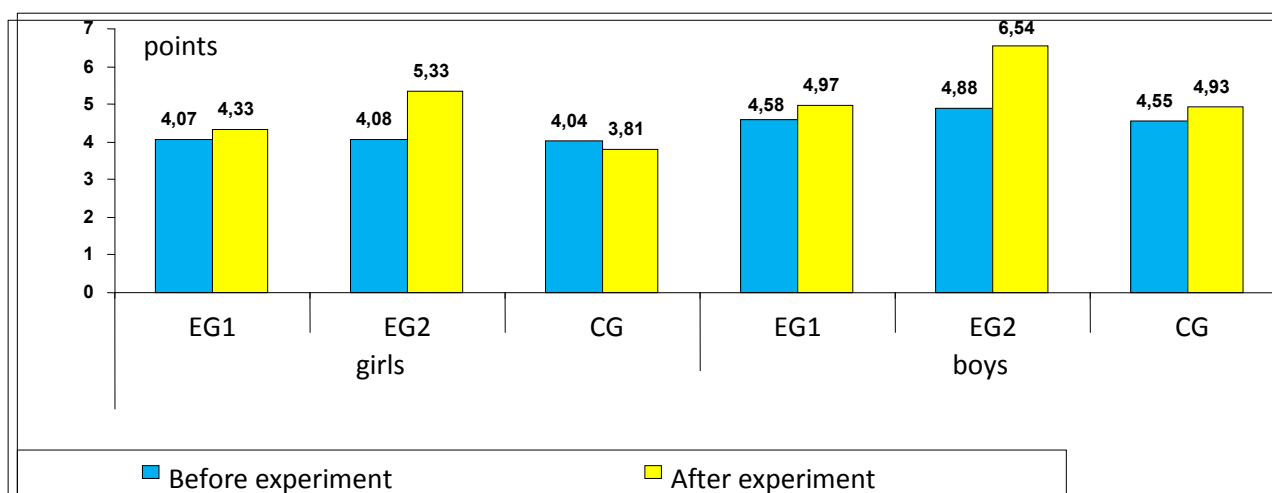


Fig.4. Results of somatic health's evaluation in EG1, EG2 and CG before and after laboratory experiment (by Apanasenko's methodic).

Comparison of final *somatic health's* indicators of EG1 and EG2 students, calculated by *Apanasenko's methodic*, showed higher results of EG2 tested ($p \leq 0.05$): this group's boys and girls demonstrated confidently more favorable values of Robinson's index, which characterizes organism's aerobic abilities, and total sum of all indicators' points; besides, girls showed more favorable values of Kettle's index, which characterizes weight-height correlations.

Summarizing results of comparative analysis of effectiveness of aerobic and anaerobic loads, which were applied in physical culture trainings of students, we can conclude that the most expressive and comprehensive health related influence was rendered by health related swimming, which is characterized by aerobic energy supply mechanisms. Such influence was mainly noticed in increasing of organism's functional status, development of general endurance, coordination, flexibility, strength, general improvement of students' somatic health. Alongside with it athletic gymnastics' trainings, which are characterized by anaerobic mechanisms of organism's energy supply, influenced more positively on strength of different muscular groups (including stroke function of myocardium), on quickness, correction of body constitution.

Comparison of results of three groups' testing results (EG1, EG2, CG) witnesses that in the whole both experimental variants of training turned out to be more efficient in influencing on most of key indicators of CVS indicators, on physical condition and physical fitness as well as on general level of students' somatic health in comparison with unified program of physical education department No.1 of SRU "BelGU". By results of the research we made the following experimentally grounded conclusions:

- Systemic application of aerobic and anaerobic loads in trainings of students is purposeful and highly effective;
- Health related swimming can be applied as mean of aerobic training and athletic gymnastics – as anaerobic training;
- Aerobic load is characterized by more expressive and comprehensive health related influence in comparison with anaerobic load that mainly is manifested in increasing of organism's functional status, in complex development of all physical qualities, in general improvement of somatic health;
- Anaerobic load, in comparison with aerobic one, influences more expressively on strength of different muscular group (including stroke function of myocardium), quickness, correction of constitution.

On the base of our conclusions we assumed that it would be perspective to experimentally ground effective combination of aerobic and anaerobic loads in health related trainings of students in order to achieve mutually conditioned, physiological changes in organism, which would facilitate students' somatic health. Realization of this assumption was carried out by mean of working out of *experimental methodic of combination of aerobic and anaerobic loads at physical culture CTs*; the sense of this methodic is that main mean of anaerobic training is athletic gymnastics and aerobic – health related swimming. Such kinds of loads shall be equally combined in weekly cycle; one training in week – athletic gymnastics, the second – health related swimming (see table 2). Training programs are identical to those, which were used in laboratory experiment. Academic load was distributed in 68 hours and includes 4 stages: stage of diagnostics (4 hours); stage of training (16 hours); stage of perfection (44 hours); stage of control (4 hours).

