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1. Physical education of different population groups.
2. Improving the training of athletes of different qualification.
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4. Human health, physical rehabilitation and physical recreation.
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CONTENT

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Approaches to the creation of prophylactic – health-improving classes of women of the second mature age

Varvara Akulova

National University of Physical Education and Sport of Ukraine, Kyiv, Ukraine

Purpose: *to carry out the theoretical analysis and synthesis of experience of the organization of prophylactic – health-improving classes of women of the second mature age.*

Material & Methods: *the complex of methods of the research was used in the course of carrying out the research at the theoretical level: analysis and synthesis, generalization, induction and deduction.*

Results: *the information concerning approaches to the creation of prophylactic – health-improving classes of women of the second mature age is analyzed. The means of physical education, which are used in the course of classes with the specified contingent, are defined.*

Conclusions: *the leading role of means of improving fitness at the organization of prophylactic – health-improving activity with the contingent of women of the second mature age is defined and the lack of approaches to planning of exercise stress depending on features of the spatial organization of body of women is established.*

Keywords: *women, mature age, prophylactic – health-improving classes, improving fitness, spatial organization.*

Introduction

The large quantity of researchers who define physical condition of women of the second mature age as the object of the scientific search, approve unanimously the existence of involution changes in organism of women of this age.

The analysis of the last researches and publications allows to note the decrease in motive function at women after 35 years old that is shown in regress of coordination abilities – accuracy decreases, speed of assimilation of movement skills decreases, interaction of coordination mechanisms is broken [10; 13]. Mechanisms of delay of motive function are followed by changes in activity of systems of organism which makes impossible functioning of organism on necessary levels of working capacity [7].

Changes in the motive sphere of a woman of the second mature age are followed by the manifestation of violations in the state of health, existence of chronic diseases, violations of mental health of a woman.

The introduction of systematic exercise stresses in the day regimen of a modern woman promotes the considerable delay of involution processes and the development of physical abilities of women at any age [3; 7]. Recently the considerable attention of researchers to health-improving physical culture is observed through the interrelation prism between health of a person and physical activity, lifestyle which caused the need of studying of programs preventively of health-improving classes with women of the second mature age who consider features of course of involution processes in the woman's organism.

Communication of the research with scientific programs, plans, subjects

The subject of the article is developed according to the Built plan of the research work in the sphere of physical culture and sport for 2016–2020 of the Ministry of Education and Science of Ukraine by the subject 3.13. “Theoretic-methodical bases of health-forming technologies in the course of physical education of different groups of the population” (number of the state registration is 0116U001615).

The purpose of the research:

to carry out the theoretical analysis and synthesis of experience of the organization of prophylactic-health-improving classes of women of the second mature age.

Material and Methods of the research

The complex of methods of research was used in the course of carrying out the research at the theoretical level: analysis and synthesis, generalization and systematization, induction and deduction. Use of these methods allowed receiving and systematizing information concerning the creation of prophylactic – health-improving classes of women of the second mature age.

Results of the research and their discussion

Prophylactic-health-improving classes of women of the second mature age are directed to the prevention of professional and most widespread diseases in certain region.

The most effective remedies of improvement (physical ex-

ercises, trainings, massage, hydro-and phytotherapy, psychophysical influence but other) are used when carrying out prophylactic – health-improving classes for the correction of the available risk factors of the development of diseases, the increase in adaptation to adverse influences, the acceleration of processes of renewal, the elimination of developments of stagnation, the improvement of functions of these or those bodies and systems which are given in to risk.

The researchers created the scientific layer of knowledge concerning the organization and holding prophylactic – health-improving classes for women of the second mature age.

The efficiency of use of modern achievements of improving fitness for the improvement of health and psychological state of women of the mature age is proved in the scientific data of A. V. Ismalova [6]. The author found out the tendency to the improvement of indicators of physical preparedness, body weight of women, under the influence of water aerobics classes.

Methodical tools for the creation of recreational classes of women of 35–45 years old on the basis of means of aerobics are offered in the scientific researches of Ye. V. Burtseva, N. V. Igoshina, V. Yu. Igoshin [2].

