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VALUE OF THE INDIVIDUAL COMPONENTS SUBJECT TRAINING GYMNASTS ACCORDING TO THE SURVEY OF COACHES WITH DIFFERENT SKILLS

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Annotation. *Purpose*: assess the significance of the individual components subject training gymnasts according to the survey of coaches with different skills. *Material*: two groups of coaches with different qualifications (n = 40). The first group of coaches -, experience from 1 to 10 years (n = 20); the second group - work experience from 11 to 25 years (n = 20). Gymnasts preliminary stage of basic training. Coaches are asked to answer 15 questions. *Results*: the content of questioning coaches gymnastics shows the relevance of the basic problems of technical training of young gymnasts (throwing and catching objects). The most difficult exercises in the training and improvement are throws and catches the ball (coefficient of concordance W = 0,814). The necessity of the development and use of new techniques for analyzing sports equipment exercises with the ball, learning and improving them. *Conclusions*: basic technical training and preparedness of gymnasts to perform exercises with objects represent a problem that is solved enough in theory and practice gymnastics.
Keywords: gymnastics, coaches, athletes, profile, subject training, basic exercises.

Introduction

Calisthenics is an Olympic discipline. Sport achievements of female gymnast are connected by specialists [1, 4, 6-10, 13, 14, 15] with their basic technical fitness. Alongside with it basic technical training and fitness are insufficiently solved problem in theory and methodic of sport kinds of gymnastics [2, 5, 9, 11, 17-20], including calisthenics [1, 4, 8, 12, 15, 16]. First of all we mean basic trainings with objects, fulfillment of bio-mechanically rational throws and catches of objects in compositions of female gymnasts. As per questioning of different qualification coaches the most technical mistakes, made by female gymnasts in fulfillment of throws and catches of objects, belong to exercises with ball, then – with ribbon, batons, skipping rope, hoop. Evaluation of objects' throws and catches as well as analysis of female gymnasts' moving in space, adequate to movement of object, is realized in conditions of training process and competitions, mainly, visually. Results of bio-mechanical analysis of sport technique of objects' throws and catches, detail study of phase structure of calisthenics exercises, analysis of reasons of mistakes as well as information about practical experience of coaches have not been elucidated sufficiently in scientific-methodic literature on calisthenics.

The work has been fulfilled in compliance with combined plan of SRW in sphere of PhC&S of Ukraine for 2011-2015. Code of topic 2.15. Name of topic "Control of static-dynamic stability of sportsman's body, of system of bodies in kinds of sports with complex coordination", state registration No. 0111U001726. Index UDK: 796.012.2.

Purpose, tasks of the work, material and methods

The purpose of the research is to evaluate some components of female gymnasts' trainings with objects by data of questioning of different qualification coaches.

The methods of the research are: analysis and generalization of scientific-methodic literature data and practical experience of coaches, pedagogic questioning of coaches, method of experts' evaluation, mathematical statistic.

Questioning was conducted among calisthenics coaches for studying of their practical experience in training and improvement of objects' manipulation techniques at stage of preliminary basic training of female gymnasts. Coaches were offered to answer 15 questions, briefly presented below:

1. Since what age it is effective to start training of manipulations with ball in calisthenics?
2. How much time shall be paid to training of ball's throws and catches at stage of preliminary basic training?
3. Mark in decreasing order basic elements for improvement of ball manipulation techniques in calisthenics.
4. How much times a week it is necessary to practice exercises with ball for improvement of sport technique?
5. Mark means (preparatory exercises), which you use for improvement of ball's manipulation techniques?
6. Mark in decreasing order from what subject it is necessary to start trainings with objects?
7. What do you think will it be quicker and more efficient to train female gymnast in group?
8. Mark in decreasing order what object is the easiest for training and improvement of sport technique?
9. Mark, what the most difficult ball throws and catches you introduce to female gymnasts of 9-10 years old age for their training and in competition programs?
10. Mark in decreasing order with what object technical mistakes in throws and catches are made?
11. What the most frequent ball catches you introduce in program for female gymnasts of 9-10 years old age?
12. What methodic techniques do you use for your gymnast to throw ball higher?
13. What technical mistakes are the most often with ball throws and catches?
14. Evaluate in points first basic combination of exercises with ball of highly qualified female gymnasts (ball throw in jump "Kazakh" – catching and roll on two arms and back with rhythmic steps.

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15. Evaluate in points the second basic combination of ball exercise fulfilled by highly qualified female gymnasts (ball throw in jump, touching in ring – catching and roll on two arms and back with rhythmic steps).

Results of calisthenics coaches' questioning were used as objective facts and practical bench marks for evaluation of kinematic structure of technique of ball throws and catches, for evaluation of sensor-motor coordination, with preparation and conducting of pedagogic experiment.

Material of the research: we formed two groups of coaches of different qualification (n=40). The first group of coaches included those with practical experience from 1 to 10 years; the second group – coaches with practical experience from 11 to 25 years. It should be noted that that is coaches had to range the offered variants of an answer to a question, the answers were classified by certain ranges in decreasing order, where "one" denoted the most important element of technical structural groups, technique of different throws and methods of catching in process of training; also it denoted the most significant mistake in throws or catching of ball during competitions, the most significant technique of different throws and catches in trainings and so on. If it was necessary to choose one answer from several, the answer «Yes" was marked as "1" and "No" – as "0".

With it, for every of offered questions we calculated concordance coefficient (*W*) and determined its statistical significance that facilitated agreement of experts' opinions [3].

Results of the researches

In respondents' opinion during trainings, for training of ball throws and catches the most effective time is 35 minutes (see fig.

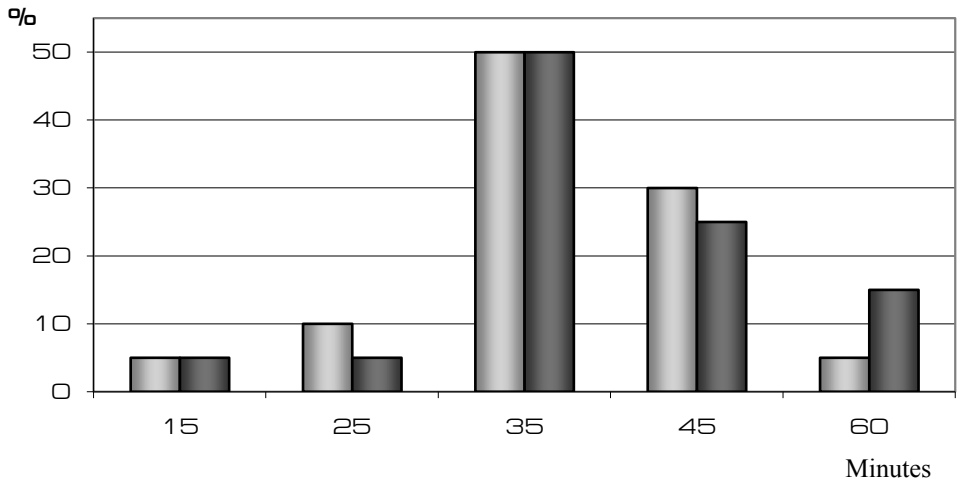

Fig.1. Respondents' opinion about quantity of time, required for training of ball throws and catches, (n = 40):
■ - coaches with experience from 1 to 10 years;
□ - coaches with experience from 10 to 25 years.

Coaches with experience from 1 to 10 years think that 35 minutes is the most effective time for training of ball throws and catches. Coaches with experience from 10 to 25 years also think that 35 minutes is the most effective time for training of ball throws and catches. Having analyzed results of both groups of respondents we can say that there are differences in variants of answers that witness about different approach to this question, but the most important is that both groups have common opinion about 35 minutes time. In table 1 we presented comparison of both respondents' groups concerning significance of training of female gymnasts in separate structural groups of ball exercises. We showed) in both groups of respondents) turn-by-turn character of ball exercises' trainings.

Table 1

Significance of calisthenics technical structural groups in ball exercises, (n = 40)

Technical elements	Ranging of answers			
	group1, experience from 1 to 10 years		group2, experience from 11 to 25 years	
	Mean range	Standard deviation	Mean range	Standard deviation
	(W=0,782; p<0,05)		*(W*=0,814; p<0,05)	
Throws, overthrows	8.25	1.07	7.0	0.85
Push offs	7.45	0.76	7.25	0.79
Catches	7.90	1.02	8.30	1.22
Passes	1.65	0.88	3.15	1.35
Rolls	4.55	0.76	5.40	1.05
Over-rolls	5.15	1.46	4.95	0.94
Mills	4.65	1.63	4.53	1.76
Turnings	2.2	0.83	1.40	0.60
"Eights"	3.2	1.85	2.13	1.07

In opinion of first group's respondents coaches start trainings with such structural components: passes, turnings, eights, mills, rolls, over-rolls; further both groups of respondents have the same opinion: training of push offs, throws, overthrows and catching of ball *(W*=0.782; p<0.05). It should be noted that among questioned with experience up to 10 years the most important component is considered to be passes 60% (n=12), turnings – 15% (n=3), eights– 25% (n=5).

Opinion of the second group is as follows: training shall be started from application of the following elements: turnings, eights, passes, rolls – further their answers are the same as in other group *(W*=0.814; p<0.05). With it, in order of priority more experienced coaches put at first place turnings– 65% (n=13), eights– 20% (n=4) and passes– 15% (n=3).

Respondents' opinion concerning training time every week for improvement of ball manipulation's technique is presented in fig.2.

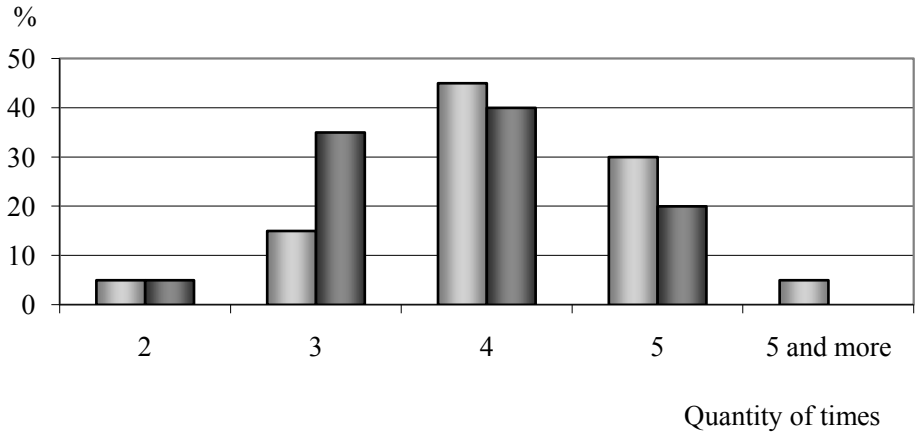

Fig.2 Respondents' opinion concerning training time every week for improvement of ball manipulation's technique (n=40):

■ - coaches with experience from 1 to 10 years;
□ - coaches with experience from 10 to 25 years.

Most of coaches with experience from 1 to 10 years prefer to improve ball manipulation's techniques four and more times a week in order to achieve "sense" of ball. Coaches with practical experience from 11 to 25 years pay

attention to these exercises from 3 to 4 times a week. In their opinion such conditions more facilitate sport techniques of female gymnasts.

On the base of analysis of objects' significance in calisthenics, with which the most of mistakes are made, we received the following results (see table 2).

Table 2

The most frequent mistakes with fulfillment of throws and catches of different objects in calisthenics, (n = 40)

Objects	**Ranging of answers**			
	group1, experience from 1 to 10 years		group2, experience from 11 to 25 years	
	Mean range	Standard deviation	Mean range	Standard deviation
	(W=0.569; p<0.05)		*(W*=0.719; p<0.05)	
Skipping rope	3.38	0.94	4.17	0.52
Hoop	4.65	0.93	4.58	0.94
Ball	1.40	0.89	1.30	0.73
Batons	3.08	0.79	2.55	0.76
Ribbon	2.50	1.15	2.40	0.75

Respondents' opinions are a little bit different however both groups agreed in answers that mistakes with balls are most frequent in throws and catches. The first group of respondents thinks that by complexity objects can be ranged as follows: ball, ribbon, skipping rope, batons, hoop *(W*=0.569; p<0.05). The second group of experienced coaches offers a little different order: ball, ribbon, batons, skipping rope, hoop *(W*=0.719; p<0.05). Respondents of both groups agreed in answers that ball and ribbon are the most difficult objects in calisthenics and mistakes are often made in ball manipulation's techniques; then opinions become different. May be it is conditioned by the fact that experience of work influences on process of training. It should be noted that by complexity ball was put on the first place by 60 % (n=12) of respondents with working experience up to 10 years and by 75% (n=15) – of more experienced coaches.

Further specifying of factors, conditioning making mistakes, permitted to determine that respondents' opinions become differ (see table 4). Coaches of the first group think that order of significance of ball throws and catches' mistakes at competitions is as follows: low amplitude of throw, catching by both hands, sportswoman does not manage to catch ball, not fixed position of ball throw, too long waiting for object, psychological instability of a sportswoman (*W*=0.708; p<0.05). Variants of second group coaches' answers were: too long waiting for object, low amplitude of throw, catching by both hands, sportswoman does not manage to catch ball, not fixed position of ball throw, psychological instability of a sportswoman, (*W*=0.799; p<0.05). It should be noted that in spite of certain discrepancies of opinions both groups of respondents put on last place psychological instability of sportswomen. It proves one more the fact that psychological training of female gymnasts is on low level and requires reviewing of coaches' position concerning this problem (see table 3).

Table 3

Significance of mistakes made with ball throws and catches at competitions (n = 40)

Mistakes made with ball throws and catches	Ranging of answers			
	group1, experience from 1 to 10 years		group2, experience from 11 to 25 years	
	Mean range	Standard deviation	Mean range	Standard deviation
	(*W=0.*708; p<0.05)		(*W=0.*799; p<0.05)	
Low amplitude of throw	1.55	0.51	1.90	0.64
Not fixed position of ball throw	1.70	0.80	3.55	1.23
Catching by both hands	4.10	1.29	3.75	0.72
Sportswoman does not manage to catch ball	3.75	0.79	5.25	0.72
Too long waiting for object	4.35	1.35	1.25	0.44
Psychological instability of a sportswoman	5.55	0.81	5.30	0.73

We also determined different opinion of respondents in respect to influence of objects' throws and catches on female gymnasts' competition results (see fig.3).

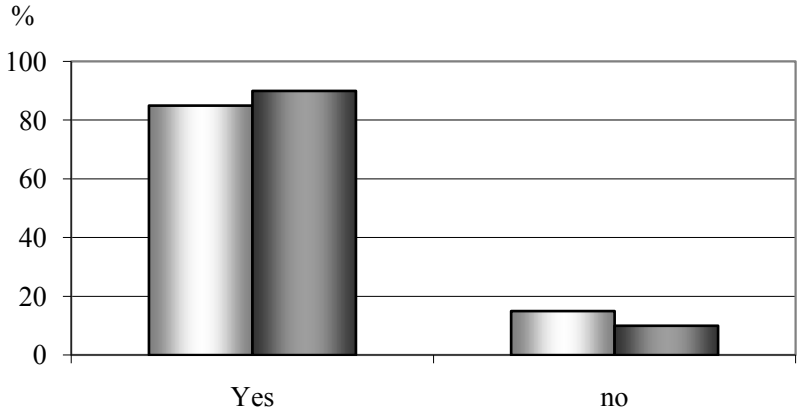

Fig. 3 Influence of objects' throws and catches on female gymnasts' competition results, (n = 40):
■ - coaches with experience from 1 to 10 years;
□ - coaches with experience from 10 to 25 years.

Basing on respondents' answers it becomes evident that in sixty – one hundred percents technique of objects' throws and catches influences on competition result. It says that objects' throws and catches technique plays very important role in fulfillment of certain exercises, combinations of exercises, whole compositions in Olympic calisthenics. With it it is necessary to consider that during competitions psychological factor can change technique of throws and especially catching of ball, because catching of object is always more difficult. This factor also depends on female gymnast's qualification and experience, acquired during trainings and in competitions. The question what throws and catches are fulfilled by gymnasts, working by program of second and first junior degrees and who are trained by our respondents, the answer was the following: catches by legs, catches out of rage of vision, catches in complex elements; catches with rolls; catches on floor; throws for complexity; throws out of range of vision; throws without arms; risky throws. The answers corresponded to the fact that all participants included in program listed above throws and catches. It is connected with requirements of Rules of competitions, videlicet: female gymnasts shall be skillful in exercises, containing elements of risk. Respondents point that ball throws and catches are bio-mechanically difficult and their fulfillment is connected with great quantity of technical mistakes. Sequence of training process and perfection of ball throws and catches are given in table 4. Coaches of first group think that it is necessary to start training of ball throws and catches in the following order: series of short throws, throws from program, throws and overthrows in pairs, series of long throws, complex throws and catches, risky throws ($W=0.423$; $p<0.05$). Respondents of second group think that training of ball throws and catches shall be started in the following sequence: series of short throws, series of long throws, throws and overthrows in pairs, risky throws, throws from program, complex throws and catches ($W=0.664$; $p<0.05$).

Table 4

Significance of different techniques of ball throes and catches in trainings, (n = 40)

Throws of ball	Ranging of answers			
	group1, experience from 1 to 10 years		group2, experience from 11 to 25 years	
	Mean range	Standard deviation	Mean range	Standard deviation
	($W=0.423$; $p<0.05$)		($W=.,664$; $p<0.05$)	
Series of short throws	1.75	0.85	1.35	0.59
Series of long throws	3.02	1.45	1.85	0.59
Throws from program	2.15	1.18	3.75	0.85
Throws of risk	4.22	1.06	3.80	0.89
Complex throws and catches	3.85	0.75	4.25	1.07

Differences in answers witness that working experience of a coach makes certain corrections: young coaches want to train female gymnast to ball throw and catching for as short period as possible, thinking that it would be effective; senior coaches train with the help of didactic order that, in the future, proves correctness of their pedagogic construction of female gymnasts' training.

Conclusions:

1. In theory and methodic of modern Olympic calisthenics there is observed insufficiency of bio-mechanically grounded parameters and indicators, which would characterize sport technique of objects' throws and catches, including ball; there is absence of experimentally verified training programs with objects. Scientific-methodic foundation of basic technical training as the basis of many-years sport perfection of calisthenics sportswomen is not completely elucidated.

2. Questioning of calisthenics coaches (working experience from 1 to 10 years - first group and from 11 to 25 years – second group, n=20) witnesses about urgency of problem of junior female gymnasts' basic technical training, in particular training to objects' throws and catches. The most difficult exercises for perfection are ball throws and catches – concordance coefficients were W= 0.782; ($p<0.05$) and W= 0. 814; ($p<0.05$) accordingly. соответственно. We have determined demand in working out and application of new methodic of analysis of ball exercises' techniques.

3. For training of ball exercises, perfection of ball throws and catches optimal for one training is period of 35 minutes. First group respondents consider ball exercises the most difficult - 60 % (n=12); in their turn, respondents of second group preferred ball exercises in 75 % of cases (n=15).

4. In opinion of first group respondents training shall be started from the following structural elements: passes, turnings, eights, mills, rolls, over-rolls; further both groups offer to train push offs, throws, overthrows and catches of ball *(W=0.*782; $p<0.05$). It should be noted that respondents with working experience from 1 to 10 years consider passes 60% (n=12), turnings– 15% (n=3), eights– 25% (n=5) to be the most important. The second group respondents are of the following opinion: in training there shall be used such elements as turnings, eights, passes, mills, rolls, over-rolls; then, opinions are equal *(W=0.*814; $p<0.05$). With it at first place more experienced coaches put turnings– 65% (n=13), eights– 20% (n=4) and passes– 15% (n=3).

5. Most of coaches with working experience from 1 to 10 years prefer to improve technique of ball's manipulation four and more times a week in order to achieve "sense" of ball. Coaches with working experience from 11 to 25 years pay attention to ball exercises from 3 to 4 times a week. In their opinion such conditions facilitate more effectively development of female gymnasts' technical fitness.

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CONCEPTUAL FOUNDATIONS OF CLASSES WITH THE DISCIPLES OF SPECIAL MEDICAL GROUP IN SECONDARY SCHOOLS

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Annotation. *Purpose:* study and scientific rationale for new approaches to the organization of educational work with students of special medical group in secondary schools. *Material*: analyzed 15 scientific sources regarding the approaches of different authors to develop educational programs for students of special medical group. *Results*: focuses on the outstanding issues in a substantive, logistical and human aspects. Found that the selection of the content of educational material for special medical groups is an empirical question. Selection is carried out by copying the existing curriculum of physical culture for healthy children with an indication of the load reduction and exemption of complex elements. Established a complete absence of evaluation of educational achievements of pupils. Based on modern approaches to teaching students based on biomedical and didactic aspects: Leading defined function of each stage of training, fleshed main goals and objectives of the educational process, substantiated various kinds of sports activity, taking into account the diagnosis of diseases and the needs of students of different ages and gender. *Conclusions*: the main controversy in the decision of the designated problem. Substantiated leading features of each stage of training in special medical groups. A system of assessment of students' achievements.
Keywords: conceptual bases, online training, special medical team, curriculum, goals, objectives, training module.