Table 2

Schema of stages of realization of experimental methodic

1-2 trainings	3-32 trainings								33-34 trainings	
Initial testing	Alternating of athletic gymnastics and health related swimming и оздоровительного плавания								Final testing	
Diagnostic stage (4 hours)	Training stage (16 hours)		Stage of perfection (44 hours)						Stage of control (4 hours)	

Results of *pedagogic experiment* (see fig. 5-9), which was conducted in the period from January 30th to May 25th, 2012) permitted to make conclusion that the worked out methodic of combination of aerobic and anaerobic loads at physical culture trainings facilitated ($p \leq 0.05$) improvement of myocardium's efficiency, normalization of diastolic BP, increasing of aerobic abilities and organism's energy potential, improvement of vegetative indicators and physical workability and efficiency of cardio-respiratory system, increasing of quickness, strength and coordination. As a result, somatic health of EG students confidently improved in average from 5 to 10 points both of girls and boys.

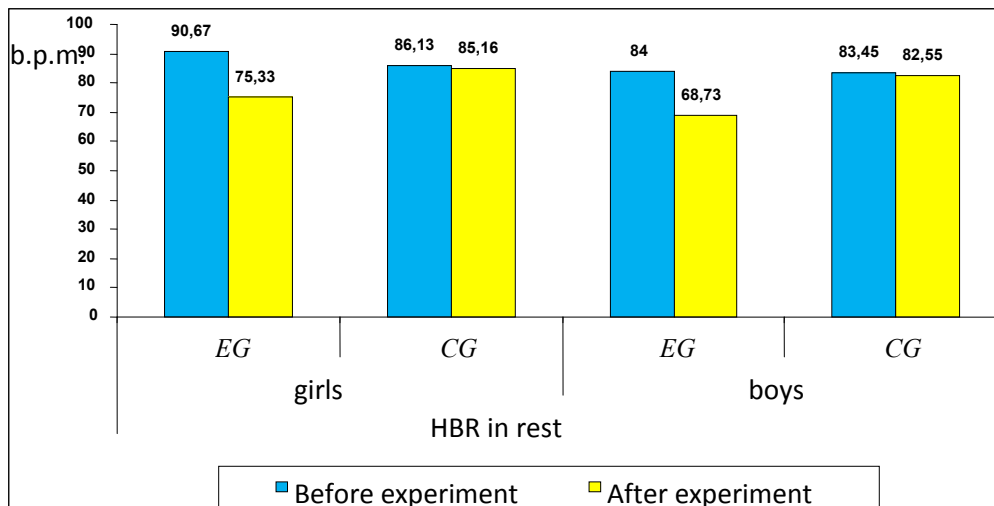


Fig. 5. HBR indicators in rest of EG and CG students before and after pedagogic experiment

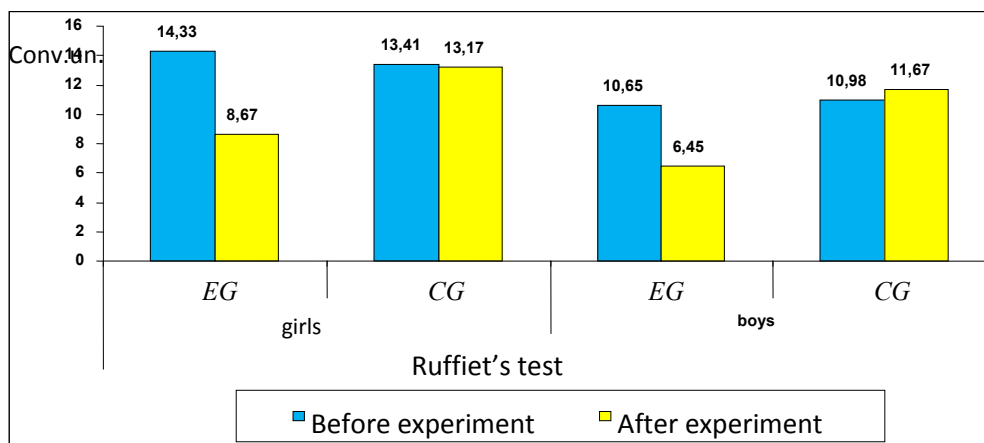


Fig. 6. Ruffiet's test results of EG and CG students before and after pedagogic experiment