The differentiated approach to planning of exercise stress and means of improving fitness according to the somatic type of women of mature age is offered by I. Ye. Yevgrafov, Ye. V. Burtseva, V. A. Burtsevoy for the achievement of the maximum improving effect of improving fitness classes, namely the improving training is directed to the increase in the level of power abilities, flexibility, in certain departments of backbone, the correction of violations of posture, the improvement of activity of the cardiorespiratory system and the level of the general physical efficiency, the correction of constitution for women of the normosthenic somatic type [5]. Tasks on the increase in dynamic power endurance of large muscular groups, the activation of metabolic processes in organism, the decrease in body weight, the correction of constitution, the increase in profitability of activity of cardiorespiratory system and level of the general physical efficiency were defined for women of the hypersthenic somatic type. Specific tasks, which were solved in the course of classes with women of the asthenic type, were the correction of violations of posture, the increase in flexibility in certain departments of backbone, the activation of metabolic processes in organism, the orientation of training process on the increase in body weight, the improvement of activity of cardiorespiratory system and the increase in level of the general physical efficiency. Authors proved the efficiency of this approach which is implemented in the form of circular training.

M. V. Rodyna, R. B. Tsallahova devoted their researches to the creation of health-improving classes taking into account the morphofunctional status and the level of health of women of the second mature age [14]. Authors pay attention to the requirement of differentiation of tasks of health-improving training according to the somatic type of women and the main groups of diseases with use of means of improving fitness. So, the tasks were defined for women with different somatic types in the course of classes – the improvement of functional indicators of systems of organism and especially aerobic endurance, besides, complexes of physical exercises were directed to the decrease in body weight for women of macrosomnic and macromesosomnic types, for women with micromesosomnic type – to the increase in power abilities.
These developments of integrated approaches to the organization of improving occupations of women of mature age are presented in scientific practice which finished the efficiency experimentally.

The combination of means of aerobics and water aerobics in the only improving program is offered in the researches N. I. Medvedkova, O. G. Selivanova [9]. The program of classes provided holding three classes different types of aerobics (basic, kick-aerobics, and dancing aerobics) at the initial stage. In the subsequent – one class in week cycle was replaced with water aerobics. The differentiation of exercise stress was carried out thanks to encumbrances of different weight.

This direction of programming of classes with the contingent of women of the mature age is also offered in the work of I. V. Adamova, Ye. O. Zemskova which considered the possibility of combination of means of rhythmical gymnastics and swimming for the correction of shape of body of women of the mature age [1].

Shaping classes is effective means of influence on morphological condition of women of the second mature age, according to A. O. Skidan, E. P. Vrublevsky [16]. According to the offered author's program, the structure of classes provides the block principle of the creation of classes with load of individual problem zones that allows reaching the solution of the main tasks of the training process of the correction of constitution and increasing in functionality of organism of women.

The generalization of the best practices concerning the introduction of fitness-technologies in the process of improvement of women of the second mature age brings to understanding of key position of a coach in the creation of these classes, namely in certain programs of trainings, parameters of exercise stress, the accounting of violations in the state of health of women which finds the maximum realization in individual form of work. The experience of the organization of prophylactic–health-improving classes, which is offered in the work V. V. Kucherenko, opens the leading role of a coach in management of the process of the improvement of women of the second mature age. The author offered the types of personal recreational classes of women of the second mature age according to some diseases [8].

The health-improving technology of use of physical exercises with encumbrances as factor of the improvement of morphofunctional status of women of the second mature age is offered by O. V. Sapozhnikova [15]. Unlike the traditionally-applied means and methods for the development of power abilities, the offered by O. V. Sapozhnikova health-improving technology of application of physical exercises combines with encumbrances what considers physiologic features of persons of the second mature age in itself means (dumbbells and rubber tube) and methods, and also in addition: articulate gymnastics, stretching, relaxation and musicotherapy which in general promotes the improvement of physical and functional condition of women of the second mature age.

The distinctive feature in creation of structural components of health-improving technology is: in preparatory part – use of articulate gymnastics; in the main part – complex applica-

tion of statodynamic methods and different means of encumbrance; in the final part – inclusion of elements of stretching, relaxation and musicotherapy [15].

Nordic walking (Scandinavian walking) is one of the means of physical education which has the high health-improving efficiency and is applied to the prevention of violations of the musculoskeletal system and the increase in functionality of organism of women of the second mature age.