Introduction

In official documents, which regulate functioning of educational establishments (Law of Ukraine On changes in Law of Ukraine "On physical culture and sports" № 1724-V1 dt. 17.11.2009 Orders of ME&S of Ukraine №956 dt. 22.10.2008, №1008 dt. 06.11.2008, № 518/674 dt. 20.07.2009 as well as combined decision of collegiums of ME&S of Ukraine, Ministry of health protection, Ministry of family, youth and sports №13/1-2, 10, 11/1 dt. 11.11.2008) and in many works of scientists and pedagogues-practicians both domestic [4, 6, 7, 10, 11], and foreign ones [14-20] the problems of pupils' health improvement have been being regarded repeatedly. Statistical indicators witness about trend to constant worsening of pupils' health, level of their physical condition. For example, as per data of institute of hygiene and medical ecology, named after Marzeyev of AMS of Ukraine fro recent 10 years morbidity of school age children has increased by 26.8% In first forms about 30% of children have chronic diseases, in 5^{th} forms – 50%, in 9^{th} and 10^{th} forms – up to 64%. A number of authors of manuals also stress certain drawbacks in pupils and students' health 5, 9, 13].

Doctor of medical sciences G.L. Apanasenko (Education of Ukraine No.3, 2013) says that even examinations, carried out by specialists, functional diagnostic, taking much time, do not give objective information about health of health; they give information only about disease. Further, he continues: "most of Ukrainian children have chronic diseases or functional disorders". Such children can not attend physical culture lessons like healthy children. Already in 70-s of the past century specialists came to such conclusion. That is why in comprehensive schools there are envisaged additional trainings of physical exercises for pupils of special health groups. They supplement compulsory physical culture lessons. It is connected with the fact that children of special health group shall attend physical culture lessons and fulfill exercises, admissible for them. There can appear a question that children with weak health have to train more than healthy children (at lessons and in special health group). In this connection Ye.G. Bulych [1] concludes that organism of special health groups' pupils requires not less and very often more than organism of healthy children.

There are statistical data about quantity of such children in comprehensive educational establishments and they vary, as per researches of different authors, from 3% to 15%. Analysis of many publications and analytical works of different levels [2, 4, 6, 7, 11] witnesses that organization of work with such children in comprehensive educational establishments is realized, maximally at satisfactory level. Specialists think that main disadvantages of organization and realization of work with unhealthy children are the following: absence of conceptual foundation of organization of special health groups' work; absence of scientifically grounded educational programs; low level of teachers' professional level on organization and conducting of trainings in special health groups; insufficient technical/material provisioning of trainings; sporadic character of medical specialists' participation in organization of trainings and monitoring of their quality.

For creation of scientifically grounded conceptual principles of organization of trainings in special health groups it was necessary to consider main contradictions, which are regarded as certain moving force in solution of these problems. These contradictions are: 1) contradiction between tasks of education's humanization, which require to consider pupil's personality and his (her) individual physical and psychic potentials, bents and actual practice of trainings, not oriented on holistic formation of personality; 2) contradiction between targets and tasks, declared by academic program for special health group and new approaches to their determination and formulating, considering work with unhealthy children (most of targets are of too general, vague character); 3). Contradiction between content of academic material, offered by existing programs, and peculiarities of responses of functional systems of pupils with

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different diagnosis and mastering of this material; 4) contradiction between traditional methods and organizational forms of trainings' conducting and requirements of differentiated and individual approaches, considering age, sex and peculiarities of pupils' diseases; 5) contradiction between existing system of pupils progress's evaluation and level of physical and mental potentials of pupils with different diagnosis and motion experience; 6) contradiction between demand in permanent control of pupils' health condition during academic classes and material possibility to conduct such control in conditions of modern comprehensive educational establishments.

The work has been fulfilled as per plan of work of theory and methodic of physical education's department of Municipal establishment "Kharkiv humanitarian-pedagogic academy" of Kharkiv regional council for 2014.

Purpose, tasks of the work, materioal and methods

The purpose is to study at theoretical level the problem of organization and conducting of physical culture trainings with comprehensive educational establishments' pupils, who have to attend special health groups, and to work out conceptual principles of this work's organization.

According to the purpose we marked out the following main *tasks:*

1. To provide grounds for functions, targets and tasks of physical culture education of special health groups' pupils at different stages of education.

2. To study main theoretical-methodological approaches to designing of academic material for special health groups content.

3. To determine main ways of evaluation of special health group pupils' progress and its components.

For solution of our tasks we, in our research, applied such general scientific methods: analysis of psychological – pedagogic and special literature (on theory and methodic of physical education, valueology, medicine, therapeutic physical culture); systemizing of scientific researches in field of therapeutic physical culture.

Results of the research

Quality of organization of any functioning depends on scientifically grounded determination of its purposes. Main purposes of academic program for special health groups of comprehensive educational establishments [8] are the following:

- Individual steady improvement of self-feeling;
- Planning and realization of ways of recovering (from temporary or continuous disease);
- Using and improving of pupils potentials for full fledged entering adult life.

Formulation of the mentioned above purposes is too generalized, vague and is not practical. In our opinion they should be de-composed. It is possible is to consider the stages of pupils' studying, their diagnosis and sex.

Consideration of studying stages envisages determination of main targets of studying at primary, secondary and senior schools. Analysis of scientific researches [2, 3] witnesses that it is possible only with determination of main functions of every studying stage both in general didactic aspect and in aspect of using of physical education means. Considering main functions of physical culture of comprehensive educational establishments' pupils [3] main functions of organization and conducting of classes with special health groups' pupils shall include: first stage of studying – diagnostic- prognostic, which stipulates determination of peculiarities of main functional systems' responses to admissible physical exercises of different orientation (for quickness, strength, coordination and etc.) and physical load (temp, rhythm, quantity of repetitions and so on); forming of "school" of movement with the help of physical exercises for variable and invariable parts of academic program (gymnastic, dancing exercises, outdoor games, track and field elements and etc.) and required theoretical knowledge about practical application of health related physical education means; recreational, which is oriented on correction of diagnosed disorders in pupils' health with the help of special therapeutic gymnastic exercises and forming of pupils' ability for recreation with relaxation and different kinds of breathing and so on.

For other stage of studying the following functions were determined: forming of foundation of physical, psychic and biological health on the base of mastering of different physical exercises and movements with using of academic program's subjects (gymnastic, aerobic, elements of outdoor games, swimming and etc.) evaluative-reflexive, which stipulates forming of pupils' ability to consciously and purposefully use means of physical education and control of own mastering of academic material, to determine disadvantages in this process and organize own independent activity on their elimination, to respond to changes of main functional systems' functioning under different loads and so on.

On the base of realization of the above mentioned functions in first and second stages of studying, on the thirds stage functions shall be the following: project-prognostic, which envisages pupils' creation of own physical development programs and improvement of physical education means in the process of application of complex; operational-control, realization of which is oriented on organization of independent trainings and control over own health during these trainings.

Determination of main functions of every studying stage permits to specify main targets and appropriate tasks for pupils of 1-4, 5-9, 10-11 forms. In our research we shall elucidate educational tasks, which for every stage, are as follows: rehabilitation of certain organism's functions; compensation of lost functions. Determination and specifying of educational and developing tasks for special health groups' pupils require separate research and we shall not stop on this problem.

Primary school:

1. Determination of pupils' organism's response to admissible physical loads with measuring of HBR (heart beats rate) and BP.

2. Training pupils to main means of motion functioning: culture of movements with elements of gymnastic; school of motion; school of jumps; school of active leisure; school of physical condition's development; school of correct posture.

3. Theoretical knowledge about significance of health related physical culture and personal hygiene, hardening and healthy life style, influence of physical exercises on organism's main functions.

4. To develop main motion skills as per sensitive periods of junior school age.

5. Pupils' mastering of ability to "listen to" own organism during fulfillment of different exercises and to timely correct intensity, tem and rhythm of fulfillment, to provide self-control.

6. To constantly carry out operative and current control over development of main motion skills and pupils' organism response to different physical loads.

7. To use complex system of evaluation of pupils' progress at trainings.

Secondary school:

1. Forming of general understanding of physical culture and its components, their role in preservation and improvement of health and physical condition.

2. Mastering of practical skills in invariable and variable parts of program by pupils in order to expand their motion experience and familiarizing of them with exercises' influence on organism's main functional systems.

3. Development of main motion skills as per sensitive periods of secondary school age.

4. Mastering of control and self-control for quality of physical exercises' fulfillment by pupils (In invariable and variable parts of program).

5. Rising of level of theoretical and methodic knowledge in evaluation of organism's response to different physical exercises (compositions, complexes, etc.) and to loads, used in academic classes (separately for pupils with different diagnosis).

6. Forming of practical skills for independent trainings of physical exercises and for active leisure.

Senior school:

1. Giving to pupils abilities to project own program of physical development and its improvement on the base of received theoretical knowledge, motion experience of previous studying stages and changes in health, which happened in pervious forms.

2. Forming of motion skills, envisaged by academic program for 10-11th forms pupils of special health groups.

3. Expanding of theoretical knowledge about determination of effective means of resisting to main kinds of diseases, which were diagnosed.

4. Mastering of theoretical and methodic knowledge about conducting of tests for determination of organism's main functional systems' functioning.

The given above main tasks of training in practical teacher's functioning shall be appropriately specified for certain form and lesson. It shall be realized considering peculiarities of contingent, variety of pupils' diseases, material-technical provisioning, specificity of academic material and so on.

Organization of special health groups' teaching envisages consideration both general-didactic and specific (intrinsic to work with unhealthy children) principles. They are: principle of systemic monitoring of pupils' health and responses of organism's functional systems to physical loads; principle of alternating of admissible loads and different forms of rest; principle of gradual increasing of intellectual and practical pedagogic influences; principle of cyclic construction of trainings' system; principle of complex application of teaching means; principle of differentiation and individualization of pedagogic influence and other.

Quality of organization of special health groups' trainings depends also on optimal content of academic material considering requirements of program, material-technical provision, peculiarities of diagnosis, pupils' sex and so on. As it was already noted authors of modern programs [8, 12] included in them such parts (modules) as in programs for practically healthy children. In our opinion academic material for special health groups' children shall be expanded. Undoubtedly, main component of every lesson shall be elements of gymnastic. They shall include general exercises with different objects and without them, exercises on special apparatuses (wall bars,, benches, pull up bars etc.) special exercises for children with different diseases and different physical fitness, correcting exercises and exercises, oriented on prophylaxis of posture abnormalities and flat-footedness. Wide block of exercises shall be connected with mobile exercises (different walks and runs, skiing, swimming and so on). Also promising are choreographic, aerobics, dancing exercises. In some cases elements of shaping or stretching can be used. Important component of every training is mobile and outdoor games of different orientation and breathing exercises. It is impossible to describe completely content of academic material within one article; this problem shall be additionally researched. But for creators of new program we should recommend to include certain counter-indications in it.

The problem of using of teaching methods also requires certain reviewing. It concerns their classification and functional sense. In our opinion it is necessary to attract specialists' attention to application of those methods, which already have been theoretically grounded in general didactic. They include classification of methods by I.Ya. Lerner (explaining, illustrative, reproduction, problematic, partially researching) or by Yu.K. Babanskiy (organization and realization of learning-cognitive functioning, stimulations and motivations, control and self-control). Also specific methods of trainings' conducting of therapeutic physical culture shall be applied.

On the base of differentiated and individual approaches it is necessary to widely use group, small group and pair forms of pupils training's organization. Using of such kinds as circle training with justified using of apparatuses and specific content for every group of pupils is also rather effective.

Evaluation of pupils' progress is rather a problem in functioning of special health groups in comprehensive educational establishments. There exist no clear criteria for pupils of special health groups, but, basing on general pedagogic approaches, it is necessary to evaluate children's functioning by three components: theoretical knowledge, technique of fulfillment of admissible exercises and compositions, positive increment in functioning of main functional systems of organism. The latter indicator shall be determined with accessible functional tests.

Conclusions:

The carried out theoretical research of program-methodic maintenance and organization of special health group pupils' trainings permit to make the following main conclusions: 1) specification of main and derivates from them tasks of teaching of different forms' children is possible only on the base of determined contradictions between organization of special health groups' work and theoretical foundation of academic process's functions; 2) academic material for special health groups shall be chosen considering belonging of pupils to group A and group B, sec, age, certain diagnosis, level of physical fitness and response of organism's main functional systems to different loads; 3) methods and forms of organization of pupils' learning activity shall be chosen on the base of general pedagogic approaches; 4) evaluation of pupils' progress shall be carried out by three indicators: level of theoretical knowledge, technique of exercises' fulfillment, positive changes in quantitative indicators of main functional systems.

Further researches stipulate development of content of academic material for every stage of pupils' studying and system for progress evaluation of special health groups' pupils.

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MODELING OF PHYSICAL FITNESS OF YOUNG KARATYST ON THE PRE BASIC TRAINING

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Annotation. *Purpose*: to develop a program of physical fitness for the correction of the pre basic training on the basis of model performance. *Material*: 57 young karate sportsmen of 9-11 years old took part in the research. *Results*: the level of general and special physical preparedness of young karate 9-11 years old was determined. Classes in the control group occurred in the existing program for yous sports school Muay Thai (Thailand boxing). For the experimental group has developed a program of selective development of general and special physical qualities of model-based training sessions. Special program contains 6 direction: 1. Development of static and dynamic balance; 2. Development of vestibular stability (precision movements after rotation); 3. Development rate movements; 4. The development of the capacity for rapid restructuring movements; 5. Development capabilities to differentiate power and spatial parameters of movement; 6. Development of the ability to perform jumping movements of rotation. Development of special physical qualities continued to work to improve engineering complex shock motions on the place and with movement. *Conclusions*: the use of selective development of special physical qualities based models of training sessions has a significant performance advantage over the control group.
Keywords: modeling , young, karate sportsmen, physical, training, special.

Introduction

It has been determined that in process of physical training it is necessary to solve the tasks, which are specific and characteristic for the given kind of sports [7, 8, 9]. In many works it has been proved that for junior karatekas to participate in competitions it is necessary to have certain level of special physical skills, ensuring qualified technical fitness [2, 4, 10]. Special physical qualities facilitate development of static and dynamic balance, accuracy of movements after rotations, maximal frequency of movements, reconstruction of motion functioning and coordination of movements, complexly coordinated kicks and blows. In karate there exists constant threat of knockout, that is why it is necessary to have high level of special physical fitness ensuring participation of sportsmen in competitions without any harm for personal health [1, 3, 10].

Many authors note that it is necessary to build system of sportsmen's training on the base of model characteristics of training and competition functioning 14-16, 18-20]. At the same time there are no model characteristics of junior karatekas' physical and technical fitness.

In our opinion correction of training process at stage of preliminary basic trainings of junior karatekas, based on model characteristics of training process, will facilitate quick forming of special movements' technique and its realization in competition functioning. That is why building of model characteristics of karatekas' general and special physical fitness at stage of preliminary basic training is an up-to-date and urgent problem.

Purpose, tasks of the work, material and methods

The purpose of this work was working out of correction program for junior karatekas' physical fitness at stage of preliminary basic training on the base of model characteristics.

The research involved junior karatekas of 9-11 years old age, who were divided into 2 groups: experimental group (EG) – 30 persons and control group (CG) – 27 persons. CG karatekas were trained by traditional program for specialized CJSS – muai-thai (Thailand boxing), while EG sportsmen were trained by worked out by us program. Scope of training hours in both groups was equal (see table 1).

Table 1.

Distribution of training hours for kinds of training (CG and EG)

Kinds of training	Hours
Theoretical preparation	14
General physical training	106
Special physical training	142
Technical training	113
Tactic training	65
Integral training	88
Coache's and refereeing practice	10
Participation in competitions	As per plan
Medial examinations	As per schedule
Total	542

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In our research we used the following methods: analysis and generalization of scientific literature, pedagogic observation, pedagogic experiment, testing, mathematical methods of research.

Results of the research

When working out of models of EG trainings we introduced certain corrections, oriented on development of special skills, characteristic for elements of karate technique. With working out of experimental program we considered specific motion abilities of a karateka:

- ability to keep static and dynamic balance;
- ability to reproduce movements with high accuracy after rotation that is ensured by good vestibular stability;
- ability to fulfill movements with high frequency (specific integral complexly coordinated and speed endurance);
- ability to quickly re-adjust and change movements (high mobility of nervous processes);
- ability to differentiate power and space-time parameters of movements;
- ability to fulfill complexly coordinated actions (jumps with rotations and etc.).

Important role of such motion psycho-motor abilities of karatekas for efficiency of sport functioning was proved by results of correlation and factor analysis [17].

Experimental program contains six blocks of training means, oriented on development of special physical skills and training to basic elements of karate techniques.

In first block we used exercises, oriented on development of static and dynamic balance. Great attention was paid to correct fulfillment of blow (kick) phase of movements and keeping balance after blow (kick).

Second block of trainings was oriented on development of movements' with rotation accuracy.

In third block of trainings, exercises were oriented on increasing of movements' frequency with preservation their technical and qualitative characteristics, i.e. on forming of specific endurance. Main scope of exercises included exercises, fulfilled in series and with change of direction that facilitated development of coordination and orientation – series of side kicks with motion in different certain directions.

The forth block of trainings was oriented on development of space and time parameters of movements that is the basis and facilitates kick and blow techniques in middle and upper levels.

In sixth block main attention was paid to complex jumps as well as fulfillment of double kicks (blows) in torso and double kicks (blows) in upper level.

The purpose of pedagogic experiment was comparing of results of our program and program of CJSS. Pedagogic experiment was carried out during one academic year (August 2009- June 2010).

Morphological-functional indicators of junior karatekas were evaluated as per commonly used methodic [5, 6], while SPF and GPF – by standards of physical fitness (Thae-quan do and aikido) [11, 12, 13].

In table 2 we present maximal indicators of physical condition of 9-11 years old karatekas.

Limitation of indicators of junior karatekas' physical condition is based on data of coaches' questioning, which witness that the rest morphological-functional indicators are of no significance in practice.

Analyzing results of studying of GPF we found positive shifts in all indicators in both groups, but rate of increment of physical skills' levels were different (see table 3).

Table 2.

Some initial indicators of physical condition of 9-11 years old karatekas

Indicators	EG (n=30)			CG (n=27)		
	M	σ	m	M	σ	m
Length of body (cm)	142.7	5.31	1.01	141.31	5.06	0.97
Mass of body (kg)	28.88	3.56	0.76	29.03	2.19	0.41
VCL (l)	2007.16	117.17	19.93	1986.7	121.3	21.45

Table 3.

GPF indicators of junior karatekas before and after experiment

Tests	Stage	EG (n=30)	CG (n=27)	t
30 meter run from low start (sec.)	Before	5.77±0.02	5.75±0.02	–
	After	5.48±0.04*	5.46±0.04*	3.6
Long jump from the spot (cm)	Before	163.9±1.3	164.4±1.0	–
	After	174.0±1.1*	168.4±1.1	4.0
High jump (cm)	Before	40.0±0.7	37.0±0.6	–
	After	45.8±0.7*	43.1±0.9*	2.45

Tests	Stage	EG (n=30)	CG (n=27)	t
Cross split (degrees)	Before	167.1±1.3	168.1±1.5	–
	After	175.2±1.1*	174.9±0.9*	0.21
Side split to the right (degrees)	Before	148.5±2.4	148.7±1.9	–
	After	157.8±2.2*	161.1±2.0*	1.13
Side split to the left(degrees)	Before	152.5±2.4	154.7±2.0	–
	After	163.3±1.8*	167.3±1.9*	1.53
6-minutes run (min)	Before	1032.2±7.6	1038.3±6.6	–
	After	1195.4±11.1*	1181.6±13.1*	0.81
Shuttle run 4x9 meters, (sec.)	Before	11.17±0.06	11.02±0.07	–
	After	10.93±0.06*	10.90±0.07*	6.39
Run on the spot for 10 sec (q-ty)	Before	36.4±0.4	36.6±0.4	–
	After	45.1±0.3*	43.4±0.1*	17.0
Jumps on the spot for 10 sec. (q-ty)	Before	17.3±0.2	17.4±0.2	–
	After	20.0±0.1*	18.5±0.2*	2.14
Jump with rotation to the right (degrees)	Before	318.7±7.1	318.9±7.6	–
	After	415.1±8.9*	386.1±6.0	2.71
Jump with rotation to the left (degrees)	Before	323.9±6.1	321.7±7.1*	–
	After	428.1±4.8*	371.1±6.8*	6.86
Right hand dynamometry (kg)	Before	15.03±0.2	15.00±0.2	–
	After	18.7±0.1*	16.56±0.3*	21.4
Left hand dynamometry (kg)	Before	14.40±0.2	14.26±0.2	–
	After	17.90±0.2*	16.70±0.1*	17.1
Reflex metering, (sec)	Before	0.190±0.003	0.190±0.002	–
	After	0.184±0.002	0.187±0.002	10.7

Notes:* – ($p < 0.05 – 0.001$); $t_{кр} = 2.0$; $p < 0.05$

Materials of the research witness that in both groups the most significant changes were in such physical qualities as speed-power, endurance, frequency of movements, strength, coordination, but with different quantitative increment.