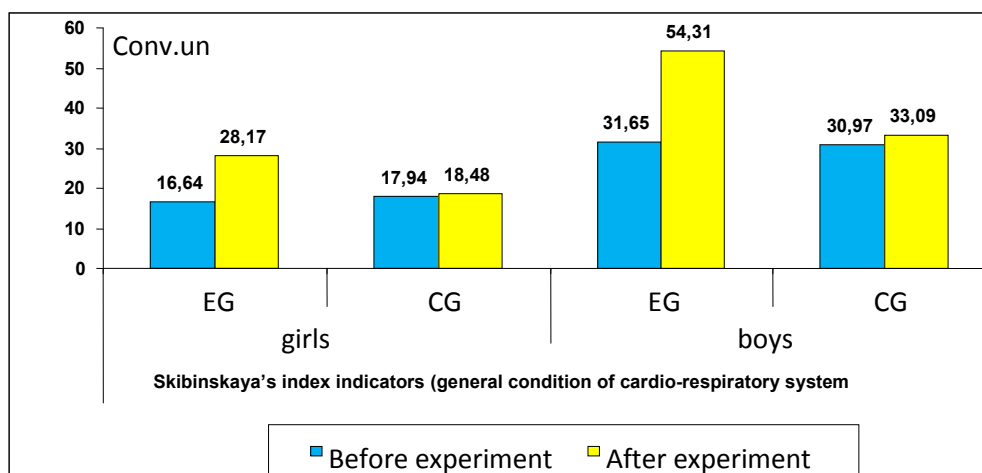


Fig. 7. Skibinskaya's index indicators of EG and CG students before and after pedagogic experiment

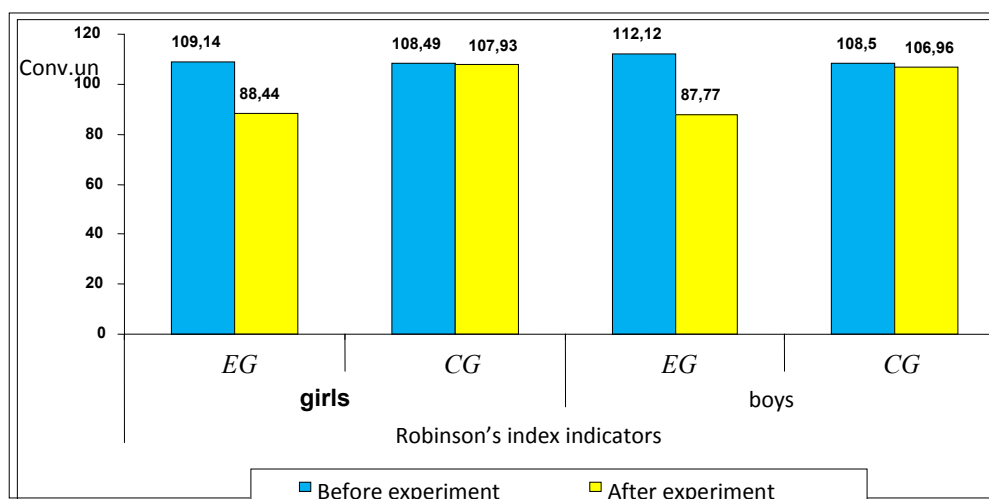


Fig. 8. Robinson's index indicators of EG and CG students before and after pedagogic experiment

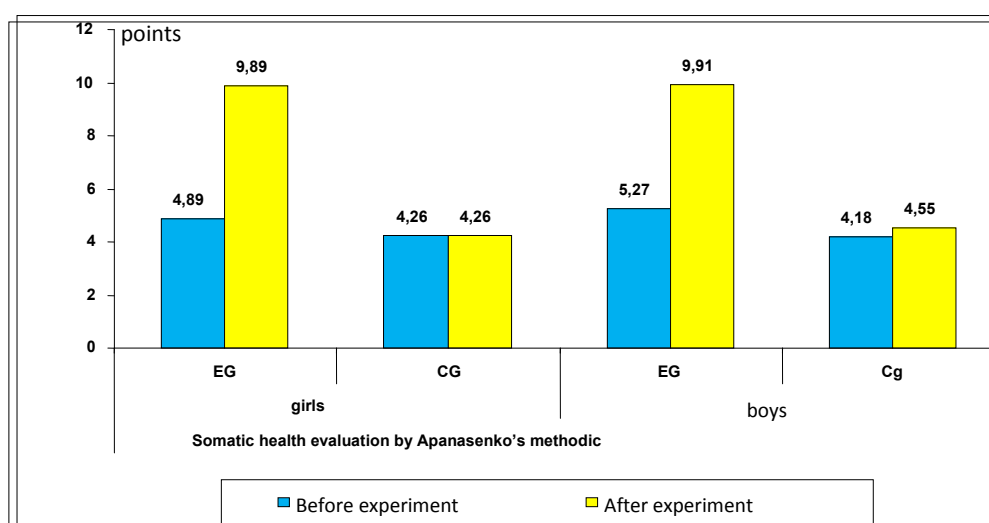


Fig.9. Results of somatic health's evaluation of EG and CG students before and after pedagogic experiment (by Apanasenko's methodic)

Generalization of testing's results witnesses that trainings, based on complex application of health related swimming and athletic gymnastics, facilitate increasing of organism's aerobic abilities and energy potential, form favorable preconditions to optimization of weight-height correlations, increasing of strength and general workability and, as a result, condition general improvement of students' somatic health.