The use of "Scandinavian walking", according to Yu. V. Naumenko, A. S. Orlan, promotes the preservation and renewal of professional health of the teacher in the health-improving process of female teachers [11]. The available, simple and safe "Scandinavian walking" reduces reliability of display of the chronic diseases including the connected with inactive lifestyle of women, mature and advanced years. Training by Scandinavian walking three times for week lasting 60 minutes, by the researches of V. I. Nazmutdinova, has a beneficial effect on indicators of activity of the cardiovascular system and physical development of women of the second mature age [11].

The system of classes "Scandinavian walking" creates favorable hormonal shifts at women with the increased body weight after menopause, or is the effective mechanism of lift of women in the period of menopause [17].

Recently the tendency to participation of women in various types of recreational activity is observed. The possibility of carrying out improving activity of women of the second mature age by means of futsal is considered in the researches of I. A. Grets, I. M. Silovanova [4].

Health-improving training is the important factor for support and improvement of health of a person, but it is necessary to pay attention that efficiency of trainings can be much higher at the expense of combination of physical exercises to the balanced diet, observance of the day regimen, positive psychological mood, and rational lifestyle.

The offered by authors techniques of the organization of improving activity of women consider the variety of means of improving fitness in the course of the classes, but, it's a pity, features of the spatial organization of body of women are unnoticed when planning the program of classes.

Conclusions

The analysis of scientific literature allows noting that prophylactic – health-improving classes of women of the second mature age are directed to the prevention of professional and most widespread diseases in certain region. Means of improving fitness are in most cases used at certain programs of classes consider indicators of physical development, functional condition of organism of women during training. It should be noted the lack of researches on questions of the creation of prophylactic – health-improving classes of women of the second mature age taking into account the spatial organization of their body.

Prospects of the subsequent researches. The perspective direction of the implementation of the obtained data is the development of the program of prophylactic–health-improving classes of women of the second mature age taking into account the spatial organization of their body.

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Varvara Akulova: *National University of Physical Education and Sport of Ukraine: Phyzkul'tury str. 1, Kyiv, 03680, Ukraine.*
ORCID.ORG/0000-0002-1419-6054
E-mail: akulovavarya@yandex.ru

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New methodical approach to the assessment of video record which is used when training of judoists

Konstantin Ananchenko[1]
Alexander Khatsayuk[2]

[1]*Kharkov State Academy of Physical Culture, Kharkiv, Ukraine*
[2]*National Academy of the National Guard of Ukraine, Kharkiv, Ukraine*

Purpose: *to offer a new methodical approach for the assessment of video record which is used when training of judoists.*

Material & Methods: *the assessment of video record, which is used in the course of training of judoists, was carried out in the research; the poll of 23 masters of sports of Ukraine and masters of sports of international class.*

Results: *flexibility of a new methodical approach for the video record assessment is proved. Methodical approach assumes the use of unique mathematical apparatus – methods of pair comparisons and arrangement of priorities. It can be used for the assessment of video films for judoists of the various skill level, age, physical parameters for individual training of certain judoists at the correct selection of parameters of comparison.*

Conclusions: *the use of the given methodical approach will promote the increase of efficiency of the competitive activity and coach's work, will allow judoists to reach high levels of individual skill.*

Keywords: *judo, judoist, video record, competitive activity, coach's work.*

Introduction

The outstanding scientists in the branch of sport – G. M. Arzyutov [2], V. S. Dakhnovskyi [3], S. S. Yermakov [4], G. P. Parkhomovich [7], A. I. Trofimov [8], G. S. Tumanyan [9], V. B. Shestakov [10], V. Yagello [11] – consider that physical, mental training of wrestlers is shown in their technical actions, from the measure, the improvement of which, success of sportsmen depends in competitions. It is possible to improve the quality and to increase the efficiency of technical actions of judoists if to use the video record which displays the advanced technique of masters of judo in the course of their preparation and operating time of the leading coaches.

Sport is the open system which exchanges with the external environment technologies, information, materials. If to apply the scientific method of abstraction, it is possible to mark out the most significant lines of the video record, which is used in the course of training of judoists. Also the complexity appears at the selection of certain educational movies, which is that it was necessary to limit, for example, 3–4 video records as sportsmen need the necessary time not only for their understanding, but also for understanding the material that is taught in limited time of preparation prior to important competitions.

The purpose of the research:

to offer a new methodical approach for the assessment of the video record, that is used in training of judoists for the purpose of the improvement of their precompetitive preparation, technical-tactical skill.