The highest increment in EG was in tests “jumps with rotation to the right and to the left” (see fig.1).

Significant increment in EG is observed in such indicators as: high jump from the spot - by 21.3%, run on the spot for 10 sec. – by 20%, right hand dynamometry – by 13.3%, lef6t hand dynamometry – by 17.4%. 6 minute run – by 15.8%.

Insignificant but confident rates of increment were determined in such indicators: 30 meters run (5%), long jump from the spot (6.1%), cross split (1.8%), side split to the right and to the left (7% and 6.3%), shuttle run 4x9 meters (2.4%), jumps on the spot for 10 sec (10.2%), reflex metering (1.6%).

In control group rates of increment of GPF indicators in most cases were a little lower than indicators in EG.

For example the highest rates of GPF indicators’ increment were in such tests: high jump from the spot (21.2%). Right and hand dynamometry (17.1% and 17.6%), jumps with rotation to the left and to the right (15.3% and 15.4%). Rather expressed trend to increment was in CG in 6 minutes run (distance 150.4 meters) – by 14.5%.

Less significant but confident were rates of increment in such indicators of CG: 30 meters run (5%), long jumps from the spot (5,6%), side split to the left and to the right (8,4% and 8,1%), jumps on the spot for 10 sec. (8,5%).

When analyzing GPF testing results we determined that all indicators had positive trend to changes. By data of materials of the research (see table 4) we can see that both in EG and CG most of indicators had statistically confident changes. Alongside with it in CG these changes were not very significant.

In EG the highest increment is observed in tests for static balance on right and left legs (see fig.2) by 30.83 and 29.95 sec as well as dynamic balance by right and left legs – by 36.26 and 37.12 sec.

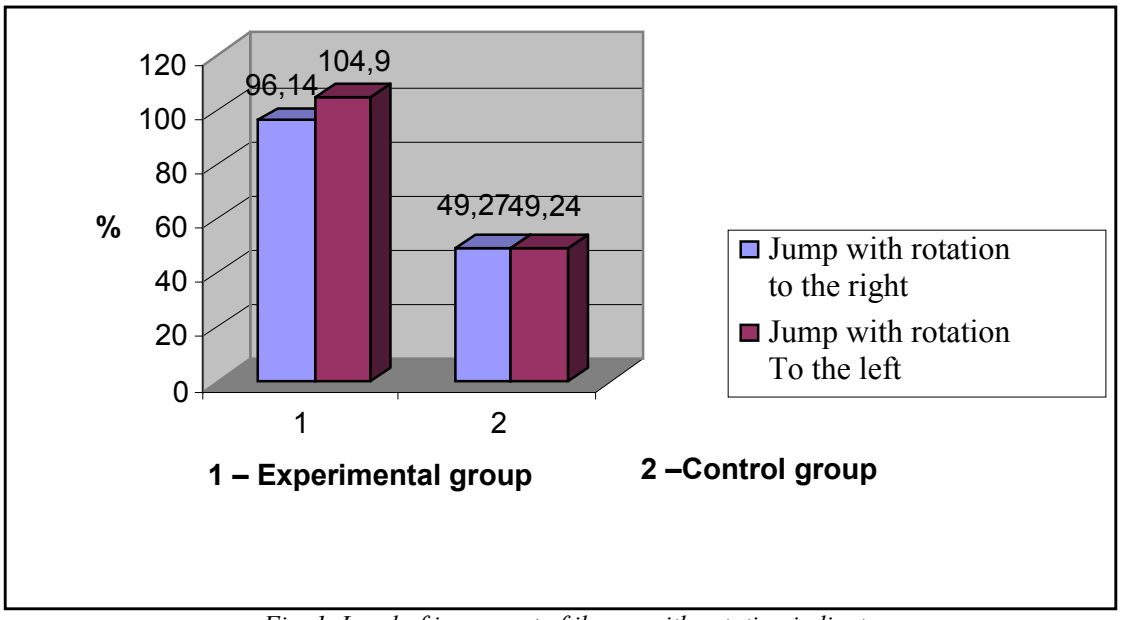

Fig. 1. Level of increment of jhump with rotation indicators

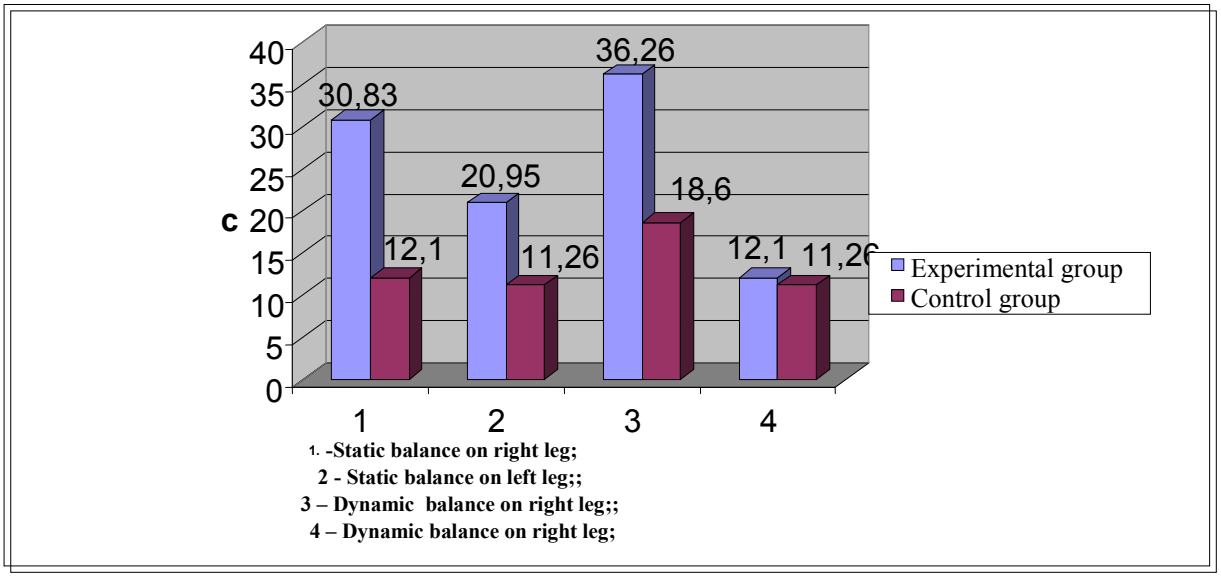

Fig.2. Indicators of static and dynamic balance

Expressed rates of increment of EG indicators were registered in the following tests: 5 side right and left kicks in upper level - (22.5% and 21.3%), right and left side kicks in middle level (17.2% and 19.3%), two blows in chest and abdomen (11.7% and 12.2%).

Table 4.

GPF indicators of junior karatekas before and after experiment

Tests	Stage	EG (n=30)	CG (n=27)	t
Static balance on right leg (sec.)	Before	12.67±0.24	12.71±0.23	–
	After	43.5±1.89*	24.81±0.94*	8.9
Static balance on left leg (sec.)	Before	22.98±1.05	22.93±0.88	–
	After	43.93±1.52*	34.19±1.09*	5.4
Dynamic balance on right leg (sec.)	Before	8.55±0.24	8.75±0.27	–
	After	44.81±1.55*	27.25±1.16*	4.69

Tests	Stage	EG (n=30)	CG (n=27)	t
Dynamic balance on left leg (sec.)	Before	9.90±0.59	10.04±0.37	–
	After	47.02±1.84*	30.72±1.19*	7.47
Five side kicks with ball of right foot in upper level (sec.)	Before	6.68±0.11	6.74±0.15	–
	After	8.18±0.12*	6.14±0.13*	14.57
Five side kicks with ball of left foot in upper level (sec.)	Before	6.99±0.16	7.04±0.13	–
	After	8.50±0.11*	6.53±0.14*	14.07
Five side kicks with ball of right foot in middle level (sec.) 10 sec., (q-ty)	Before	16.5±0.2	16.5±0.2	–
	After	19.3±0.2*	19.4±0.2*	0.1
Five side kicks with ball of left foot in middle level (sec.) 10 sec., (q-ty)	Before	15.8±0.2	15.5±0.2	–
	After	18.2±0.2*	18.5±0.2*	0.32
Double blow by arms: front arm blows in chest, rear arm blows in abdomen for 10 sec (q-ty)	Before	8.7±0.2	8.8±0.2	–
	After	10.2±0.1*	10.1±0.2*	0.45
The same, but 5 combinations (sec.)	Before	8.14±0.3	8.09±0.27	–
	After	7.36±0.17*	7.48±0.13*	0.7
Double blow and one kick in middle level, 5 combinations (sec.)	Before	15.14±0.09	15.09±0.1	–
	After	12.7±0.07*	12.9±0.09*	1.8
Attack-counter-attack (sec.)	Before	5.14±0.09	5.17±0.07	–
	After	4.16±0.07*	4.72±0.08*	56

Notes: * – ($p < 0.05 – 0.001$); $t_{кр}= 2.0$; $p < 0.05$

Insignificant rates of increment of GPF in EG group were registered in one test “attack-counter-attack” (6.5%) that, probably is connected with high initial result. In control group rates of increment of GPF testing were lower than in experimental group (see table 4) excluding test “side kicks in middle level.

The highest increment of tests’ results was registered also in tests dynamic balance on right and left legs – by 15.8 and 20.6 sec. and static balance on tight and left legs – by 12.1 and 11.26 sec. Rather expressed rates of indicators’ increment were observed in right and left side kicks in middle area for 10 sec (17.5% and 19.1%). The least rates of increment were registered in tests for accuracy of kicks after rotation, attack-counter-attack that witness about relatively high initial data.

The worked out models of trainings ensured, thus, significant increment of GPF and SPF indicators.

The highest scope of special exercises EG sportsmen fulfilled on specially prepared stages (involving, basic, pre-competition) and to less extent – in competition micro-cycles.

In annual macro-cycle we used the following schema:

1. Exercises, oriented on development of static and dynamic balance were used in preparatory micro-cycles. They were oriented on selective development of special physical skills.
2. Exercises for accuracy of movements after rotations were used in general and special-preparatory periods and were oriented on consolidation and perfection of movements’ technique.
3. Exercises for frequency of movements were used in special-preparatory period (about 30%) and in competition period (about18%). They were oriented on fulfillment of series of side kicks on the sport and in motion.
4. Exercises for dynamic and space parameters of movements were fulfilled in general preparatory stages (about 40%) and on special stages (about 30%) and were oriented on perfection of technique of combined side kicks and blows in chest and abdomen.
5. Exercises for reconstruction of movements were used mainly in main and competition periods for perfection of attacks and counter attacks.
6. Exercises for complex jumps were used in main and special-preparatory periods. These exercises were oriented on perfection offside and rotating kicks in complex jumps.

All offered exercises were fulfilled considering certain amplitude of movements, accuracy, temp and rhythm. Alternation of load and rest during fulfillment of series of exercises were planned so that organism of junior sportsmen could recreate before fulfillment of the next series.

Thus, quantitative characteristic of GPF and SPF levels showed that application of trainings' models ensured achievement of the highest level of physical fitness in comparison with existing program of CJSS [10].

Conclusions:

1. Analysis of special literature, our researches permit to determine required direction of training process for optimization of system of junior karatekas' training.
2. Working out of model training programs shall be based on laws of organism systems' adaptation to physical loads.
3. Introduction of specially selected exercises permits to qualitatively influence on general and special physical fitness of junior karatekas.

The prospects of further researches imply working out of computer programs on the base of model characteristics of physical fitness on all stages of sportsmen's training.

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METHODOLOGY DEVELOPMENT AND INTEGRATED CONTROL POWER-SPEED HIGH-CLASS HANDBALL PLAYERS

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Annotation. *Purpose*: based practices and identify effective means of controlling the level of development of power-speed high-class handball players. *Material*: The study involved 24 women's handball team player of Super League of Ukraine "Dneprjanka" Kherson. *Results*: methodical conditions defined development speed-strength. Revealed significant changes in terms of the development of power-speed after applying the proposed method of training. Hit run handball throws the ball with 7 meters at best point guards (4.9 ball) and welterweight (4.6 ball) players, and the lowest at the extremes (4.4 ball) and linear (4.4 ball) players. Analyzing the accuracy of the shots from a 9-meter mark, found no significant differences between the mean values are not established. *Conclusions*: Exercise speed-strength of character necessary to carry out the preparatory and in the early part of the basic training. Handball is recommended to use individual tasks to improve the general and special speed-strength training.
Keywords: handball, team, playing roles, integrated control, tests, speed-strength.

Introduction

Analyzing progress of sport games status in Ukraine we cannot but agree with V.A. Zaporozhanov [4], G.A. Lisencuk [9], V.Ya. Ignatyeva [5], who say that there is an acute demand in using of scientifically grounded modern methods of sport training's control.

Great number of scientists recognize that there is non compliance of sport games' level in Ukraine with world level and national interests and demands [1-4, 6, 7, 14]. Among many reasons they mention the main one – insufficient organizational and methodic maintenance of trainings, including absence of scientifically grounded system of complex control that worsens managing of training of country's sport teams [8, 10, 13, 15, 16].

In competitions sportswomen function in conditions of constant quick changes of conflict game's situations. L.A. Latyshkevich, I.Ye. Turchin [8], Matthys S.P.J. [17], Moesch K. [18] affirm that organism is influenced by extreme by value and duration loads, which require mobilization of all handball players' skills andy ability to demonstrate them in variable situations. It witnesses that physical fitness alongside with technical-tactic level is one of the most important components of training process's building. Alongside with it insufficient level of female handball players' physical fitness prevents from effective mastering of technical tactic actions and does not permit effectively realize them in competition functioning [7, 10, 11, 12, 17-20].

Significant part of works, devoted to hand ball, is connected with studying of technical-tactic fitness of highly qualified handball players. To less extent there exist researches, devoted to complex studying of handball players' physical fitness.

That is why development of methodic of speed-power qualities' training and complex control over their level among highly qualified female handball players, condition urgency of our research.

Purpose, tasks of the work, material and methods

The purpose of the research is to ground methodic of training and control of level of speed-power qualities of female highly qualified handball players.

Material and methods: the contingent of the research included handball players of women team of Ukrainian super league "Dnieprianka", Kherson. Most of sportswomen are candidate masters of sports and masters of sports in handball, participants of European cup competitions, who are the members of main three Ukrainian teams. We involved sportswomen of main and reserve team staff, 24 persons in total. They were 8 half middle players, 7 end players, 5 – linear and 4 ball handlers. Half of sportswomen were students of Kherson state university.

We applied a number of common methods of pedagogic experiment and some special, videlicet: testing of handball players' speed power qualities.

Results of the research

Organization of the research stipulated theoretical, experimental and analytical directions, which were combined in organizational structure, consisting of four stages.

At first stage (September – October 2012) by data of literature sources we generalized experience of advanced specialists in handball as well as comprehensively studied status of speed-power fitness of handball sportswomen. As a result there appeared demand in perfection of speed-power fitness of qualified handball players.

At the same stage we worked out complex of tests and carried out pedagogic testing for determination of initial level of speed-power fitness.

The second stage (November 2012) was connected with analysis of structure of highly qualified female handball players' training. With the help of complex testing we determined the level of sportswomen's speed-power fitness.

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The tasks of third stage (January – March 2013) implied introduction of methodic of female handball players' speed-power qualities' training in training proves of women handball team "Dnieprianka".

The forth stage (March- April 2013) was connected with processing of the received data, with foundation of purposefulness and effectiveness of the offered methodic application on the base of worked out complex of tests at different stages of training.

In modern handball speed-power qualities remain to be of first priority. It is connected with the fact that in course of competition functioning, during game, sportsman fulfills great number of jumps, jerks, accelerations, which would be impossible without significant speed-power fitness.

According to the above mentioned we determined the level of speed-power fitness at the beginning of experiment, before application of special methodic for development of this fitness.

Analyzing the received results we can note that at the beginning of experiment higher results in 30 meters run were demonstrated by end players (M ± m = 4.5 ± 0.1 sec), a little lower results were shown by ball handlers and half middle players, the lowest were of linear players (M ± m = 4.8 ± 0.2). It is explained by the fact that in competition functioning exactly end players fulfill the highest quantity of quick jerks, which require high speed and speed-power qualities.

Analysis of jump tests showed that practically in all exercises, results of end and half middle players significantly differed from results of ball handlers and linear players. Only in test high jump from the spot by methodic of Abalakov half middle players yielded end players (M ± m = 43.3 ± 0.7cm and M ± m = 46.2 ± 0.5cm accordingly). In general there exists clear regularity, implying that with increasing of anthropometric indicators sportswomen's indicator of jump exercises also increase.

Studying and comparing results of tests, connected with evaluation of upper limbs' speed-power qualities, videlicet – throwing of ball for distance from different initial positions, we can conclude that these qualities are the best among linear players: (M ± m = 14.8 ± 0.2 meters – by test "throw of filled ball in standing position" and M ± m = 10.7 ± 0.2meters – "throw of filled ball from sitting position") and ball handlers (M ± m = 14.7 ± 0.5 m and M ± m = 10.8 ± 0,2 meters accordingly); the worst results were of half middle and end players, who, in average, covered distance of M ± m = 10.4 ± 0.3 m from sitting position and M ± m = 14.5 ± 0.4 meters – from standing position. In our opinion, the received results are conditioned by game role of players.

Having determined general status of speed-power qualities we researched special speed-power fitness with the help of specially selected tests. Having analyzed tests' results we could note that end players had the highest speed on site (M ± m = 4.9 ± 0.3) as well as half-middle (M ± m = 5.2 ± 0.5sec.) a little lower were results of ball handlers (M ± m = 5.3 ± 0.3sec.) and the least results were demonstrated by linear players (M ± m = 5.8 ± 0.1sec.).

To some extent higher level of upper limbs' speed-power qualities in test "throw of handball ball from run" was demonstrated by half-middle players, a little less and practically equal - by ball handlers and linear players and the least was shown by end players. In our opinion it is connected with the fact that fulfillment of this test depends greatly on anthropometric parameters of sportswomen and specificities of competition functioning, which influence on development of certain motion skills.

Analysis of tests for accuracy, quickness and strength of upper limbs, videlicet, throws of ball at 7 and 9 meters distances for accuracy and strength showed that throws from 7 meters distance were better than from 9 meters. Distance, at which ball bounded also was bigger with throw from 7 meters. This is explained by the fact that the less is the distance to target the more accurate is throw and the higher distance is covered by the ball, the less distance it goes after hitting wall.

Results of some tests of players of different roles witness that the highest accuracy of 7 meters' throws is intrinsic to ball handlers. Less accuracy was demonstrated by half middle players and the worst – by end and linear players. Higher indicators of throw power and, accordingly, of bound distance, was shown by linear and half middle players, less power of throws was demonstrated by ball handlers and end players. A little different situation was with 9 meters' throws for accuracy: the best indicators were shown by half middle players and practically equal indicators were demonstrated by ball handlers, linear and end players. Power of these throws was identical to 7 meters' throws.

Results of complex test witness about dominating of end players (M ± m = 33.4 ± 1.5 sec.), a little less indicators were shown by ball handlers (M ± m = 35.7 ± 1.7 sec.) and low indicators were demonstrated by half middle (M ± m = 38.4 ± 1.1 sec.) and linear players (M ± m = 39.5 ± 1.8 sec.).

Generalizing testing results of special and general fitness levels we can conclude that their demonstration depends on many factors, among which the main are anthropometric parameters of sportswomen, specificities of competition functioning and handball players' movements at competitions.

Higher indicators of lower limbs' speed-power qualities were demonstrated by end and half-middle players. High values of upper limbs' speed-power qualities, demonstrated in throw exercises, characterize half middle, linear players and ball handlers.

However, it is necessary to note that results of studying of speed-power qualities points at need in application of certain methodic for perfection of female handball players' speed power fitness.

In compliance with tasks of our research we worked out and implemented methodic of development of highly qualified female handball players' speed-power qualities. This methodic included certain complexes of exercises of

different orientation with different loads. Also we analyzed in detail and specified certain methodic conditions for development of speed-power qualities.

In the course of our research, in season, in breaks between tours of Ukrainian championship, connected with participants of combined team in selective competitions for world championship, we applied our methodic of trainings. Most of offered by us exercises were fulfilled in preparatory and sometimes in main parts of training. Besides, handball players were offered individual tasks on perfection of general and special speed-power fitness.