Conclusions:

1. It has been theoretically determined that anaerobic power load facilitates the following: increasing of i-muscular concentration of highly energetic substances and glycogen; rising of muscles' buffer ability; hyper-trophy of muscular filaments (including myocardium); increasing of stroke and minute blood volume; improvement of strength and coordination. It has been experimentally proved that in health related students' trainings effect of anaerobic load was the most noticeable in increasing of myocardium's stroke function ($p \leq 0.05$), normalization of DBP ($p \leq 0.05$), improvement of organism's aerobic potentials ($p \leq 0.05$), increasing of strength of different muscular groups ($p \leq 0.05$), improvement of quickness ($p \leq 0.05$) and coordination ($p \leq 0.05$), correction of constitution ($p \leq 0.05$) that in combination conditions general improvement of students' somatic health.

2. It has been theoretically determined that aerobic power load facilitates the following: efficiency of myocardium's functioning, increasing of capillary's quantity in each one muscular filament; improvement of lung ventilation and oxygen utilization system's efficiency; reducing of lactate; increasing of myoglobin content in muscles and intensification of using of fats as source of energy; increasing of sizes and quantity of mitochondrion. It has been experimentally proved that in health related students' trainings effect of aerobic load was the most noticeable in increasing of myocardium's efficiency ($p \leq 0.05$), normalization of SBP ($p \leq 0.05$) and DBP ($p \leq 0.05$), increasing of aerobic abilities ($p \leq 0.05$) and organism's energy potential ($p \leq 0.05$), increasing of physical workability ($p \leq 0.05$), stabilization of vegetative indicators ($p \leq 0.05$), general improvement of cardio-respiratory system's efficiency ($p \leq 0.05$), improvement of flexibility ($p \leq 0.05$), quickness ($p \leq 0.05$), coordination ($p \leq 0.05$), increasing of all physical qualities ($p \leq 0.05$) that condition general improvement of students' somatic health.

3. It has been theoretically determined that anaerobic power load insufficiently influences on aerobic abilities and causes relatively little adaptation changes in cardio-vascular and oxygen-transportation systems of organism. Aerobic training does not noticeably influence on muscles' buffer ability, i-muscular concentration of highly energetic substances. Hyper-trophy of muscular filaments, ability to fulfill highly intensive physical work. It has been experimentally proved that in health related students' trainings effect of anaerobic load was most noticeable in increasing of of muscular filaments (including myocardium) strength; quickness, correction of constitution; aerobic load influences on organism's functional state, complex development of all physical qualities, general somatic health. The received data witness about promising character of combining of aerobic and anaerobic loads in health related trainings of students in order to achieve mutually-conditioned physiological changes in organism, which would facilitate improvement of somatic health.

4. The worked out by us experimental methodic of combination of aerobic and anaerobic loads at physical culture CTs with students implies that athletic gymnastics shall be used as main mean of anaerobic load and health related swimming – as aerobic one. Such kinds of loads shall be combined in weekly cycle equally, in "turn-by turn" way. At athletic gymnastics' trainings basic power exercises for increasing of muscles' volume shall be used as well as auxiliary exercises, oriented on development of power endurance and shaping of muscles. At health related swimming trainings there shall alternate swimming of equal segments of distance by front crawl with little HBR increment 130-140 b.p.m. and by breast stroke with HBR of 100-110 b.p.m.

5. The worked out methodic of aerobic and anaerobic loads' combination at physical culture trainings of students facilitated increasing of myocardium's efficiency ($p \leq 0.05$), normalization of DPB ($p \leq 0.05$), increasing of aerobic abilities ($p \leq 0.05$) and organism's energy potential ($p \leq 0.05$), improvement of vegetative indicators ($p \leq 0.05$), improvement of physical workability ($p \leq 0.05$) and efficiency of cardio-respiratory system ($p \leq 0.05$), increasing of strength ($p \leq 0.05$), quickness ($p \leq 0.05$), coordination ($p \leq 0.05$). As a result somatic health of experimental group's students confidently ($p \leq 0.05$) increased: girls – before experiment 4.89 ± 0.48 points, after experiment 9.89 ± 1.05 points; boys – before experiment 5.27 ± 0.90 points, after experiment 9.91 ± 0.96 points.

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Cite this article as: Goginava S.E., Rumba O.G. On improving effect combining aerobic and anaerobic loads of character in the classroom for physical training in universities. *Physical education of students*, 2014, vol.3, pp. 20-29. doi:10.6084/m9.figshare.924492

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Received: 15.02.2014
Published: 27.02.2014