Communication of the research with scientific programs, plans, subjects

The research is executed according to the Built plan of the research works of Kharkiv state academy of physical culture for 2011–2015 on the subject "Individualization of the training process of the qualified wrestlers".

Material and Methods of the research

The intuitive survey of 23 masters of sports of Ukraine and masters of sports of international class of the federation of judo of the Kharkiv region was conducted during the research. The duration of carrying out the research – was 2 years (2014–2015). The assessment of the video record, which is used in the course of training of judoists, is carried out. The methodical approach allows use of a unique mathematical apparatus – methods of pair comparisons and arrangement of priorities. It was used for the assessment of videos for judoists of different skill level, age, and physical parameters for individual training of certain judoists by the condition of the correct selection of parameters of comparison.

Results of the research and their discussion

We developed the new scientific method, which can be applied to the assessment of the video record, which is used in the course of training of judoists.

We were faced by the concrete task: to choose four from training films about judo, what as much as possible would answer effective actions of judoists during the competitions. It would be expedient to use them as the main evident material at the stage of training of sportsmen.

The choice was carried out from the following 7 training films

about judo.

1. Training of judo – Judo in Japan. Hirotako Okado (60 min, in 2006).

2. Judo throws – Ippon Super A. The best throws in judo (60 min, in 2004)
3. Judo. Technique of the main methods of fight in stand. Union-sportfilm (30 min, in 1985).

4. Judo lessons. UCHI MATA. Technique. Method. Practice (68 min, in 2014).

5. Training of judo – V. Yelchaninov. Technique of throws in stand (60 min, in 2005).

6. Training of judo – Technique of fight in stand from O. Yatskevich (70 min, in 2003).

7. Judo in Japan. Movie 1. Training. Method. Technique (60 min, in 2001).

The following factors (parameters) were chosen for comparison.

1. Ease, availability of perception.

2. Compliance of technical actions to the skill level of judoists.
3. Compliance of technical actions of style of maintaining duel of judoists.

4. Variety of nuances of performance of technical actions by judoists, their specification.

5. Use of interesting and effective technical actions wgich are borrowed from other types of single combats.

6. Skill level of performance of technical actions which are shown from the point of view of purity.

7. Demonstration of performance of technical actions by judoists which have different physical data (different weight categories, different growth).

We could see the task of the quantitative determination of the listed above qualitative parameters. It would be possible to be carried out also by means of numerical score, however its shortcoming is the subjective way of the determination of weighing coefficients. We offer the techniqume which is based on the use of unique mathematical apparatus, – methods of pair comparisons and arrangement of priorities with use of the personal computer.

When developing the methodical approach to the assessment of the video record, which is used when training judoists, we left the following:

– the solution of tasks from the assessment of the video record is often carried out at total or partial absence of the necessary initial information which predetermines use of expert estimates. The similar tasks can be solved at the insufficient initial information and at its total absence by means of the method of arrangement of priorities;
– in our opinion, it is necessary to consider the application of method of arrangement of priorities perspective when receiving the quantitative assessment of the video record which is used when training judoists.

There is no analog of application of this method in the scientific research in the branch of physical culture and sport now. Our methodical approach is directed to the subsequent development of models of the solution of similar tasks by this method, and also the subsequent distribution of experience of their decision and approbation.

We applied the method of pair comparisons with the purpose of the detection of advantage of experts "in pure form" at the solution of the task of arrangement of priorities. Such approach is caused by the fact that other types of estimates, for example, score, demand transitivity – logicality of advantages (if the video record 1 is better than the video record 2, and the video record 2 is better than the video record 3, then and the video record 1 is better than the video record 3).

Intransitivity of the system of pair comparisons can meet rather often. First, very widespread situation, when the expert-appraiser, is unequally familiar with video records, which are the subject to estimation, and at assessment of some of them can allow inaccuracy. Secondly, several experts can carry out, and each of them estimates only part of objects that can cause some contradictions at rather large number of objects of their estimation on one sign. Thirdly, the expert who estimates all objects can have unequal differential threshold at the assessment of different objects. For example, three video records 1, 2, 3 differ by any indicator a little. The expert badly feels the difference by certain indicator between video records 1 and 2 and the judgment will express as 1=2, however the differences between 1 and 3, 2 and 3 are for it obvious and its judgments will be the following: 1>3 and 2<3 that leads to intransitive system of the relations: 1>3, 2<3, 2=3. And, at last, fourthly, even if several experts of the same video record in the set sign received transitive systems of comparisons at the individual assessment, then the violation of transitivity is possible at their report in group assessment by the rule of the majority. The paired comparison of such transitivity does not assume what is the essential advantage of the approach, which is offered by us.