With application of the worked out methodic all female handball players fulfilled all offered exercises practically equally, however, in some cases we accentuated development of quality, which was dominating for a certain sportswoman.

On completing of experimental part of our work we carried out repeated testing for determination of speed-power fitness after application of our methodic. Results of testing of general speed-power fitness are given in table 1.

Table 1

Indicators of general speed-power fitness of female handball players after implementation of the worked out methodic

Test	Game role			
	Ball handlers M ± m	Half middle players M ± m	End players M ± m	Linear players M ± m
30 meters run, sec.	4.4±0.2	4.5±0.1	4.3±0.1	4.7±0.3
High jump from the spot, cm	49.7±0.2	50.1±0.4	55.0±0.2	44.6±0.9
Long jump from the spot, cm	225.2±2.4	231.2±1.5	225.4±1.1	222.3±0.7
High jump from the spot, cm	262.2±2.4	260.5±1.8	251.4±2.2	257.2±1.9
Jumps in series (times)	8.8±0.2	9.2±0.5	8.1±0.2	8.6±0.1
Ling jumps from three steps, cm	504.8±3.5	495.1±1.6	488.2±2.5	481.4±1.9
Throw of filled ball from behind head (standing), m	15.8±0.2	15.7±0.2	14.9±0.1	15.9±0.1
Throw of filled ball from behind head (sitting), m	12.2±0.1	11.8±0.2	11.9±0.3	12.4±0.3

Analyzing results of repeated testing we can note that positive changes took place in practically all tests. For example the best indicators of 30 meters' run were demonstrated by end players (M ± m = 4.3 ±0.1 sec.), and the worst – by linear players (M ± m = 4.7 ± 0.3 sec.).

Studying of speed-power qualities in jump exercises showed that be test of Abalakov the best values were shown by end players (M ± m = 55.0 ± 0.2 cm), and the worst – by linear players (M ± m = 44.6 ± 0.9 cm). In test long jump from the spot the highest results were demonstrated by half middle players (M ± m = 231.2 ± 1.5 cm), practically equal results ball handlers and end players had and the worst results were shown by linear players (M ± m = 222.3 ± 0.7 cm). In test high jump the best result belonged to ball handlers and half middle players (M ± m = 262.2 ± 2.4 cm and M ± m = 260.5 ± 1.8 cm accordingly); indicators of linear players differed insignificantly. In connection with not very high growth, the leas indicators in this test were shown by end players (M ± m = 251.4 ± 2.2 cm). The trend to all handlers' dominating was registered also in test long jumps from three steps. The worst indicators were demonstrated by linear players. Results of jump endurance's testing proved that half middle players fulfill, in average, M = 9.2 skips, ball handlers - M = 8.8, linear players M = 8.6 and end players – 8.1 skips.

Analyzing indicators of upper limbs speed-power abilities we determined domination of linear players in both tests. Results of half middle players and ball handlers do not differ significantly between each other. Achievements of end players were not significant. It is explained by the fact that in process of competitions linear players often have to enter power fight for position and, consequently, they fulfill significant quantity of exercises for progressing of required for it qualities.

Having determined the level of general speed power fitness and researched its manifestation in players of different game roles we carried out identical studying of special speed-power fitness of female handball players and presented the results of it in table 2.

Table 2

Indicators of special speed-power fitness of female handball players after implementation of the worked out methodic

Test	Game role			
	Ball handlers M ± m	Half middle players M ± m	End players M ± m	Linear players M ± m
30 meters' run with dribbling, sec.	4.8±0.2	4.8±0.4	4.6±0.1	5.1±0.1
Complex test, sec.	32.4±1.8	34.1±0.6	32.1±0.7	36.2±1.2
Handball ball's throw from run, m	45.2±1.7	46.1±1.2	40.2±1.4	42.7±1.1
7 meter' handball ball's throw for accuracy (q-ty of points)	4.9±0.1	4.6±0.3	4.4±0.1	4.4±0.3
7 meter' handball ball's power throw , m	7.5±0.3	7.6±0.2	6.6±0.4	7.4±0.3
9 meter' handball ball's throw for accuracy (q-ty of points)	4.3±0.2	4.3±0.1	4.1±0.4	4.0±0.1
9 meter' handball ball's power throw , m	5.5±0.2	5.1±0.5	4.6±0.4	5.3±0.2

Results of after experiment testing showed the speed of 30 meters run with dribbling was increased by all handball players, with the least indicators belonging to end players (M ± m = 4.6 ± 0.1 sec.), and the highest – to linear players (M ± m = 5.1 ± 0.1 sec.). Speed power qualities by complex test were characterized by equally high values of ball handlers and end players and by low values of linear players.

Accuracy with 7 meters handball ball's throws was better among ball handlers (M ± m = 4.9 ± 0.1 points) and half middle players (M ± m = 4.6 ± 0.3 points); the lowest accuracy was demonstrated by end players (M ± m = 4.4 ± 0.1) and by linear players (M ± m = 4.4 ± 0.3). Analyzing accuracy of 9 meters handball ball's throws we determined that there were no significant differences between mean values.

Comparing the strength of throw and, accordingly, distance of bound from wall we can note that at distance of 7 meters results were nearly equal, while at 9 meters distance we registered expressive dominating of ball handlers and linear players.

Conclusions:

Summarizing our results we should note that there is a clear interconnection between peculiarities of motion functioning during competitions and requirement for female handball players to demonstrate certain motion skills. For example, in most cases end players finalize quick attack and they have to demonstrate significant speed-power endurance, videlicet – high start speed. That is why, as a rule, this category of sportswomen is characterized by not long height, but by ability to fulfill great quantity of accelerations and jerks.

Half middle players and ball handlers fulfill in competition functioning great number of throws to goal in spite of blocking by adversaries; that is why female handball players of this game role have significant length of body and lower limbs' speed power abilities. It also reflects in high results in jump exercises.

Linear players have to enter in power fights with adversaries. That is why they are characterized by significant speed-power qualities of upper limbs and by domination of power fitness.

In the whole results of the researches point at substantial changes in indicators of speed-power qualities after application of the offered methodic of trainings.

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STUDY OF THE EFFICIENCY USE OF PHYSICAL REHABILITATION IN PATIENTS WITH CHRONIC GASTRITIS

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Annotation. *Purpose:* to make physical rehabilitation program for patients with chronic gastritis type B, promotes normalization of gastric secretory function and prolong the period of remission. Objectives of the study was to assess the dynamics of gastric secretory function and functional status of the autonomic nervous system in patients with the chronic gastritis type B. *Material:* the study involved 37 women with a diagnosis of the chronic gastritis type B, increased acid gastric function. *Results:* it was established the positive influence of corrective exercises for the lower thoracic and lumbar spine, regulated breathing exercises based on the tone of the autonomic nervous system in combination with massage and diet therapy on the state of gastric secretory function. *Conclusions*: it is recommended to carry out therapeutic physical culture in the form of morning hygienic gymnastics, therapeutic exercises, self-study.
Keywords: physical rehabilitation, chronic gastritis, gastric secretory function.

Introduction

Chronic gastritis (CG) is a chronic pluricausal inflammation-dystrophic disease of stomach's mucosa with disordering of cells' regeneration and progressing atrophy of stomach epithelium. CG is of the following kinds: A-auto-immune CG, B – bacterial, C – chemically conditioned and special (rear) forms of CG (eosinophilic, granulomatous, lymphocyte, radiation and caused by some infections) [8, 13, 14, 20].

Analysis of rehabilitations of CG patients permitted to determine that in rehabilitation treatments' system important place is taken by therapeutic physical culture, massage, diet therapy. They permit to weaken disease, strengthen immunity and organism's responsiveness [7, 15, 18, 19]. With chronic gastritis therapeutic physical culture methodic (TPC) of I.I. Parkhotic (2003), S.N. Popova (2005, 2008), V.A. Yepifanova (2006) et al. [1, 5, 9, 11, 16, 17] are used. At rehabilitation stages the following TPC form are applied: morning hygienic exercises, Terrainkur, walking, dozed run, outdoor games (volleyball, badminton, tennis), swimming,, rowing, skiing. However, existing programs of physical rehabilitation do not consider significant influence of vegetative innervations on secretory function of stomach. Normalization of stomach's secretory function happens just after application of TPC means and is not durable. In literature there is no information about combined application of massage and physical exercises with this disease. Thus, all listed above conditions demand in working out and evaluation of effectiveness of new rehabilitation program, which would facilitate normalization of stomach's secretory function and achievement of steady remission of B-type chronic gastritis.

The work has been fulfilled by direction of priority according to Law of Ukraine "On Directions of priority in development of science and engineering", number 3.5. "Sciences about life, new technologies of prophylaxis and treatment of the most frequent diseases" in frames of topic of protity 3.5.29. "Creation of standards and technologies of healthy life style's implementation, technologies of increasing of food's safety and quality".

Purpose, tasks of the work, material and methods

The purpose of the research is to create program of physical rehabilitation for patients with chronic B-type gastritis, which would facilitate normalization of stomach's secretory function and prolongation of remission period.

The tasks of the research were evaluation of dynamic of stomach secretory function's indicators, functional status of vegetative nervous system of patients with chronic B-type gastritis.

The methods of the research: our researches were conducted from September 2013 to March 2014 in Kharkov municipal students' hospital. Clinic examination of 37 women with chronic B-type gastritis and increased acid forming stomach's function was the base of our research. They were divided in two groups: main group (MG – 19 patients) and control one (CG – 18 patients). Mean age of main group patients was 38.9±0.8 years old and in control group – 39.4±0.6 years old. By quantity of patients, age and presence of diagnosed pathology main and control groups were homogeneous.

For evaluation of rehabilitation measures' effectiveness we used results of tests of stomach's secretory function with the help of ph-metering with acid gastro-meter AGM-05K Gastroscan-5; also we used indicators of vegetative nervous system's functional condition, measured with the help of ortho- and clinostatic tests [6, 10, 12]. The received data were processed by mathematical statistic's methods with the help of certified software STATISTICA-6,0.

Results of the research

Primary examination was conducted before physical rehabilitation course. Patients of both groups showed disorders of stomach's secretory function in form of hyper-acidity in combination with continuous acid forming (see table 1).

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Table 1

Indicators of stomach secretion during primary examination (M±m)

Indicators	Secretion	Norm	Groups		t	p
			MG, n=19	CG, n=18		
Condition of acid formation in stomach	On an empty stomach	1.6-2.0	1.28±0.06	1.23±0.05	0.57	>0.05
	stimulated	1.2-2.0	1.07±0.03	1.07±0.04	0.08	>0.05

With ortho and clinostatic tests we found increased activity of parasympathetic section of VNS (57.9% of MG patients and 55.6% of CG patients.

For prolongation of remission period of chronic B-type gastritis and normalization of stomach's secretory function we worked out and applied in main group complex program of physical rehabilitation. Including therapeutic physical culture, massage and diet therapy. TPC was carried out in forms of morning hygienic exercises, therapeutic gymnastic, independent trainings. The basis of therapeutic gymnastic complexes were general physical exercises, exercises for correction of backbone (mainly lower thoracic sand lumbar spines) and dozed breathing exercises, considering VNS tonus, executed in relaxed state and in walk. At poly-clinical stage in main group we applied therapeutic massage by methodic of P.B. Yefimenko (2013) [2]. At poly-clinical stage in control group we applied TPC by methodic of O.I. Parkhotik (2003) and therapeutic massage by methodic of L.A. Kunichev (1985) [4, 9]. Diet therapy was recommended to both groups' patients – table No.16 by M.I. Pevzner with four meals a day [3]. Considering remission period of main disease, both groups' patients were not cured with medicine [13, 15].

After 4 months of physical rehabilitation certain changes took place in general condition of both groups' patients. During repeated examination we found improvement of stomach's secretory function of both groups. Patients (see table 2). Patients of main group showed normalization of acid forming on empty stomach and stimulated: accordingly 1.65±0.04 and 1.46±0.04 ($p<0.05$). In control group improvement of acid forming function also took place, but stimulated secretion did not reached normal values. Besides, with repeated examination in MG normal acidity was diagnosed in 13 patients (68.4%), in CG – in 6 patients (33,3%); in MG stimulated acidity was found in 18 patients (94.7%), in CG – in 9 patients (50.0%).

Table 2

Indicators of stomach secretion during primary and repeated examinations in main and control groups (M±m)

Indicators	Secretion	Norm	Periods of examination		t	p
			Primary examination	Repeated examination		
Main group (n=19)						
Condition of acid formation in stomach	On an empty stomach	1.6-2.0	1.28±0.06	1.65±0.04	5.53	<0.05
	stimulated	1.2-2.0	1.07±0.04	1.46±0.04	10.9	<0.05
Control group (n=18)						
Condition of acid formation in stomach	On an empty stomach	1.6-2.0	1.23±0.05	1.45±0.04	3.35	<0.05
	stimulated	1.2-2.0	1.07±0.04	1.16±0.03	6.59	<0.05

When comparing repeated indicators of acid forming on empty stomach and stimulated one we found statistically significant improvement of main group's indicators in comparison with control group that witnesses about more substantial influence of the offered physical rehabilitation program on stomach's secretory function of main group's patient (see table 3).

Table 3

Comparative characteristic of stomach secretion's indicators of main and control groups' patients during repeated examination
(M±m)

Condition of acid formation in stomach	Groups		t	p
	MG, n=19	CG, n=18		
On and empty stomach	1.65±0.04	1.45±0.04	3.62	<0.05
Stimulated	1.46±0.04	1.16±0.03	5.37	<0.05

Application of physical rehabilitation means resulted in changes of functioning of vegetative nervous system's sympathetic and parasympathetic sections. For example, balance of both VNS sections was registered in 73.7% of main group's patients and in 22.2% of control group's patients. Parasympathetic thonium took place in 10.5% of MG patients and in 61.1% of CG patients (see fig.1). Thus, application of dozed breathing, considering activity of VNS parasympathetic an sympathetic sections facilitated progressing of aethonium of main group's patients that, in its turn, facilitated normalization of stomach's secretory function Condition of acid formation in stomach [8, 13].

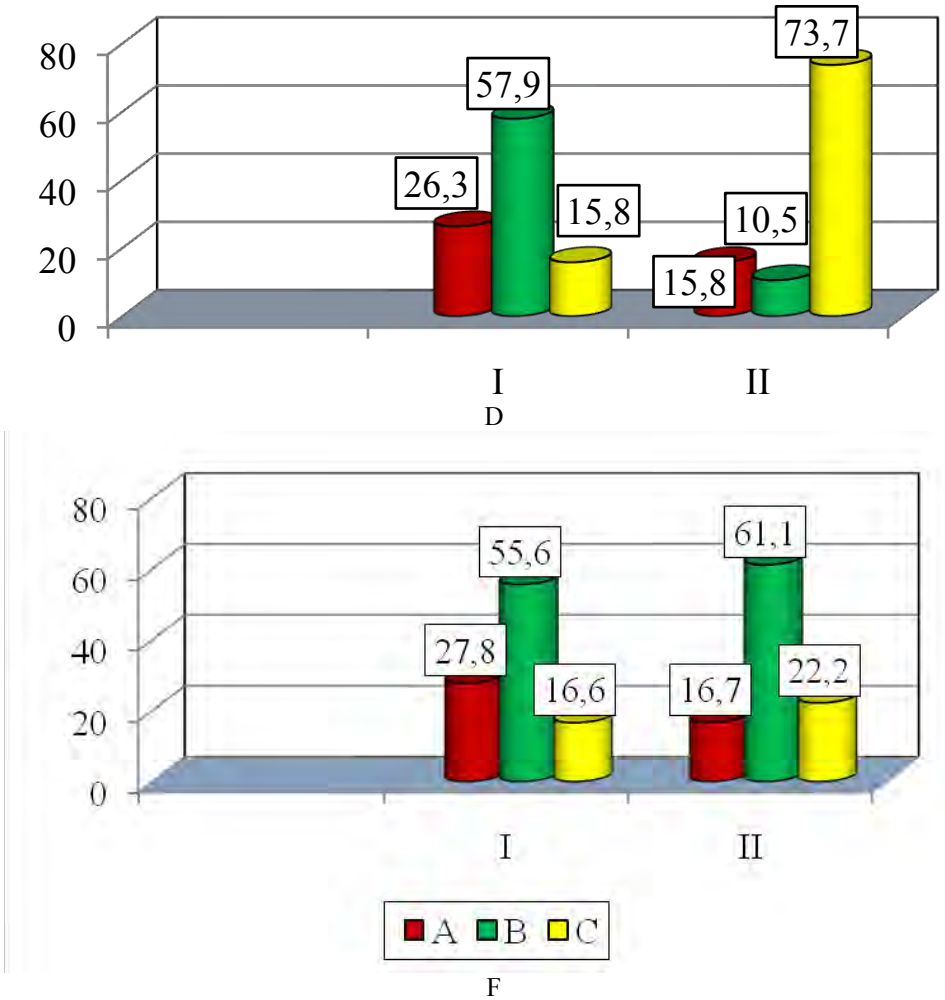

Fig.1. Activity of VNS sections of both groups' patients in repeated examination (%): I –primary examination; II – repeated examination;
A –sympathetic thonium, B – parasympathetic thonium; C – aethonium;
D –main group; F – control group

Conclusions:

For normalization of stomach's secretory function in case of chronic B-type gastritis it is recommended to include in complexes of therapeutic gymnastic and independent trainings correcting physical exercises for backbone (mainly low thoracic and lumbar spines), dozed exercised, considering tonus of VNS in combination with therapeutic massage and diet therapy.

The prospects of further researches imply grounding, development and evaluation of effectiveness of physical rehabilitation program for patients with chronic A-type gastritis.

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ANALYSIS OF THE EFFECTIVENESS OF PHYSICAL REHABILITATION ACCORDING SPIROGRAPHIC INDICATORS IN COMMUNITY-ACQUIRED PNEUMONIA DURING CONVALESCENCE

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Annotation. *Purpose*: to make a program of physical rehabilitation for convalescents after community-acquired pneumonia, promotes normalization of respiratory function. The objectives of the study was to evaluate the dynamics spirographic indicators during convalescence community-acquired pneumonia. *Material:* the study involved 28 women aged 19 to 24 years with a diagnosis of community-acquired pneumonia after convalescent. *Results:* the positive influence of physiotherapy based dance aerobics; morning hygienic gymnastics; therapeutic massage and physical therapy on indicators of lung volumes, ventilation and bronchial patency according spirographic research. *Conclusion:* in community-acquired pneumonia during the convalescence period recommended physical rehabilitation, which includes curative gymnastics based on dance aerobics, morning hygienic gymnastics, massage therapy, physiotherapy. It improves the functionality of the cardiorespiratory system, nonspecific immunity and overall physical performance level.

Keywords: physical rehabilitation, community acquired pneumonia, spirographic indicators.

Introduction

Pneumonia is a pluricausal epicenter of lungs' disease with involving of respiratory systems and compulsory presence of internal alveoral inflammation excudation in pathological process [2, 3, 4, 12, 16, 19, 20]. 3Morbidity for pneumonia among adult population of developed countries is 3-16% a years; with it by estimation of specialists, approximately 60% of cases remain not diagnosed [5, 6, 7]. In connection with existing situation, in 2001 American and Canadian thoracic society as well as Centers of control and prophylaxis of morbidity in USA offered new recommendations on diagnostics and antibiotic therapy of pneumonia [15, 17]. But only with the help of antibiotic therapy it is impossible to quickly liquidate inflammation process in lungs, unfavorable progressing of pneumonia and complications after it. For complete rehabilitation of respiratory organs' morphological structure and functions, activation of cardio-vascular and other organism's systems, adaptation to physical loads it is compulsory to apply means of physical rehabilitation in recovery period. But among great number of scientific works, devoted to physical rehabilitation with pneumonia we could not find commonly accepted methodic of therapeutic gymnastic and therapeutic massage. The existing methodic do not consider functional condition of respiratory and vegetative nervous systems as well as tolerance of patients' cardio-vascular system to physical loads. There are contradictory data concerning application of methodic of control and regulation of physical loads in respect to general status of recovery after pneumonia, i.e. there is no optimal pedagogic control in the process of therapeutic gymnastic [9, 11, 13].

Thus, all above mentioned condition demand in working out and evaluation of physical rehabilitation's program, which would facilitate recreation of functional condition of respiratory system and increasing of physical workability in process of recovery after pneumonia.

The work has been fulfilled as per priority direction, in compliance with Law of Ukraine "On Priority directions of science and engineering's development", number 3.5. "Sciences about life, new technologies of prophylaxis and treatment of most frequent diseases" within topic of priority 3.5.29 "Forming of standards and technologies of healthy life style, technology of increasing of food's quality and safety implementation".