Because of it, the result of the paired comparison most precisely displays the subjective advantage because the smallest restrictions are imposed on the choice here, and the method does not impose to the expert of aprioristic conditions.

The quantitative assessment of videos, which are used in quality evident material in training of judoists, is calculated by us on the basis of the expert information. The procedure of conducting examination is based on the use of the method of pair comparisons according to which all video records are in pairs compared among themselves by the certain factor, and each following assessment is not connected with th previous. All these pair estimates make the matrix of pair advantages at processing of which the weighing coefficients of the concrete video are received which is used in the quality evident material in the course of training of judoists.

The paired assessment was carried out with the use of symbols: > – better; ≥ – better or equally; = – equally; ≤ – worse or equally; < – worse.

The expert makes the comparison of video records by the assessment factors irrespective of results of other comparisons including wrong, and one mistake which was made not so considerably influences results of calculation of values of priorities of videos in this case the lack of the requirement of transitivity of the system of comparisons.
We applied the approach during the scientific research, in which coefficients of A_{ij} are used at the solution of tasks concerning the arrangment of priorities, which change and are purposefully fixed at the video record assessment by the certain factor of comparison:

$$Aij=\begin{cases} 1+y, & \text{if } Xi>Xj \\ 1+0.5y, & \text{if } Xi>Xj \\ 1, & \text{if } Xi=Xj \\ 1-0.5y, & \text{if } Xi<Xj \\ 1+y, & \text{if } Xi<Xj, \end{cases}$$

where *0<y<1; y – any rational number in the set interval.*

Measures of change of limits of suspension of this factor in the estimated videos, which are fixed in the form of the relation of extremes of the ranged row, were set on the basis of the analysis of the available information or by means of the expert assessment:

$$Kc=\frac{X_{i\,max}}{X_{i\,min}} \qquad (2)$$

where X_i max – the video record with the maximum assessment of factor;
X_i min – the video record with the minimum assessment of factor.

The corresponding coefficients of A_{ij} were selected by the found relation of K_c. Further the square matrix of $A=||A_{ij}||$ was under construction on the basis of system of pair comparisons and with use of the picked-up A_{ij} coefficients.
The calculation of values of priorities of factors of the assessment of $p_i(k)$ is made by the iterative method with the use of formula:

$$p_i(k)=\frac{1}{Q(k)}\ A_p(k-1) \qquad (3)$$

where k=1, 2....;

$Q_k=\sum_{j=1}^{n}\sum_{i=1}^{n}A_{ij}\,p_i(k-1)$ – sum component of vector $A_p(k-1)$;

$p_i(k)$ – the normalized iterated force of K-system.

The actual coefficient of the relation of K_a is compared to the settlement K_c. The task is considered solved at coherence of coefficients. Otherwise the correction of coefficients A_{ij} is carried out and the calculation repeats.

The assessment of limits of change of this factor in the objects (definition of K_c) was the most difficult and responsible moment at the solution of our task. When it is possible to estimate ratio of concrete video records bythis factor, it is necessary to rank the number of videos for definition of its extremes. The method of arrangement of priorities with any coefficients of A_{ij} was applied to this purpose. As it is the only direct quantitative assessment at the solution of task, the receiving of it can be organized more carefully and consequently, and more qualitatively.

We define the necessary coefficients of A_{ij} by the found K_c coefficient:

$$y=\frac{K_{c-1}}{K_{c+1}}+\frac{0.05}{m} \qquad (4)$$

where K_c – calculated coefficient of the relation of extremes of the ranged row;
m – number of the estimated videos which are used in training of judoists.

The procedure of the search of values was following in our case of intransitivity of the system of pair comparisons and existence of the relations of equality in it:

– y_p was defined – the previous value y was also solved the task about arrangement of priorities;
– by the acquired values of priorities estimation factors are ranked;
– the previous actual relation of priorities of K_{PP} of extremes of the ranked row, which was received with use unitary enterprise, was established;
– the final value to corrections of the previous value y_p was defined by the coefficient W:

$$W=\frac{K_c}{K_{pp}} \qquad (5)$$

$$y=y_p\cdot W \qquad (6)$$

In general view the formula for definition y can be presented in the following form:

$$y=\left(\frac{K_{c-1}}{K_{c+1}}+\frac{0.05}{m}\right)\cdot\frac{K_c}{K_{pp}} \qquad (7)$$

It is possible to mark out some more essential advantages of the usable method by us:

– the method allows to use intransitive initial information;

– the procedure of the statement of judgments by experts is almost feasible as the direct quantitative assessment of ratios between videos is not required, which are used in training of judoists, by the certain factors of comparison;

– the possibility of coordination of the settlement quantitative relations appears between factors and the “true” quantitative relations between them by means of selection of coefficients of A_{ij}.

We invited the highly skilled judo coaches of the sports club “Slobozhanets” of Kharkiv, the leading coaches and referees of the federation of judo of the Kharkiv region, Federation of judo of Ukraine before filling of matrixes. Matrixes of comparisons were received during the poll of 32 coaches and referees.

Results of the quantitative assessment of the chosen 7 videos by the parameter “Easeness, availability of perception” are given in table 1.

In the same way results of the quantitative assessment of the chosen 7 videos by the parameters “Compliance of technical

Table 1

The quantitative assessment of the chosen 7 videos by the parameter "Easeness, availability of perception"

Conditional number of the video record	1	2	3	4	5	6	7	Score
1	=							0,13
2	<	=						0,10
3	≤	<	=					0,08
4	>	>	>	=				0,19
5	≥	>	>	=	=			0,18
6	≥	>	>	<	=	=		0,18
7	≥	≥	>	≤	≤	<	=	0,15
X_i max – the maximum assessment behind parameter								0,19
X_j min – the minimum assessment behind parameter								0,08
K_p the set								2,5
K_p the actual								2,375
Number of iterations								3

actions to the skill level of judoists", "Compliance of technical actions of style of maintaining duel of judoists", "Variety of nuances of performance of technical actions by judoists, their specification", "Uses of interesting and effective technical actions which are borrowed from other types of single combats", "Skill level of performance of technical actions which are shown from the point of view of purity", "Demonstration of performance of technical actions by judoists which have different physical data (different weight categories, different growth)" were received.

Further we carried out the comparison of parameters of estimation of videos which are used in training of judoists, among themselves. Its results are given in table 2.

Results of the quantitative assessment of videos, which are used in training of judoists, are generalized in table 3.

From table 3 we can see that the place in rating, which was defined by calculations, coincides with found in the course of intuitive poll of 23 masters of sports of Ukraine and masters of sports of international class of Federation of judo of the Kharkiv region. It speaks about the correctness and the reliability of the technique, which was developed and approved by us.

We scientifically prove the expediency of the choice as the best video record when training judoists of the following movies on the basis of calculations: 1) Judo lessons. UCHI MATA. Method. Technique. Practice (68 min, in 2014); 2) Training of judo – V. Yelchaninov. Technique of throws in stand (60 min, in 2005); 3) Training of judo – Technique of fight in stand from O. Yatskevich (70 min, in 2003); 4) Judo in Japan. Movie 1. Training. Technique. Method (60 min, in 2001).

M. L. Zaytseva suggests to apply the method of arrangement of priorities to the receiving quantitative assessment of works of art, which are used in quality evident material in the course of study of students, when teaching disciplines "Aesthetics", "History of arts" in the publication "Methodical approach to the assessment of the evident material used when teaching disciplines "Aesthetics", "History of arts" [6, p. 43]. However the essential advantage of our approbation is that all calculations are carried out with the use of specially-developed program "PRIORITETS" that allows to carry out the unlimited number of iterations taking into account the expert assessment of coefficient of the relation of extremes of the ranged row.

The method of expert evaluations was used by O. V. Zhirnov and G. A. Bondar [5, p. 25]. This method allowed them to range the studied object by the measure of influence on sports result. Types of sports preparation in academic rowing and rowing on canoes were the objects of the examination: special physical preparation, overall physical fitness, technical training, mental preparation, tactical preparation, theoretical preparation and sports training. However, the authors used the method of pair comparison, where the most powerful object in each couple was estimated in "1", and the second at "0" points [5, p. 26]. Our approach is more precisely and more perspective as coefficients, which are purposefully fixed at the video record assessment by the certain parameter of comparison, are used "floating" (that change). It increases validity and accuracy of assessment significantly which is carried out.