Purpose, tasks of the work, material and methods

The purpose of the research: to produce program of physical rehabilitation for recovering persons after not hospital pneumonia, which would facilitate normalizing of indicators of external breathing.

The tasks of the research were evaluation of dynamic of spirography's indicators during recovery after not hospital pneumonia.

The methods of the research: we carried out the research from September 2013 up to March 2014 on the base of Kharkiv municipal student's hospital. Clinic-functional examinations of 28 women of age from 19 to 24 years old, who recovered after not hospital pneumonia, were the base of our researches. All participants were divided in two groups: main group 2 14 persons (mean age 2-.11 years old) and control group – 14 persons (mean age – 20.15 years old).

Function of external breathing was researched with the help of spirography's data (we determined breathing volume (BV), vital capacity of lungs (VCL), frequency of breathing (FB), minute volume of breathing (MVB), maximal ventilation of lungs (MVL), forced vital capacity of lungs (forced VCL) and maximal volume speed of breathing at inhale and exhale ($Vi_{nh,}$ $V_{exh.}$)) and with the help of hypoxic tests: Tests of Stange and Genchy [10]. In the researches we used instrumental-programmed complex SPIROCOM (made in National sero-space university "KhAI" and STC of radio-electronic medical devices and technologies "KhAI-MEDICA", Kharkiv).

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Results of the research

Primary examination of recovering patients after not hospital pneumonia was carried out during 2-4 days after their discharging form hospital. Primary spirographic examination showed that the passed infiltrated processes in lungs of the examined patients resulted in reducing of some external breathing's indicators. As we can see in table 1both patients of main and control groups had reduced indicators of lung volumes and lung ventilation (MVL,B, FB, $Vi_{nh,}$ $V_{exh.}$)

Increasing of FB in both groups has compensating character in connection with progress of pathological process in lings and decreasing of functioning lung tissue. Indicators VCL and BV of both groups' women were within normal values, but at lower limit of norm that can result from low physical condition or pathological infiltrating process in lungs. Increasing of MVB up to 6.30±0.16 l/min in main group and up 6.28±0.05 l/min. in control group is connected with mobilization of compensatory mechanisms (hyper-ventilation is physiological defense against hypoxia), resulted form pathological process in lungs.

Table 1

Spirographyc indicators of main and control groups' patients received at primary examination (M±m)

Indicators	Norm	Groups		t	p
		Main group, n=14	Control group, n=14		
Breathing frequency (BF) inh/exh p.min.	6-18	18.64±0.29	18.71±0.22	0.20	>0.05
Vital capacity of lungs (VCL), l	2.50-4.00	2.66±005	2.59±0.05	0.93	>0.05
Forced VCL, l	2.20-3.70	2.42±0.07	2.42±0.06	0.02	>0.05
Maximal ventilation of lungs (MVL), l/min	50-70	60.99±1.28	60.43±1.16	0.32	>0.05
Minute volume of breathing (MVB), l/min.	3.50-5.00	6.30±0.16	6.28±0.05	0.11	>0.05
Breathing volume (BV), ml	300-900	336.43±6.08	347.71±3.15	1.65	>0.05
Speed of inhale (Vinh.), l/sec.	35-5.0	3.01±0.07	2.94±0.02	0.96	>0.05
Speed of exhale (Vexh.) l/sec.	33-4.2	2.88±0.02	2.84±0.03	1.18	>0.05

Low indicators of volume speed of forced inhale and exhale (3.01±0.07 l/sec in MG and 2.94±0.02 l/sec. in CG)) are after effects of reducing of breathing muscles' potentials of recovering patients after pneumonia. Indicators of forced VCL and MVL in main and control groups was within norm that witness about absence of disorders in nervous regulation of external breathing's function, worsening of bronchial permeability, decreasing of lung tissue's elasticity and reducing of respiratory system's energetic potential.

Researching indicators of hypoxic tests we came to conclusion that they were reduced owing to progressing of recovering patients' asthenic-vegetative syndrome after pneumonia: time of pause after inhale in main group was 16.79±0.22 sec. and 16.50±0.25 sec. in control group ($p>0.05$). Pause after exhale in main group was 14.37±0.23 sec. and in control – 14.44±0.18 sec. ($p>0.05$).

For increasing of cardio-respiratory system's functional condition, strengthening of breathing muscles, increasing of chest and diaphragm's excursion, increasing of vital capacity of lungs, normalization of breathing and ventilation of lungs, increasing of non specific immunity, improvement of psycho-emotional status of patient and rising of general physical workability's level, in main group we applied program of physical rehabilitation, which included therapeutic gymnastic on the base of dance aerobic; morning hygienic exercises; therapeutic massage by P.B. Yefimenko's methodic (2013) [8]; sauna therapy for training of temperature regulating, adaptation mechanisms.

Physical load in attenuated, attenuating-training and training motion modes was dozed by complexity of movements, quantity of repetitions, amplitude, speed of fulfillment.

In attenuated motion mode we used general developing exercises for all muscular groups in combination with exercises for strength and flexibility in order to prepare muscular-ligament system and cardio-vascular system for higher physical loads; exercises for vestibular system; for balance; exercises with ball and gymnastic rod with not full and then with full amplitude with moderate speed, from initial positions "standing", "walking", "sitting on floor" on base of aerobic. Quantity of repetitions of every exercise was 10-14 times. Muscles of girdle and torso were accentuated.

After 0.5 month, with sufficient increasing of general physical workability, patients started to train in *attenuating-training mode.*

In attenuating-training mode we used exercises for upper limbs and girdle, neck, torso with elements of aerobic, with full amplitude, at moderate speed and quantity of repetitions – 8-16 times; exercises for coordination and for improvement of vestibular system; dozed breathing exercises in walking, considering activity of vegetative nervous system; pauses for rest and relaxation exercises; run, jumps and hops.

In training mode we used exercises for upper limbs and girdle's muscles, for neck and torsi with element of aerobic and with full amplitude at moderate and quick speed, with quantity of repetitions 12-16-30 times; exercises for coordination and vestibular system; dozed breathing exercises in walking, considering activity of vegetative nervous system; pauses for rest and relaxation exercises. All physical exercises were fulfilled from initial positions "sitting on floor" and "standing". When composing complexes of TPC we accentuated combining of different, earlier mastered exercises in choreographic compositions; change of temp, rhythm, direction and amplitude of movements.

With aerobic training in attenuated and attenuating-training modes we used rhythmic music of "foxtrot", "Charleston", "tango", Latin-American rhythms ("cha-cha-cha", "samba", "rumba"); in training mode we applied quicker music in "disco", "rock-n-roll", "brake-dance" style[14].

In control group patients practiced therapeutic physical culture by methodic of S.M. Popov (2005, 2008) [9, 13], they passed turpentine bath therapy; mineral wax applications on inter blade area and therapeutic massage by methodic of A.A. Biriukov (2004) [1].

Repeated examination of recovering patients was carried out after application of physical rehabilitation programs during two months. Testing of external breathing's function showed improvement of spirographic indicators in main and control groups, which resulted from application of physical rehabilitation means (see table 2). For example in main group FB reduced from 18.64±0.29 to 9.86±0.29 inh/exh/p.min., in control group from 18.71±0.22 to 12.43±0.34 inh/exh/p.min., that witness about reducing of asthenic-vegetative syndrome and about improvement of respiratory system's condition ($p<0.001$). Application of complex physical rehabilitation program resulted in statistically significant increasing of VCL in main group by 24.4% (in control – by 17.8%) and increasing of BV from 336.43±6.08 to 480.29±11.28 ml in MG (in CG - from 347.71±3.15 to 437.57±8.17 ml) that is after effect of increasing of lung tissue's elasticity and reducing of chest's rigidness.

Table 2

Spirographyc indicators of main and control groups' patients received at repeated examination (M±m)

Indicators	Norm	Primary examination	Repeated examination	t	p
1	2	3	4	5	6
Main group, n=14					
Frequency of breathing (FB), inh/exh/p.min	6-18	18.64±0.29	9.86±0.29	21.31	<0.001
Vital capacity of lungs (VCL) l	2.50-4.00	2.66±0.05	3.31±0.04	10.1	<0.001
Forced VCL, l	2.20-3.70	2.42±0.07	3.14±0.07	7.03	<0.001
Maximal ventilation of lungs (MVL), l/min	50-70	60.99±1.28	64.83±0.86	2.50	<0.05
Minute volume of breathing (MVB), l/min.	3.50-5.00	6.30±0.16	4.40±0.10	10.33	<0.001
Breathing volume (BV), ml	300-900	336.43±6.08	480.29±11.28	11.23	<0.001
Speed of inhale (Vinh.), l/sec.	3.5-5.0	3.01±0.07	4.34±0.08	12.61	<0.001
Speed of exhale (Vexh.) l/sec.	3.3-4.2	2.88±0.02	3.72±0.06	12.49	<0.001
Control group, n=14					
Frequency of breathing (FB), inh/exh/p.min	6-18	18.71±0.22	12.43±0.34	15.41	<0.001
Vital capacity of lungs (VCL) l	2.50-4.00	2.59±0.05	3.05±0.06	5.59	<0.05
Forced VCL, l	2.20-3.70	2.42±0.06	2.88±0.06	5.92	<0.05
Maximal ventilation of lungs (MVL), l/min	50-70	60.43±1.16	61.31±1.11	0.55	>0.05
Minute volume of breathing (MVB), l/min.	3.50-5.00	6.28±0.05	5.08±0.09	12.12	<0.001
Breathing volume (BV), ml	300-900	347.71±3.15	437.57±8.17	10.26	<0.001
Speed of inhale (Vinh.), l/sec.	3.5-5.0	2.94±0.02	3.50±0.04	12.23	<0.001
Speed of exhale (Vexh.) l/sec.	3.3-4.2	2.84±0.03	3.41±0.04	12.92	<0.001

After application of physical rehabilitation means forced VCL of recovering after pneumonia patients increased in MG from 2.42±0.07 to 3.14±0.07 l ($p<0.001$) and in CG – from 2.42±0.06 to 2.88±0.06 l ($p<0.05$) as a result of airs resistance decreasing in thin bronchi. Increasing of MVL up to 64.83±0.86 l/min in main group and up to

61.31±1.11 l/min. in control groups ($p<0.05$) witnesses about improvement of external breathing's functional and energetic potentials, its nervous regulation and lungs tissues' elasticity.

MVB statistically significantly reduced in main group from 6.30±0.16 to 4.40±0.10 l/min, in control group from 6.28±0.05 to 5.08±0.09 l/min. Owing to reduction of hyperventilation, which is a physiological defense against hypoxia with pneumonia.

In both groups we registered statistically significant increasing of volume speed of forced inhale and exhale as a result of respiratory tracts permeability's improvement and increasing of breathing muscles' potential.

When comparing repeated indicators of external breathing's function in MG and CG we determined statistically significant improvement in main group that witness about effectiveness of complex physical rehabilitation in its influencing on respiratory system's functional condition (see table 3).

Table 3

Spirographic indicators of main and control groups' patients, received at repeated examination (M±m)

Indicators	Norm	Groups		t	p
		MG, n=14	CG, n=14		
Frequency of breathing (FB), inh/exh/p.min	6-18	9.86±0.29	12.43±0.34	5.69	<0.05
Vital capacity of lungs (VCL) l	2.50-4.00	3.31±0.04	3.05±0.06	3.55	<0.05
Forced VCL, l	2.20-3.70	3.14±0.07	2.88±0.06	2.70	<0.05
Maximal ventilation of lungs (MVL), l/min	50-70	64.83±0.86	61.31±1.11	2.51	<0.05
Minute volume of breathing (MVB), l/min.	3.50-5.00	4.40±0.10	5.08±0.09	5.20	<0.05
Breathing volume (BV), ml	300-900	480.29±11.28	437.57±8.17	3.07	<0.05
Speed of inhale (Vinh.), l/sec.	3.5-5.0	4.34±0.08	3.50±0.04	9.72	<0.001
Speed of exhale (Vexh.) l/sec.	3.3-4.2	3.72±0.06	3.41±0.04	4.24	<0.05

Repeated hypoxic tests resulted in determination of statistically significant increasing of pause period after inhale/exhale in main group. In control group dynamic of these indicators was insignificant. Besides, in main group results of Shtage's test were "satisfactory" and results of Genchy's test – "good". Comparing indicators of hypoxic tests of MG and CG after repeated examination we came to conclusion that in main group inhale/exhale pause was longer than in control group ($p<0.001$).

Conclusions:

For improvement of cardio-vascular system's potentials, strengthening of breathing muscles, increasing of chest and diaphragm's excursion, normalization of breathing process and lungs' ventilation, increasing of non specific immunity, improvement of psycho-emotional status and general physical workability in recovery period after not hospital pneumonia it is recommended to apply physical rehabilitation program, which included therapeutic gymnastic on base of dance aerobic; morning hygienic exercises; therapeutic massage by P.B. Yefimenko's methodic (2013); sauna therapy.

The prospects of further researches imply analysis of dynamic of cardio-vascular system's response to physical load in process of physical rehabilitation of recovering patients after not hospital pneumonia.

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MODEL TRAINING OF FUTURE SPECIALISTS IN HUMAN HEALTH TO STRENGTHEN THE USE OF HEALTH TECHNOLOGIES

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Annotation. *Purpose*: develop a model of scientific and methodological training of future specialists in human health to strengthen the use of health technologies. *Material*: processed more than 100 literary sources. *Results*: analyzed the methodological, organizational and educational and training aspects of the training of future specialists in human health. On the basis of scientific modeling, the basic structural components of the model of professional training of future specialists, are characterized by their nature and relationship. Theoretical basis to ensure a high level of training future specialist is an integral concept of professionalization based on the theoretical and methodological basis of its essence. *Conclusions*: it is proved that the effectiveness of training future specialist determined holistic concept of professionalization and relevant scientific and methodological support of the educational process.
Keywords: model, training, experts, health, man.

Introduction

The current process of Ukraine's accession to the European education and research area is associated with increased requirements for the training of future specialists. Global changes that have gradually accumulated, led to a reorientation of the educational direction and formation of a new paradigm of education outcome. A characteristic feature of the current trends in education is a focus on the development of creativity, independence, competitiveness, mobility, future professionals, including human health, on the effectiveness of training which largely depends on the quality of health services.

The training of future specialists in human health should be seen as an integrated system that reflects the objective trends in the development of higher education, vocational patterns of activity, place and role of the expert in her list of functions, for which he is prepared while studying at system of vocational education, the basic requirements for the content knowledge and skills necessary for successful performance of professional duties and further develop important professional and personal qualities. To optimize the training of future specialists in health, we set out to develop appropriate methodological model using the method of scientific modeling, which allows to identify the most significant structural components are based on an analysis of methodological, organizational and educational characteristics of the process of training future of health professionals to use health strengthening technologies.

The study was carried out according to research and development plan of Department of “Human health and physical rehabilitation” of Physical Education Institute of Sumy State Pedagogical University of A.S. Makarenko under the topic "Theoretical and methodological, organizational and methodological problems of health, physical rehabilitation and correctional pedagogy" (№ 0107U002826).

Purpose, tasks of the work, material and methods

Goal: to develop a scientific-methodological model of professional training of future human health specialists for the usage of health strengthening technologies.

Objective: to analyze methodological, organizational and the educational features of the training process of future health specialists; consider the method of scientific modeling in the context of our research; identify key structural components of the model of professional training of human health future specialists for the usage of health strengthening technologies, uncover their essential characteristics and relationships.

Methods of research: theoretical analysis and synthesis of scientific –methodical literature on the study.

Results of the research

As you know, design emerged due to the need of solving tasks that for some reason cannot be solved directly. Some researchers finds in modeling characteristic of theoretical thinking in solving cognitive tasks. In general, the scientific (including educational) literature presented a variety definition of "model" and "modeling" according to the tasks to be solved by any research. Here are some definitions, the meaning of which, in our view, essentially corresponds to our study.

Model - a specific object created to produce and / or store information in the form of a mental image, description by symbolic means (formulas, graphs, etc.) or tangible object that reflects the properties, characteristics and relationships of the object arbitrary nature of the original, which is essential to address the subject (person) of a task [20, p. 186].

M.M. Fitsula’s scientific model defines as "semantic material presented and implemented as a system that adequately reflects the purpose of the study (e.g., simulating optimization of the training process, managing the educational process, etc.) arise as a mean of theoretical studies of pedagogical phenomena through an imaginary creation (design) life situations; helps to know the pattern of human behavior in different situations [24, p. 32].

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However, any model is formalized structure that will work only if it has semantic content. In the context of our research model, we consider how the image circuits graph of any object, process or phenomenon that is used to simplify it and opens the possibility of transferring information from model to prototype.

The training model of future professionals from health to technology with the usage of health strengthening technologies displays basic conceptual positions and educational technology. The graphic representation of training model of future professionals of human health technology with the usage of health strengthening technologies presents in Figure 1.

Conceptual provisions constitute regulatory requirements for training, methodological approaches, general didactic and specific principles of human health future specialists training.

In developing the concept, we took into account the provisions laid down in a number of international and national documents such as the Charter of the WHO (1948) Declaration of "Health-21 : Policy Framework Health for All in the WHO European Region" (1998), National Strategy development of Education in Ukraine for 2012-2021, the European strategy "Health and development of children and adolescents" (2005), The Concept of the National Program "Health 2020: Ukrainian dimension" in 2012-2020 years (2011) and others that are crucial for the organization and operation of recreational areas in Ukraine for the long term, taking into account the country's development and international experience.

Methodological approaches include: competency, holistic, synergistic and activity.

Improving the quality of professional education is now one of the issues for the whole world educational community whose solution is associated with the modernization of the content of the pedagogical process and rethinking the purpose and outcome of education. On these grounds was formed *competence approach*, which is now considered in the context of the Bologna process. According to many scientists, educators, the implementation of this approach creates a new vision of the educational content, but also contributes to a reorientation of traditional cognitive tendencies of higher education, its methods and technologies [5; 11; 12].

While scientists debate about the nature and components of professional competence, this concept appears in the regulations that govern the field of higher education in Ukraine. Industry standards of higher education in Ukraine introduced a model of professional competence of the expert, entitled "The educational qualification characteristics" [8]. Thus, a competency approach to education in Ukraine is actually implemented at the state level.

Holistic approach to rights developed in the world of philosophy and medicine since antiquity. Characteristic for new thinking holism (greek "holos" - whole) is not based on detail and on a holistic understanding of the human body, in which everything is interconnected and interdependent. This knowledge in their modern interpretation broaden and deepen the scientific concept of world order conducive to its development complement conception of man as a microcosm, complete, extremely complex and multifaceted, self-organizing bio-energy information system. The whole is always greater than the sum of the parts and the specific characteristics [25; 26].

Health science, studying the processes occurring in the human body, harmonization, summarizes the philosophical perception of the phenomenon of man allows another look at the life and health and to realize that the human body is the most powerful incarnation of all philosophical laws. When the doctor finds the presence or absence of disease only within his competence, psychologist saves mental health and teacher of physical training sees path to health as Sport and Recreation course, occurs an ignore process of the holistic approach to the problem of human health [17].

The essence of the *synergistic approach* in teaching is to control without controlling, gently guide the students in a positive way of ensuring their self-education, self-education, self-development, and self-improvement. The nature of synergistic effect – is an effect, based on its own form and abilities, and therefore, the teacher does not impose its will on the student, and refusing to micromanagement, encourages independence, sees success, supports the initiative, awakens interest in opening themselves, the world, the constant search for their own way to develop their abilities [18].

Activity approach (G.A. Atanov, A.N. Leontiev, V.A. Kazakov and others) consider activity as the main source of identity formation factor and its development, as in the work of the student acquires experience which uses the internal structure of the individual, and therefore, provides professional activities of personal content. In general, the activity approach provides guidance on the development of creative potential, takes into account the age and individual characteristics of each student through the activity that promotes self-fulfillment and personal growth [3].

Professional training of specialists in health education is built according to the *principles*, among which we distinguish general didactic and specific, with appropriate professional guidance.

The process of training future professionals from health to technology for usage of health strengthening technologies becomes efficient only under the conditions of its implementation in the context of technological approach is not to remain only a theoretical construct, the model must include not only the concept and methodology development, and technology and its implementation. *Technology* of future health specialists training is a technology of education, the structure of which stand out: the target component (purpose and objectives); semantic, procedural and diagnostic components.

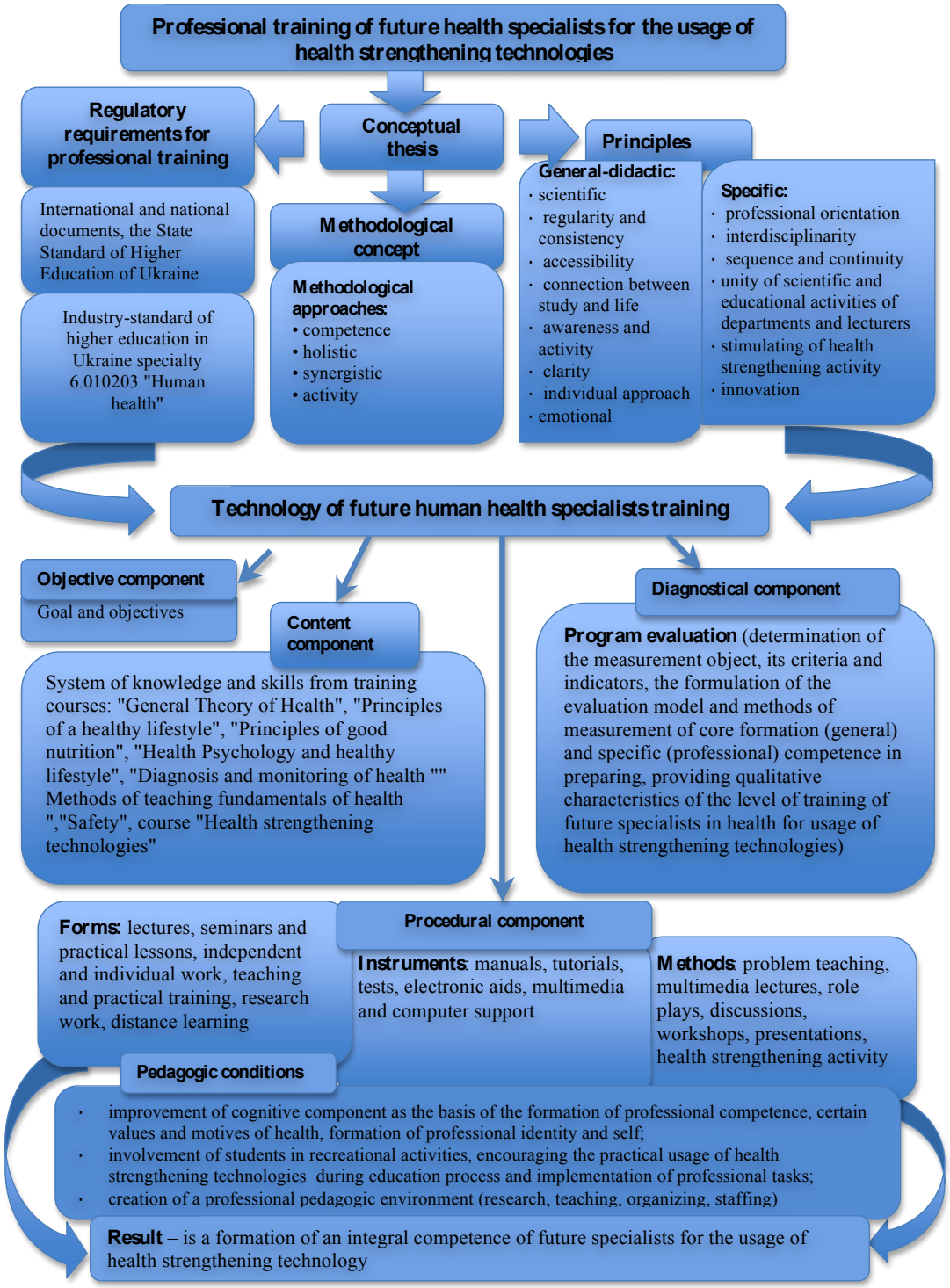

Figure 1. The training model of future specialists of human health for the usage of health strengthening technologies

The goal of training future specialists in human health is integral formation of their competence for usage of health strengthening technologies.

According to goal, we formulated the *tasks* of training of future professionals from health to technology for usage of health strengthening technologies:

1) the development of future professionals of health motivational value attitude to activities aimed at restoring human health, its recovery and improvement of overall quality of life;

2) mastery of an integrated system of theoretical knowledge, special skills, and practical skills needed to use health strengthening technologies;

3) formation of professionally important personal qualities necessary for the application of health strengthening technology in the conditions of social life rapid changes, innovation in the conservation and promotion of health of the human body, retraining and adaptation to new socio-economic conditions of the labor market.

The content component of professional training health industry presented content elements (cycles of disciplines, subjects, themes, software issues, system knowledge and skills, etc.) that are put to ensure the formation of readiness to perform professional duties and necessary qualifications.

For health education, despite its close relationship with the health and physical education, is the problem of determining the actual range of knowledge needed to improve the most skilled, given the specifics of his profession. As the science of health is a relatively young industry, whose development has just begun, during its formation could not avoid some controversy during consideration of specific issues, solution of which is due to the complexity of the subject of the study - human health, because the human body as bio-systems most reflects philosophical laws of existence and therefore demands the dialectical approach. One-tailed understanding of the purpose and objectives of the training of health industry experts raises certain difficulties associated with the selection, adaptation and purposeful practical use of knowledge about health [1; 2; 6; 7; 9; 13; 19; 22].

In the field of educational, scientific and methodological literature on pedagogy health today is a very common term of "health saving technology". To some extent, it has become "fashionable", but analysis of the sources reveals broad and ambiguous range of approaches to its understanding. The concept of "health saving technology" used as a synonym to valeological education, promotion of healthy lifestyles, health culture. It is understood as individual medical and toiletries as sports and wellness technology. As an educational phenomenon, health saving technologies in the works of researchers and educators often is independent of educational technology, but appears as quality characteristic of educational technology, an important part of the educational process, which involves the creation of a safe and comfortable stay in pupils in the school, the implementation of such a relationship between participants of educational process as providing the solution of educational problems, take into account the health status of students with a view to maintaining and, if possible, strengthen [4; 10; 14].

Indeed, the current situation will be a significant achievement if the health of children and adolescents in the study will not be degraded and will (continue) at least at the level with which they come to school. Today it is one of the most important tasks of education. Therefore, in terms of teaching practice in respect of the general process and subject teachers, the term of "health saving" is justified and legitimate. But this is not the case of professional's recreational areas, the main purpose of professional activity which is to improve health, increase its level, increase functional capacity and reserves the protective forces, and strengthen the body.

Health is not permanent and unchanging, it is a dynamic state of human life, which is characterized by the body's ability to regulate and heal itself. Before any chronic disease was seen as a stable entity, able to change the state of the body is only one way - the downside, but the practice has denied such an approach. Much evidence suggests that the disease can reverse or at least stop. Current opinion suggests that pathology should be seen as a process, the direction of which is possible both one and the other way. So, speaking of experts of health, it should be applied the term to capture this dynamic changes in the health of the human body, and, moreover, it is a positive trend. It is therefore most appropriate in this case, in our opinion, is the term "health strengthening technologies" [16].

Analysis of currently existing knowledge about the health of individual components and content targeting health sciences complex allowed among the most important factors to determine that the cause disorder functional state of an ordinary individual, that look just the knowledge of which is determined by the need to explore the features of the professional activity of experts recreational field [15].

Previously, the content of education was associated with verbal learning material. Today it is not only the level and extent of acquired theoretical knowledge but also the activities of students, their emotional attitude to the material being studied. Particular importance is attached to the last position when it comes to improving education specialist areas that cannot grasp without practical creative individual application of theoretical knowledge as to their future careers and in their lives. Therefore, interpretation of the meaning of education given in the dictionary of professional education, most appropriately reflects the nature of most health-education: «The content of education - is a system of scientific knowledge about nature, society, human thinking, practical skills and ways of life, philosophical, moral, aesthetic ideas and relevant behavior that should capture the student, the student in the learning process"[23, p. 117].

Procedural component was developed based on the presence of a close relationship of semantic and procedural aspects of the educational process and foresaw the use of certain features of traditional methods for their use in the implementation of learning technologies [21].

The *diagnostic component* designed to determine the degree of task performance and the goal of training future professionals of health. We have developed a procedure for measuring the level of formation of individual competencies involves the use of a wide range of diagnostic, monitoring and evaluation.

Conclusions

1. The transformation of public attitudes about education and human development, and changing educational paradigms influence the content and organization of higher education.

2. Socio-pedagogical modeling brings out the fact that reality is hidden because of veil of all variety and multidimensionality phenomena opens up new properties and possibilities of improving the process of training future specialists.

3. Preparation of future specialists in health is complex, purposeful, dynamic system, which is the basis set of theoretical and methodological approaches to ensure the training of competent professionals, ready to carry out recreational activities. The theoretical basis of ensuring a high level of professional training of specialist health is a holistic concept of professionalization based on theoretical and practical bases its essence.

Since the proposed model is a theoretical construct, the *prospect for further research* is to improve it by testing and experimental verification.

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COMPARATIVE CHARACTERISTICS STRUCTURE PHYSICALLY PREPARED FIGHTERS HIGH QUALIFICATION LIGHT, MEDIUM AND HEAVY WEIGHT CATEGORY

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Annotation. *Purpose*: study of the structure of physical preparedness (PP) highly skilled fighters of different weight categories. *Material*: 147 athletes surveyed in separate weight classes. Recorded 26 indicators PP. *Results*: It was found that the mass of fighters is an important determinant of the level of development, value and structure of the phase relationship indicators. Informative indices PP interrelated with weight category fighters are: Runtime 45 shots in a specialized test, the number of pull-ups in the maximum rate of 10 seconds and the maximum number is not limited to a run-time while climbing a rope to a height of 4 m, height of jumps up to space. With the increase in the weight category of fighters dropping speed, relative strength, speed and power endurance, reduced muscle explosive quality, the level of special performance. Same relationship PP indicators reflecting its structure changed insignificantly. *Conclusions*: The developed regression models should be used for modeling and prediction of individual athletes sides PP light, medium and heavy weight categories, construction of group regulatory assessment scales.
Keywords: structure, physical, preparedness, weight, weight, category, relationship, wrestlers.

Introduction

Physical fitness (PF) of wrestlers is an important component of sportsmen's general fitness alongside with technical-tactic, functional and psychological fitness in combination ensuring the level and specificity of sport form, special workability and sport result [6, 7, 9-14, 16, 19, 20].

At the same time, specificity of structure of wrestlers' physical fitness (SPF) is determined by level of development, correlation and interconnections of motion qualities, first of all – speed-power qualities and level of special endurance [4, 6, 7].

Analysis of works, devoted to wrestling, showed that they insufficiently elucidate correlation and interconnections of SPF components both between each other and with other components of general structure of sportsmen's fitness [1, 3, 8].

Analytical character of most of works, describing different sides of wrestlers' PF [1, 5, 15, 17, 18], did not permit for researchers to reflect its structure and elucidate partial role and interconnections of every component in general structure of PF of different qualifications', weight categories' sex's, period of training's sportsmen.

Extreme importance and insufficient elucidation of this problem conditioned our choice of research of exactly this problem.

Purpose, tasks of the work, material and methods

The purpose of this work is studying of physical fitness's structure of highly qualified wrestlers of different weight categories.

The methods of the research: strain dynamometry, calipometry, tapping metering, methods of pedagogic evaluation and testing of speed-power fitness and special workability of wrestlers, computer graphic analysis and mathematical statistic.

We tested 147 sportsmen- from 15 to 35 wrestlers in certain (from 7) weight categories. In the process of the research we registered morphological metric indicators of physical condition, speed-power qualities and special endurance of wrestlers.

Special endurance was evaluated in test with throws of partner of equal weight by 1 hand with bent – 3-5 series (15 throws in every series).

For researching of physical fitness dynamic in process of weight category's growing and for determination of the most variable parameters all tested were distributed by mass of body into 7 weigh groups, accepted in wrestling.

For studying of specific features of physical fitness's structure of wrestlers, who differ by body mass, all sample of the tested was conventionally divided in 3 groups: light (62.05±0.56 kg), middle (73.74±0.69) and heavy (96.78±1.85 kg).

For processing of experimental material we used different methods of variation statistic, including methods of correlation, regressive, dispersion and etc. methods of statistic analysis in system *STATISTICA* in Windows [2].

Results for the researches

Analysis of physical fitness of 7 weight categories showed that by most of parameters there exists rather expressed dependence of speed-power qualities on mass of sportsmen, which varies with changing of weight category.

In fig.1 we presented the most informative PF indicators, which reflect dynamic of progressing of quickness, strength, speed-power endurance of wrestlers in process of increasing of weight with changing of 7 weight categories.

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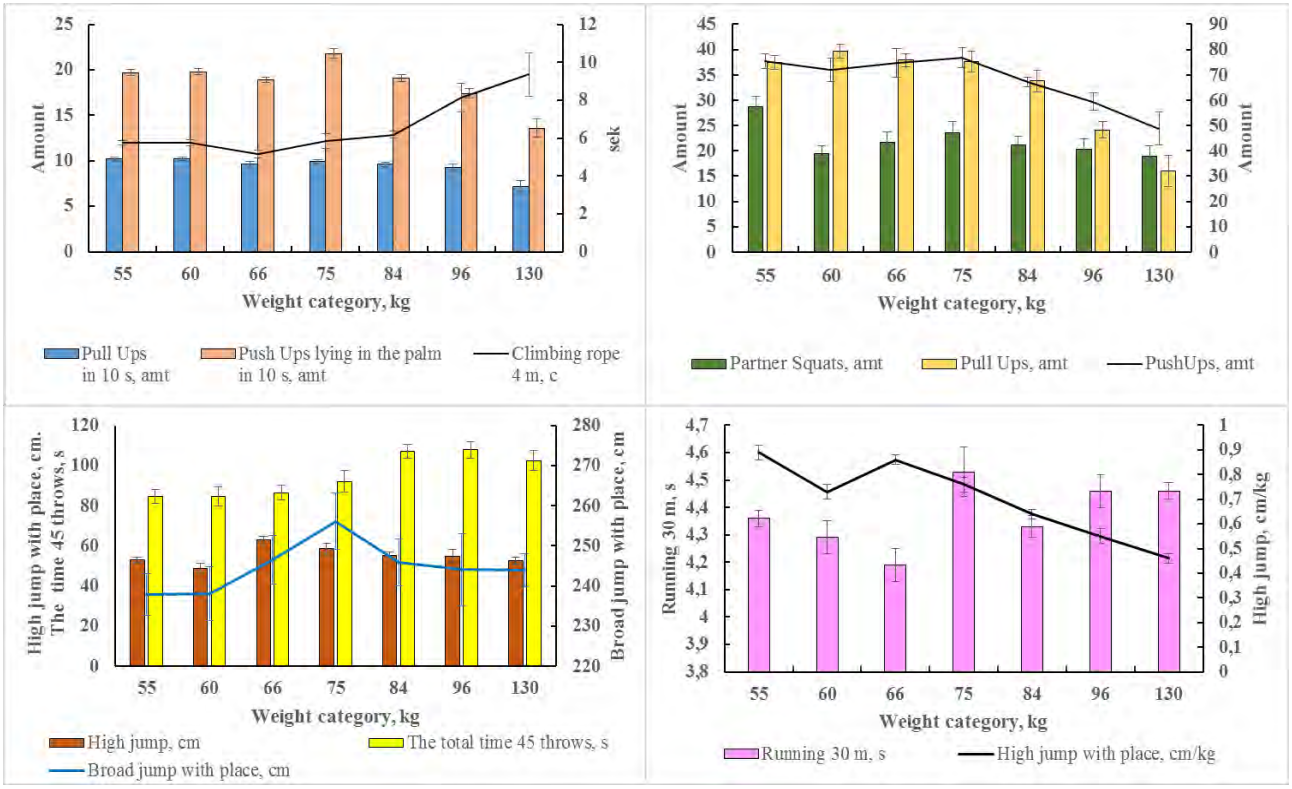

Fig.1 Some indicators of physical fitness of wrestlers of different weight categories

The character of these curves witnesses that there is no linear dependence on change of sportsmen's weight categories in variation of most studied indicators.

Quantity of chin ups ($p<0.01$) and squatting with partner of equal weight, relative values of high jump from the spot ($p<0.01$): are close to linear dependence; with increasing of weight category result in the mentioned tests reduces.

Change of long jump's results, speed of climbing rope have expressed curvilinear character: with increasing of weight category result of long jump from the spot first reaches the highest values among sportsmen of 75 kg weight category, then among wrestlers of 3 the heaviest categories it gradually reduces. Time of climbing rope first reduces, reaching the least values for wrestlers of 66 kg category, the increases by exponent, reaching maximum for wrestlers of heavy weight.

Results of 30 meters' run, chin ups for quickness, high jumps from the spot change a little with increasing of weight category.

Analysis of variability of the tested indicators showed that in values of a number of them there exists significant individual variance in dynamic of changes of 7 weight categories (from 55 to 130 kg): high jump from the spot– 22.4 %, in chin ups– 27.5 %, in pressing ups – 15.2 %, in quickness of throws in specialized tests – 11.2-13.2 %.

In fig.2 we presented correlation coefficients (r), which reflect interconnection of some speed-power indicators with wrestlers' weight categories.

They reflect rather high interconnection of most of the tested parameters with sportsmen's weight category. Interconnection of 30 meters' run, high and long jumps results with body mass of wrestlers is rather weak.

In connection with the fact that wrestlers of little weight categories are as a rule of small height, for excluding of theis factor's influencing on high jumps results and for objective evaluation of lower limbs muscles' contracting abilities of sportsmen of different weight categories, we calculated relation of jump height to sportsmen's height. The calculated coefficients showed contracting abilities of lower limbs' muscles of light weigh wrestlers in this test are also higher then the same of heavy weight sportsmen.

The greatest dependence on weight category were in results of chin ups, climbing rope for quickness, high jump in relation to mass of body during test for special endurance: with increasing of weight category results in these tests worsen.

In table 1 we presented regressive models of speed-power indicators' dependence on wrestlers' weight category.

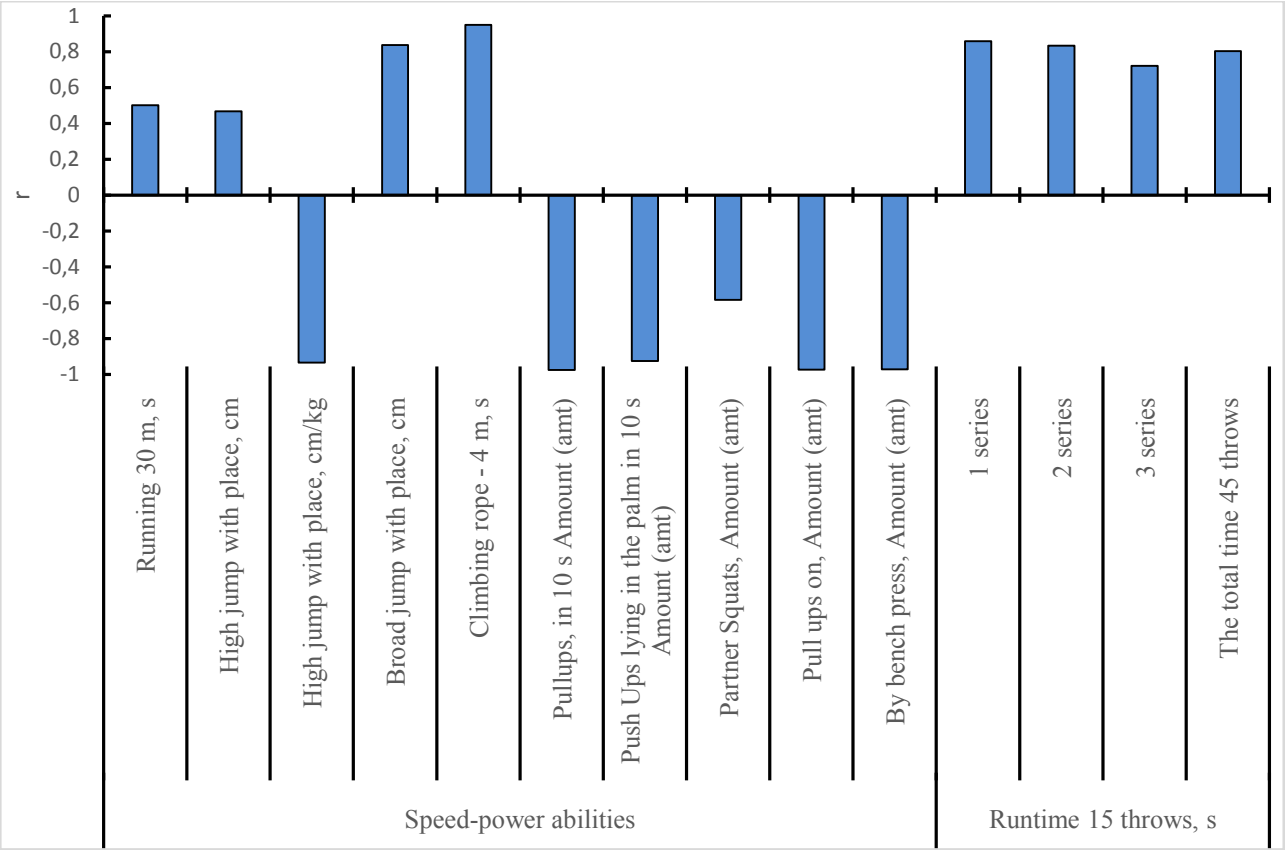

Fig.2. Interconnections of speed-power endurance's indicators with weight categories of highly qualified wrestlers

Table 1

Regressive models of speed-power indicators' dependence on wrestlers' weight category

Indicators	Equations of regression*	Coefficients of determination (d) and correlation (r), P
Squatting (q-ty)	38.8+0.0014x2-0.33x	d = 0.34 (r=-0.583), >0.05
Chin ups (q-ty)	$33.55+0.3274x-0.004x^2$	d = 0.944 (r=-0.972),<0.001
Pressing ups (q-ty)	$69.23+0.357x-0.0045x^2$	d = 0.940 (r=-0.970),<0.001
Chin ups for 10 sec. (q-ty)	$7.25+0,0945x-0.0008x^2$	d =0.950 (r=-0.975),<0.001
Pressing ups for 10 sec. (q-ty)	$8.4+0.34\ x-0.0025x^2$	d =0.856 (r=-0.925),<0.001
Climbing rope, sec.	$6.81+0.0007x^2 – 0.0652x$	d =0.901 (r=0.949),<0.001
30 meters' run, sec.	0.0027x + 4.1649	d=0.251 (r=0.501), >0.05
High jump from the spot, cm/kg	$2E-05x^2 – 0.0101x + 1.36$	d=0.872 (r=-0.934), <0.001
High jump from the spot, cm	$24.52 + 0.766x -0.0045x^2$	d=0.218 (r=0.467), >0.05
Long jump, cm	$0.0005x^3 – 0.1414x^2 + 12.64x – 117.1$	d=0.701 (r=0.837),<0.01

Notes:* x – wrestlers' weight category, kg

The worked out by us equations are model characteristics of determined dependences. Most of them are statistically confident, have high coefficients of determination (d) and correlation (r) and that is why they can be used for construction of norms' scales for certain indicators of speed-power fitness of wrestlers of different weight categories.

For determination of more exact dependences between mass of sportsmen and different motion qualities, with future analysis sportsmen of seven weight categories were combined in 3 weight groups: 1) light; (63.23±0.54 kg); 2) middle (80.05±0.74 kg); and heavy (105.9±2.05 kg).

The increased scopes of samples permitted to fulfill factorial, correlation and regressive analysis of SPF in every of three groups of wrestlers separately, to ground and work out differentiated methods of testing, evaluation and training of light, middle and heavy weight categories' sportsmen.

Analysis of the received results showed that "light group" hs advantage in respect to "heavy group" by most of speed, speed-power and strength (in respect to own weight) indicators, by level do speed-power endurance and special workability; in climbing rope for quickness, in quantity of chin ups, pressing ups and squatting with partner of the same weight, in quickness of 15 throws of partner of the same weight by one arm.

We did not registered any statistically significant differences between sportsmen of light and middle categories by most of the tested parameters, with the exception of long and high jumps' results, in which sportsmen of middle categories have expressed advantage.

Sportsmen of middle category have advantage in respect to heavy weight category by most of the tested parameters.

Results of factorial analysis (see fig.3) reflect certain similarity and differences in structure of physical fitness of 3 weight groups' categories:

- in all weight groups we found 4 leading factors, determining wrestlers' SPF;
- leading factor of SPF in every of compared groups is factor of special workability.

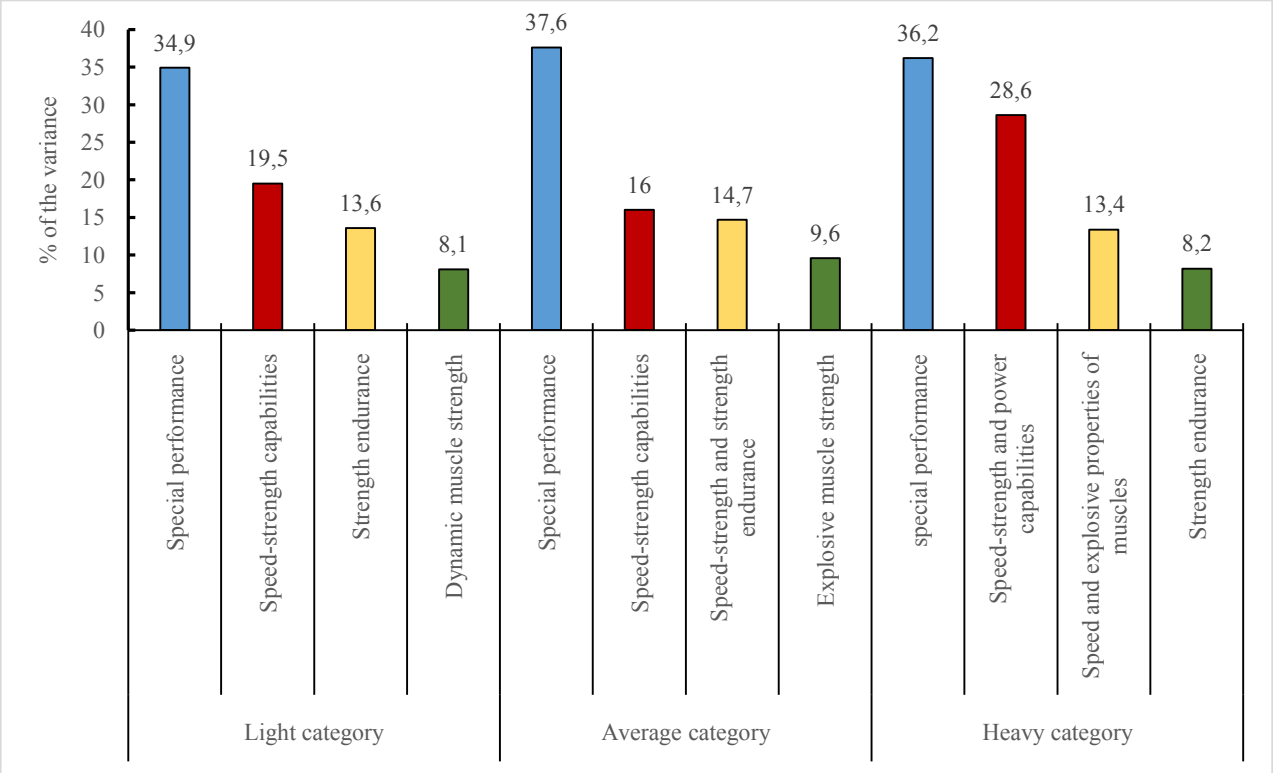

Fig.3. Factorial structure of physical fitness of 3 weight groups' wrestlers

The second factor of all the "heaviest" indicators included speed-power indicators, and in third – the maximally heaviest group, also – power potentials of upper limbs' muscles.

The forth factor of 1st group's (63.23±0.54 kg) and 3rd (105.9±2.05 kg) sportsmen included indicators, characterizing power endurance condition.

Concerning sportsmen of 2nd weight group (80.05±0.74 kg) the forth factor included as the "heaviest" indicators, which characterizes explosive contraction abilities of upper limbs' muscles.

For sportsmen of 3rd group the third factor of SPF is the factor of speed and explosive abilities of sportsmen's lower limbs' muscles (13.4 %).

Testing results of wrestlers, divided by weight into light (61.7±1.5 kg) and heavy (86.8±1.7 kg) groups witness that nearly by all absolute power indicators sportsmen of heavy categories have advantage (see table 2). In relative power indicators of static endurance (determined by time of keeping on backbone dynamometer force 80% from maximal) and speed indicators light weight sportsmen have advantage.

Table 2

Testing results of power and some speed potentials of light and heavy weight sportsmen

	Weight, kg	Jump-test		Hand dynamometry		Backbone dynamometry			Latent time, msec	Tapping test	
		Fmax, H	J, H/c	Strength of right hand, H	Strength of left hand, H	Fmax, H	Fmax /масса, H	Static endurance, Sec.		Quantity for 1 sec	Time 1 Of movement sec.
$\overline{X}$	**61.7**	**1999.2**	**3603.5**	**396.9**	**372.4**	**1445.5**	**22.6**	**13.1**	**142.5**	**6.52**	**0.154**
±m	1.5	141.12	312.62	15.68	13.72	36.26	0.49	1.8	6.0	0.12	0.003
n	30	35	35	16	16	16	16	16	12	14	14
$\overline{X}$	**86.8**	**2536.2**	**4118.0**	**614.5**	**600.7**	**1796.3**	**20.29**	**7.9**	**169.8**	**5.83**	**0.172**
±m	1.7	168.56	350.84	14.7	13.72	29.4	0.784	0.7	4.1	0.07	0.002
n	2.	27	27	12	12	12	12	12	12	14	14
t	**10.91**	**2.44**	**1.09**	**10.12**	**11.77**	**7.52**	**-2.54**	**2.70**	**3.75**	**4.93**	**4.78**
P	<0.01	<0.01	>0.05	<0.01	<0.01	<0.01	<0,.01	<0.01	<0.01	<0.01	<0.01

Discussion:

Numerous researches of different authors as well as our earlier researches showed that physical fitness of highly qualified wrestlers is an important component of general structure of sportsmen's fitness, [3, 4, 6, 7, 17], alongside with technical tactic, functional, psychological and will-moral components. However, up to present time in literature problems of systemic organization of sportsmen's fitness structure, considering partial role, correlations and interconnections of all components, determining to different extent special workability and sport results, have been elucidated insufficiently [6, 7, 9, 15, 20]. Also SPF of different weight categories' wrestlers has been described insufficiently [4, 6, 7, 17, 20].

Insufficient solution of problems of highly qualified different weight categories wrestlers' SPF, from point of view of correlation and interconnection of different components served as the ground for our research.

The conducted researches and application of modern mathematics permitted to determine the most variable SPF indicators of wrestlers of different weight categories, which reflect their special workability, speed, speed-power and strength abilities: time of fulfillment of 45 throws in specialized tests, quantity of chin ups at maximal rate for 10 sec. and their maximal quantity without limitation of time, climbing of 4 meters rope, height of jumps from the spot.

It was determined that with increasing of weight category level of sportsmen's physical fitness reduces: with increasing of wrestlers' mass, quickness, relative force, speed and speed-power endurance decrease, explosive potentials of muscles, special workability reduce.

In spite of the fact wrestlers of light and middle weight categories have advantage in respect to heavy wrestlers by most of speed-power indicators; structure of their physical fitness as correlation and interconnection of its separate components vary, with it, to less extent.

Most of worked out by us equations of regression reflect mainly liear form of dependence of speed-power indicators on sportsmen's weight categories; they have high coefficient of determination that witness about their high information characters. In this connection they can be used as mathematical models for simulation, prognostication and evaluation of different sides of physical fitness of the tested groups of sportsmen.

Alongside with it leading factor of special workability (1^{st} factor), which is characteristic for structure of physical fitness of all tested groups, we found certain differences between three groups in indicators of 2-4 factors, which determine in total more than 50% of dispersion of the tested indicators. Specific character of SPF of every group is connected with them.

With testing in conditions, which level differences in mass of body, wrestlers of heavy weight categories yield to more light sportsmen by most of the tested parameters of physical fitness. In absolute values of power indicators, which to certain extent are determined by mass of sportsmen, they have clear advantage.

The found informative indicators of physical fitness's structure of highly qualified wrestlers, we recommend mathematical models for construction of norm evaluation scales, differentiated for sportsmen of light, middle and heavy weight categories.

Conclusions:

1. Mass of sportsman is an important system-forming factor, which determines level of development, correlation and interconnection of parameters of sportsmen's physical fitness structure.

2. The most variable indicators of physical fitness's structure of different categories' wrestlers are: time of fulfillment of 45 throws in specialized test, quantity of chin ups at maximal rate for 10 sec. and maximal quantity of chin ups without limitation of time, climbing 4 meters' rope, height of high jumps from the spot.

3. With increasing of weight category of wrestlers, quickness, relative strength, speed and speed-power endurance, reduce; explosive abilities of muscles, level of special workability weaken.

4. The worked out by us regressive models can be used as mathematical models for simulation, prognostication and construction of norms' evaluation scales for sportsmen of light, middle and heavy weight categories.

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THE INDICATORS OF THE PHYSICAL HEALTH OF STUDENTS ON THE CHARACTERISTICS OF THE PHYSICAL FITNESS, AEROBIC AND ANAEROBIC PRODUCTIVITY OF THEIR BODY

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Annotation. *Purpose*: identification and assessment of physical health of students on physical performance characteristics, aerobic and anaerobic performance of their body. The objective of this study was to investigate the influence of cross-country training aerobic and anaerobic focus on physical performance, aerobic and anaerobic organism performance of students. *Material*: The study involved 413 students (boys) aged 21 - 23 years. Efficiency of impact studies using cross-country loads of aerobic and anaerobic focus on the physical health of students. *Results*: It was found that the level of physical health of students on a scale of G.L. Apanasenko steadily deteriorating. Decrease is observed to a safe level in 22 years and further still below the safe level for 23 years. Anaerobic performance level of students in the body 21, 22 and 23 do not differ significantly and is below the average. *Conclusions:* confirmed that aerobic and anaerobic capacity of the organism students do not meet the proper level and require correction. Found that such a correction would be the most effective subject to the development and implementation of health technologies. Technology based on the use of extracurricular activities running exercises.
Keywords: aerobic, performance, physical health, cross training, anaerobic.

Introduction

The key indicators of the physical health is physical capacity, aerobic and anaerobic (lactate) performance of the body. Given that there is enough controversial information on aerobic and anaerobic capacity of the body of a young person, studies that allow tracing the dynamics of the parameters that characterize the physical capability, aerobic and anaerobic (lactate) capacity of male students at the age of 21, 22 and 23 years.

To study the physical operability we have determined absolute and relative indicators PWC170. The study of aerobic capacity was carried out according to absolute and relative indicators of maximum oxygen consumption (VO2 max). The assessment of the aerobic capacity was done in accordance with the criteria suggested by Y.P. Pyarnata [14].

Purpose, tasks of the work, material and methods

Aim of the study - was to identify and assess the level of physical health of men at the age of 21-23 years.

Task of the study was to investigate the impact of aerobic and anaerobic jogging exercises on the physical capability, aerobic and anaerobic (lactate) capacity of the body of university students at the age of 21-23 years.

Methods of the study: we investigated the effect of classes using aerobic and anaerobic jogging loads on the physical health of male students at the age of 21 - 23 years. We have found methods and properties that are appropriate to use in the study of the physical condition of university students. Studying the dynamics level of aerobic capacity (RIOs) of the student's body at the age of 21-23 years has shown that according to the criteria, suggested, by Y.P. Pyarnata [14], 21-year old people develop a "mediocre level", with 22 and 23-year old students having the level below the mediocre one." We have discovered that the level of physical health according to the scale by G.L. Apanasenko [3], male students at the age of 21-23 years have a steadily deteriorating level, decreasing to a "safe"one at the age of 22 years, with that falling below the "safe" level at the age of 23 years. The level of the anaerobic capacity in male body at the age of 21, 22 and 23 years does not differ significantly and is below the average index, which according to A. Shögy, G. Cherebetin [21] is 38.1 kgm • min-1 • kg-1.

The experimental research work was carried out at DMZ "Lugansk Shevchenko National University." The study involved 413 male students at the age of 21 - 23 years and 17 sports teachers and doctors.

Results of the research

The key indicators of physical health is physical capability, aerobic and anaerobic (lactate) capacity of the body. Given that there is enough controversial information on aerobic and anaerobic capacity of the body of a young person, studies that allow tracing the dynamics of the parameters that characterize the physical capability, aerobic and anaerobic (lactate) capacity of male students at the age of 21, 22 and 23 years.

The comparative analysis of physical and aerobic capacity of the body gives enough reason to believe that both the absolute and relative indicators PWC170 and VO2 max at the age of 21-23 years do not undergo significant changes.

However, it should be noted that the dynamics of aerobic capacity, which is assessed according to the relative value of VO2 max, confirming its decline at the age of 22 years, compared to the average value of this index at the age of 21 years. So at the age of 21 RIOs corresponds to «mediocre ", and at the age of 22 years it is "below mediocre" , with the same level at the age of 23 years.

We have found out that all of the tested individuals in any age group showed "excellent" RIOs. Moreover, at the age of 21-23 years there is a less number of those whose RIOs corresponds to "good" and "mediocre", with an increased number of people with RIOs "below mediocre".

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The boundary of the transition from the healthy condition to the state of illness is the level that cannot compensate for the functional and biochemical changes in the body under the influence of negative factors.

"Safe" ("critical") level of health is determined by the relative index of VO2 max and is 42 ml • min^{-1} kg^{-1} for men. Taking into account this value, the results of our studies show that men at the age of 21 years have the level which is slightly higher than the "safe" one. And at the age of 22 years it corresponds to the "safe" level, and at the age of 23 years it is below that level.

Given the fact that the body's anaerobic capacity evaluation criteria are absent, we have carried out a comparative analysis of anaerobic (lactate) capacity of students at the age of 21, 22 and 23 years. In addition, anaerobic (lactate) capacity was analysed by comparing the value of MKZMR per 1 min of each testee with an average value, which according to A. Shögy, G. Cherebetin [21] corresponds to 38,1 kgm min^{-1} kg^{-1} for the persons of this age.

Analyzing the results of research, we have found the following: It is a common knowledge that one of the most important tasks of physical education in higher schools is to strengthen the health of students, as well as to further ensure an effective process of forming a sustained motivation of permanent employment by physical culture [6].

The youth, who enters higher educational establishment falls under the influence of unusual social factors related to the necessity of creative assimilation of a large ammount of information, due to the necessity of the formation of certain professional abilities and skills, as well as unusual conditions of the student's life. Junior students primarily feel certain discomfort. This phenomenon can be called " inadaptability" of young people to study at higher educational establishments" and is connected with the following reasons [15]: difference in methods and organization of studying in higher schools and a necessity in self-sufficiency for absorbing education information; the lack of well-established interpersonal relations, i.e. the group contact, which is typical of the new team at the stage of formation; the destruction of the old life patterns that prevailed during the years of study at school, and the formation of the new one, with new troubles while entering universities, connected with living in a hostel, separation from their parents, namely, independent budget, planning and organization of training and leisure time etc.

To overcome this discomfort a young person is required considerable of physical and mental forces. Classes in physical education are to compensate for the loss of these forces. They should become part of preparing students for future professional activity.

The necessity of enhancing the health of students is stressed by the fact that school leavers are physically and functionally ill-prepared to the requirements of physical education at higher schools[12]. While studying at the university there is also a trend towards the deterioration of the health of young people. We have found that 37% of the students have variations in the state of health, more than 20% of them are under clinical supervision [11], with a constantly growing number of special medical groups – from 5, 36% of freshmen to 14, and 46% of senior students [10].

According to the World Health Organization the concept of "health" is defined as a State of a complete comfort – physical, mental and social, not merely the absence of disease or physical defects. With the reference to the facts, mentioned above, physical health should be considered as a potential capacity that determines the direction of the change in the health, not only as a state of the body functions. Thus, one can perform not only qualitative, but also quantitative assessment of the health.

Given the fact that physical health caused by the level of aerobic and anaerobic capacity of the body, the research of the physical health was carried out by identifying indicators that characterize the aerobic and anaerobic (lactate) capacity of the body.

The main index of the aerobic capacity, as it is known, is the value of the maximum oxygen consumption ($VO_{2\ max}$). As we know, $VO_{2\ max}$ can be determined by using direct and indirect methods.

The main principle to determine $VO_{2\ max}$ directly is to perform the load of not less than two minutes long, with the intensity of an individual "critical power"(up to failure) Such load causes a maximum mobilizing system of the oxygen provision of the working muscles. A testee reaches a "critical power" usually during continuous operation or a series of discrete (discontinuous) loads of growing power. Physical exercises may be different: work on ergometer or on treadmill (tribal), climbing up a notch, specific physical exercises – running, swimming, rowing, etc. It is necessary to take into account that the value of VO2 max </b20 > depends on the volume of a muscle mass, which is involved when carrying out the research. So, if the work on ergometer is performed by hands, the value of $VO_{2\ max}$ will be slightly lower than that by feet, but when working on a treadmill it will be greater than when working on ergometer. This should be paid attention in case of dynamic observations for one and the same testees or when comparing the value of $VO_{2\ max}$ in different individuals. You can only compare values obtained using the same method.

One of the methodological problems in determining the $VO_{2\ max}$ is the reliability of achievement of an individual maximum level of oxygen consumption, which requires maximum mobilization of the functional capacity of the body. Therefore, an important factor in defining $VO_{2\ max}$ directly is a sufficient motivation of testees to muscular loads. Refusal from physical work is not always indicative of the workloads of "a critical capacity". Even in conditions of an appropriate motivation the phenomenon of "a critical capacity" in laboratory studies happens very rare. Athletes - of about 50% of cases, with ill-trained persons - seldom [4]. The absolute criterion for reaching the oxygen consumption at the level of $VO_{2\ max}$ is the phenomenon of "alignment" (leaving off), i.e. losses of the oxygen consumption dependence from the capacity of work. This phenomenon demonstrates the complete use of the reserves to mobilize the system of transporting and utilizing of oxygen that, in other words - about the maximum physical stress of the testee.

On the basis of the recommendations of leading experts, we have found out that the direct determination of $VO_{2\ max}$ provides continuous, graded growing power load on ergometer or on treadmill. The duration of each stage of power ranges from 2 to 5 min. You can also use a series of discrete loads. Then the duration of the work at each level of power should not be less than 5-6 min, rest intervals should be enough for recovery after the previous load. As we know, the procedure to determine $VO_{2\ max}$ is quite long and exhausting. In addition, local muscle fatigue occurs of lower limbs that makes sometimes stop working or reduce intensity.

Procedure of the direct determination of $VO_{2\ max}$ is dangerous to some extent. Analyzing the results of 170,000 tests, R. Rochmis and H. Blockburn [20] have discovered that the number of fatal accidents during testing can reach 0.01% of the studies.

So, despite high validity, direct methods of determination of $VO_{2\ max}$ also have some faults. One of them is that an accurate determining of the $VO_{2\ max}$ level greatly depends on the motivation of a tested to perform the work "up to failure". Not always a refusal from testing demonstrates exhausting of the body reserves, and in many cases it is connected with the local fatigue of the locomotive organs. The second disadvantage is the exhausting nature of the procedure. The third one is the absence of security guarantees for the health of a tested.

So, we have discovered that in case of the screening examination one should use indirect methods to determine $VO_{2\ max}$. They are based on the fact that there is a linear dependence between the value of the oxygen consumption and heart rate. Such connection allows us to find the dependence between them in the presence of the two points in the system of rectilinear coordinates, with the level of the oxygen consumption marked on the horizontal axis, and with the heart rate on the vertical axis. These points are to measure the heart rate on the two levels of physical activity after a "steady state". Therefore, the duration of the first and second loads should be not less than 5 min, with the heart rate measured at the end of work. $VO_{2\ max}$ is determined by linear extrapolation obtained between two points of a straight line to the value of the maximum pulse rate (heart rate $_{max}$), which is calculated by the formula: maximum heart rate $_{max}$ = 220 – T, where T is the age in years.

Another method of an indirect determination of $VO_{2\ max}$ is based on the presence of a close correlation between values of $VO_{2\ max}$ and physical capacity (PWC_{170}).

It is a common knowledge that the PWC_{170} is the power of the muscle in the heart rate, which corresponds to 170 beats min^{-1}. The heart rate of 170 beats min^{-1} describes the beginning of a zone of an optimal functioning of the cardio-respiratory system during physical activity. In addition, there is a linear dependence between power and the heart rate [8].

Thus, we can state that the heart rate of 170 beats min^{-1} is chosen to determine PWC_{170} on the basis of the fact that from the physiological point of view, it shows the beginning of an optimal zone of the cardio-respiratory system, and from the viewpoint of methodology – the beginning of a clear non-linear dependence on the capacity of muscle to work on the curve of a maximum heart rate.

The level of an aerobic capacity of the body depends on the age and gender. So, we have found out that one should evaluate an individual value of $VO_{2\ max}$ taking into account these factors. However, there is a close dependence of absolute indicators of $VO_{2\ max}$ from the body weight. In order to eliminate the influence of the body weight when evaluating an aerobic capacity, one usually uses not absolute, but relative indicators of $VO_{2\ max}$ in mL min^{-1} kg^{-1}. But there are no universally excepted assessment criteria of the aerobic capacity of the body according to a relative indicator of $VO_{2\ max}$. One of the reasons for the abovementioned discrepancies is the lack of standardization of methods to determine $VO_{2\ max.}$ It is connected with the examination of the heterogeneous population. We have found that the data suggested by different authors [11, 12, 16, 17] are somewhat different.

We have discovered that depending on the value of the given index scientists determine 4-6 levels of the maximum oxygen consumption and consider them to be the level of the aerobic capacity.

We have determined that the Y. P. Pyarnata's evaluation criteria of $VO_{2\ max}$ [14] similar to V. L. Karpmana's criteria [8], but they are applied to the younger groups at the age of10-11 years, so they should be used for research and assessment of the aerobic capacity of a young person.

Taking the above mentioned facts into consideration, on the basis of the comparative analysis we used Y.P. Pyarnata's criteria [14]to assess the aerobic capacity of the students at the age of 21-23 years according to the indicators of $VO_{2\ max\ rest.}$

We have discovered while studying at universities there is a necessity to correct the RFU and, in particular, the aerobic and anoxic (lactate) capacity of the body. We have determined that the results of some studies show the tendency to reduce the level of the latter along with an older age, especially of men, who are older than 19 years [7, 9].

The results of our studies also confirm the data suggested in the special literature as to the insufficient level of physical health of male students at the age of 21-23 years. So, the relative value of $VO_{2\ max}$, which quantitatively reflects the level of health of men at the age of 21 and 22 years is on the verge of "a safe level" of health, and at the age of 23 years it is below the safe level."

These facts indicate that higher educational establishments irrationally use all possibilities of physical education in solving the tasks of preparing students for employment. So, on the one hand, there exists a strong need to further develop and improve appropriate methods of organizing and conducting extracurricular classes in physical education. But on the other hand, there is a need for the scientific reasoning of new ways to improve the quality of physical education during class hours [2.18].

So, we have revealed that a weak point of the university studying is the methodical provision of physical education. The existing programs of physical training do not address the task of improving the physical health of students, as well as improving capacity to work in general [1, 5, 19]. It violates the basic principle of functioning of the system of physical education in higher schools, namely: the principle of health orientation. In our opinion, the deterioration of the health of students is connected with the fact that only junior students have classes in physical education in the majority of universities. Besides, one can observe a reduced number of academic hours in physical education. The results of our research indicate that there have been no significant changes of physical capability, aerobic and anaerobic (lactate) capacity of the body as well as the parameters of the motor skills of the students for 28 weeks of classes conducted on the basis of the programs being traditionally used in Ukrainian universities.

The above facts determine the necessity to apply and test the effectiveness of the developed programs (I-VII) of extracurricular classes in athletics, which are based on jogging loads with different modes of work of the body. In accordance with the scheme of study the programs are to become the core of the universal therapeutic technologies that one can use at any university provided one should meet certain requirements.

Conclusions.

Analysis of the results of the research involving students of universities allowed to make the following conclusions:

We have discovered methods and characteristics that are to be used in the process of studying the physical condition of university students (subsections 2.1 – 2.3). The research of the changes of the level of the aerobic capacity (RAC) of the body of students at the age of 21-23 years showed that according to the criteria suggested by Y. P. Pyârnata, male students at the age of 21year show "a mediocre level", with the level below it at the age of 22-23 years. We have found that the level of physical health according to the scale, suggested by G. L. Apanasenka, is reduced to a "safe" level at the age of 22 years reaching the level below the "safe" one at the age of 23 years. The level of the anaerobic capacity of men at the age of 21, 22 and 23 years is of no difference and is below an average one which according to A. Shögy, G. Cherebetin [21] is 38,1 kgm min^{-1} kg^{-1}.

Thus, we have confirmed that the aerobic and anaerobic capacity of young male students do not meet appropriate standards, therefore require correction. In the process of the research we have determined that such a correction will be the most effective in terms of development and implementation of health technologies, based on the use of jogging at extracurricular classes. Firstly, due to availability, simplicity and objectivity of dosage, jogging can serve as a universal remedy for effective impact on physical health. Secondly, the rational use of the jogging exercise can provide necessary influence both on the aerobic and anaerobic mechanisms.

On the basis of the experimental research and experience of the experts we have developed the programs for extracurricular classes (I-VII) with the use of jogging exercises that provide a substantial improvement in indicators of the physical health of students. According to the research scheme the basis of programs I, III, V is jogging exercises that develop the aerobic capacity and the basis of programs II, IV, VI, VII is exercises that mainly promote anaerobic and aerobic mechanisms. When we work out programs, we take into account the following factors: methodological principles of physical education, age and sexual features and health study, the functional readiness of the body to do physical exercises, the intensity of jogging loads, the mode of energy supply of jogging, the frequency and influence on the physical health. The peculiar features of the suggested programs for extracurricular classes are that the volume of physical activity was determined for each of the testee individually taking into account functional readiness of the body. Moreover, we have excluded a possibility of the overdose of physical work. We have found that the impact on the aerobic and anaerobic processes of the energy supply depends on the content of the classes, which is determined by the method of training as well as the intensity and volume of the work. The developed programs have become the basis to create the universal therapeutic technologies.

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SIGNIFICANCE OF YOUTH AND SPORTS IN UKRAINE BACKUP FOR THE EDUCATION OF THE YOUNGER GENERATION

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Annotation. *Purpose:* determine the social significance and especially the development of youth and sports reserve in Ukraine. *Material*: a questionnaire survey of 50 experts in the sphere of physical culture and sports. *Results*: notes that children and youth and sports reserve three tasks: training of sports reserve, rehabilitation of children and youth, education of children and youth. Structure of youth and sports reserve in Ukraine in 1455 has youth sports schools, 184 specialized youth sports school of Olympic reserve, sports club 4522, 891 children and youth sports and sports club in the community population, 17 schools of Physical Culture and Olympic reserve, 35 high school sports. *Conclusions*: Children and Youth and reserve a sport that requires a thorough reform. Determined that develop youth sport must youth sports school.
Keywords: children, youth, sports, backup, club, health.

Introduction

Today, the government paid much attention to physical culture and sport development that is reflected in the Ukraine Laws, Decrees of President, Cabinet of Ministers, Ministry of Youth and Sports of Ukraine and Ministry of Education and Science of Ukraine and others. Youth sport is an important part of the physical culture and sport. It's functions are to ensure the children involvement to practice a particular sport to make the particular sport specialization and to ensure its transmission to reserve sport. In turn, the reserve sport is to select talented children and youth to practice a particular sport and create the conditions for the their individual development, provide conditions for the transition to the top sport achievements and replenishment of national teams [1].

Ukrainian researchers studied sanitary and educational components of youth sport, including promotion of healthy lifestyle and organization of educational process in youth sports and sport organizing. Svyrydenko O.O. determined the educational mission of teenfgers' healthy lifestyle in youth sport schools. Roters T.T. and Mazin V.M. note that assignments that are to children and youth sport schools state involves three interrelated aspects: sport, athletic and education. In scientific papers by Bondar T.S. studied the system of school sport club in details. [1, 2, 3, 6, 7, 8, and others]. However, relevant to youth and reserve sport as an integrated system has not covered by modern authors yet.

Research carried out up to the Thematic plan of research Kharkiv State Physical Culture Academy in 2013-2015 years on "Improving training athletes in sports, technical and applied sports".

Purpose, tasks of the work, material and methods

The aim of the research is to determine the social significance and fitures of youth and reserve sport in Ukraine.

The reseach purposes are:

1. To study the quantitative development of youth and reserve sport in Ukraine.
2. To identify the expert opinion on physical culture and sport.

Methods and setup of studies. The study used a set of scientific methods, including literature and documents, methods of systems analysis, methods of mathematical data processing and method of the survey (questionnaire). The paper presents an analysis of the main legal acts that regulate the sport activity, some statistics reports by the Ministry of Youth and Sports, by the Department of Physical Culture and Sport Department of Education and Science, the results of a survey of 50 sport experts in Kharkiv.

Results of the research

A Kharkov sport experts determine the social significance of youth and reserve sport in Ukraine. In the survey of 50 respondents take part sport specialists, including 35 men aged 27 to 73 years and 15 women aged 26 to 80 years.

Most of the experts for about 98% (49 people) feel the need to develop youth and reserve sports in Ukraine. Junior and reserve sport helps to solve a number of problems, including reserve sport preparation, children and youth rehabilitation, youth education. During the survey, respondents were asked to choose one point about the function of youth and reserve sport. According to experts, Youth and Reserve Sport perform all of three tasks. However, reserve sport preparation was nominated for the first place by the experts (46%), the second place were children and youth rehabilitation (30%), the third place was children and youth education (24%) (Fig. 1).

The youth and reserve sport development provides by physical culture and sport agents in particular youth sport schools, sport clubs, special education sport profile, high sport schools, state sport teams in sport reserve areas of central executive bodies, that implement the national education policy, physical education and sport, national sport and sport associations, sport federations and other sport subjects. All the mentioned above sport organizations facilitate for full children and young people recover, provide meaningful leisure and recreation for children and youth, and also create healthy lifestyles, harmonise physical development of young athletes [4]. The number of pupils in youth sport schools in 2013 is 607338, that is about 13% of the total number among the pupils from to 18 years old. Compared with

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2012, the number of pupils sport schools increased by 5405 persons [5]. The majority of respondents about 98% (49 people) say that youth and reserve level sport will improve the health of our population.

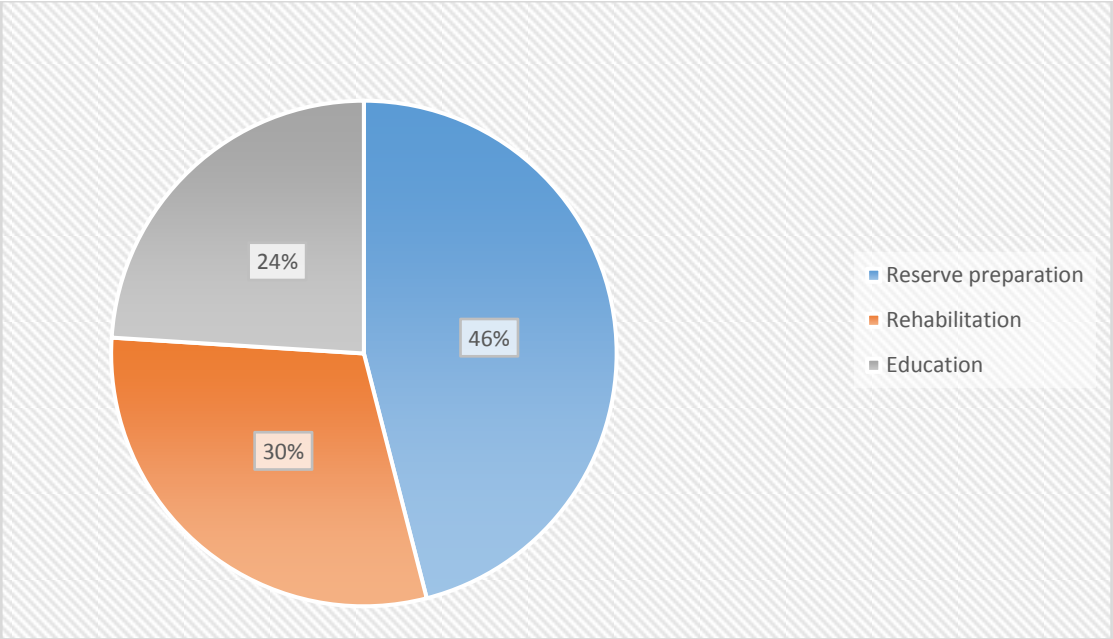

Fig. 1. Youth and reserve sport purposes:
A- Reserve preparation; B - Rehabilitation; C - Education

The survey found out that the majority of experts ,that is 66% (33 people) believe that in our country established mechanism of Youth and Sports of the reserve, but it needs some reforms, 32% of specialists (16 people) think that such mechanism does not exist, and only 1 person (2%) believes that there is a good mechanism that requires no changes and additions in our country.

System of Ukrainian Youth and reserve Sport includes a number of sport organizations [5], that are given in the Table. 1.

Table 1

The System of youth and reserve sport in Ukraine

№	The name of organization	Quantity
1.	Junior sport schools	1455
2.	Specialized youth Olympic reserve sport schools	184
3.	Sport clubs	4522
	including:	
3.1.	Sport oriented clubs	1069
3.2.	Sport and recreation orientated clubs	1639
3.3.	Sports and recreation and sport oriented clubs	1814
4.	Youth sport domiciliary clubs	891
5.	Physical Education and Olympic reserve schools	17
7.	High sport schools	35

It was several points for the question «What kinds of organizations need to develop youth and reserve sports in Ukraine". Thus, according to about 86% (43 persons) experts, Youth and reserve Sport must develop youth sport schools firstly. The same is youth sport development that provide physical education schools, so consider 42% (21 people) of respondents, as for the Sport federation it's about 38% (19 people) and residencial Sport Clubs is about 36% (18 people).

According to 30% of experts (15 people) are private sport clubs should be developed next. The last place took sport societies with the rate of 26% (13 people) respondents. 30% of respondents (15 people) believe that working together of all the above mentioned sport institutions and organizations is going to have a positive impact for youth and reserve sport development. Percentage for the total number of accommodated scores as follows (Fig. 2).

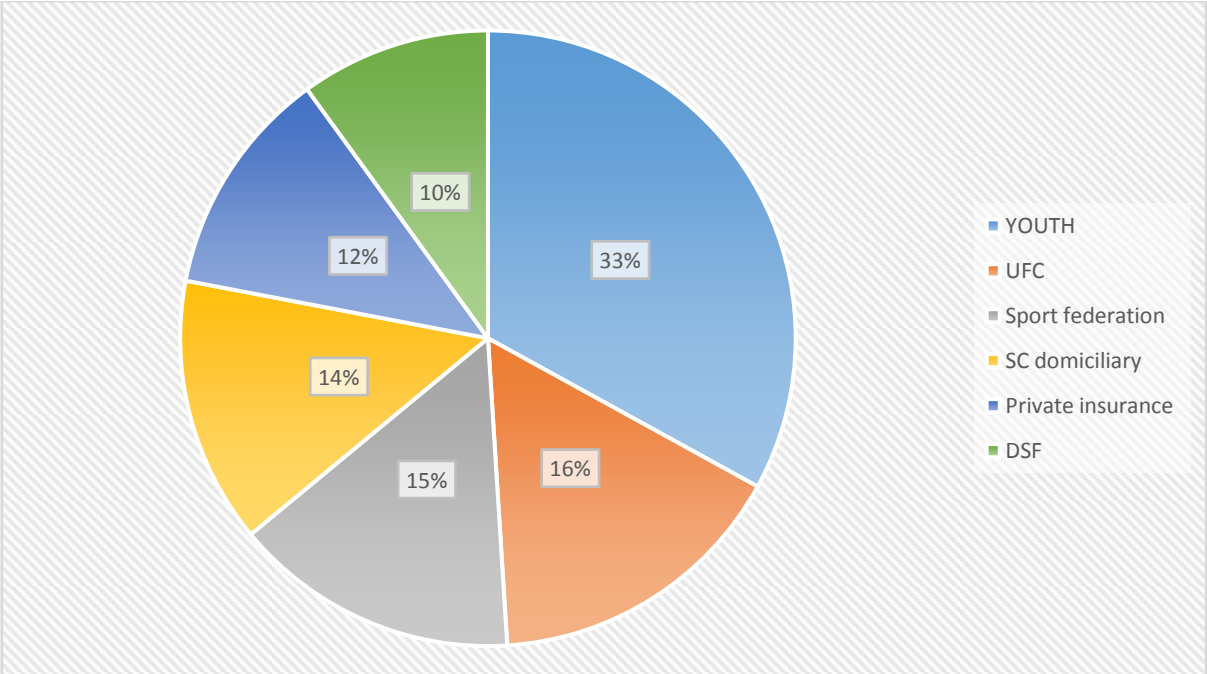

Fig. 2. Organization to ensure the development of youth reserve sports:
A - YOUTH; B - UFC; C- Sport federation; D- SC domiciliary; E- Private insurance; F - DSF

Conclusions.

1. The study of literature and documents, statistical reports for 2013 showed that the youth sport current structure and reserve sport of Ukraine consist of about 1455 youth sport schools, 184 special youth Olympic reserve sport school, 4522 sport clubs, including 1069 sport orientation clubs, 1639 fitness club and 1814 fitness clubs and sport orientation ones, as well as 891 residence youth sport clubs and 17 Physical Education schools and Olympic reserve ones, 35 higher sportsmanship schools.

2. The survey of physical culture experts was held to determine the social significance and characteristics of youth and reserve sports in Ukraine. It was determined that 98 % of professionals feel the need to develop youth and reserve sports in Ukraine , recognize that the priority functions of youth sports and sport reserve preparation (46%), yourth reabilitation (30%) and youth education (24 %). 98% (49 people) say that youth and reserve sport is going to fit the population of our country. It was found that the majority of experts, which is about 66 % or 33 people believe that in our country established Youth and reserve Sports mechanism, but it needs some reforms. 86% of specialists determin that to develop children and youth sport in Ukraine must first children- youth sports school. For more detailed study of the issue one needs to improve the mechanism for involving children and youths in the Youth and reserve sport system in Ukraine.

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