We will note especially that the specially developed program "PRIORITETS" was provided by us to all interested persons, coaches and regional federations of judo of Ukraine free of charge. It allowed us widely not only to approve the offered by us program, but also to finish the expediency of application of the new methodical approach for the assessment of the video record which is used in the course of training of judoists, the improvement of the training process, and the increase in level of technical-tactical training of wrestlers.

Conclusions

The offered methodical approach gives the evidence-based assessment, idle time in application. It can be recommended for the assessment of the video record which is used in the course of training of judoists. It should be noted flexibility of the methodical approach concerning the assessment of the video record which is used in the course of training of judoists. It can be used for the assessment of videos for judoists of different skill level, age, physical parameters for individual training of the certain judoists by the condition of the correct selection of factorial signs [1, p. 102]. It will promote the efficiency of the competitive activity and coach's work, will allow sportsmen to reach high levels of individual skill.

Prospects of the subsequent researches in this direction. The assessment of the video record, which is used in the

Table 2

Comparisons of parameters of estimation of videos which are used in training of judoists, among themselves

Conditional number of the video record	1	2	3	4	5	6	7	Score
1	=							0,18
2	<	=						0,13
3	≤	≥	=					0,16
4	<	<	<	=				0,12
5	<	<	<	≥	=			0,14
6	=	=	=	≥	≥	=		0,11
7	≤	≤	=	≥	>	<	=	0,16
X_i max – the maximum assessment behind parameter								0,18
X_j min – the minimum assessment behind parameter								0,11
K_p the set								1,5
K_p the actual								1,636
Number of iterations								2

Table 3

Quantitative assessment of the video record which is used in training of judoists

Conditional number of factor of comparison	Factor weight F_1 0,18	F_2 0,13	F_3 0,16	F_4 0,12	F_5 0,14	F_6 0,11	F_7 0,16	Assessment of the video, points	The place in rating which was defined in the way by	
	Quantitative assessment of parameters								intuitive poll	calculation
1	0,13	0,13	0,16	0,11	0,13	0,15	0,13	0,13	5	5
2	0,10	0,12	0,16	0,09	0,12	0,14	0,13	0,12	7	6
3	0,08	0,10	0,09	0,09	0,13	0,13	0,11	0,10	6	7
4	0,19	0,17	0,20	0,19	0,16	0,15	0,16	0,18	1	1
5	0,18	0,17	0,16	0,20	0,16	0,15	0,16	0,17	2	2
6	0,18	0,16	0,12	0,16	0,15	0,14	0,15	0,15	4	3
7	0,15	0,16	0,12	0,16	0,15	0,14	0,15	0,15	3	4

course of training of judoists, taking into account their age, sex and skill.

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Konstantin Ananchenko: *PhD (Physical Education and Sport); Kharkov State Academy of Physical Culture: Klochkovska Street 99, Kharkov, 61058, Ukraine.*
ORCID.ORG/0000-0001-5915-7262
E-mail: ananchenko_@bk.ru

Alexander Khatsayuk: *National Academy of the National Guard of Ukraine: Povstannia Square 3, Kharkiv, 61001, Ukraine.*
ORCID.ORG/0000-0002-4166-9099
E-mail: hatsa@mail333.com

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Biokinematic characteristics of technique of swimming the crawl on the chest of the qualified swimmers with consequences of infantile cerebral paralysis

Vasiliy Bosko

Sumy State Pedagogical University name is A. S. Makarenko, Sumy, Ukraine

Purpose: *to determine biokinematic characteristics of technique of swimming the crawl on the chest of disabled sportsmen with consequences of infantile cerebral paralysis (ICP).*

Material & Methods: *analysis and synthesis of data of scientific and methodical literature, video filming, computer video analysis, methods of mathematical statistics.*

Results: *materials of the research of biokinematic characteristics of technique of swimming the crawl on the chest of disabled sportsmen with spastic diplegia and hemiparetic form, which are describing features of technique of swimming of disabled persons with consequences of infantile cerebral paralysis, are presented.*

Conclusions: *it is recorded that the received results of the biomechanical analysis of movements of the qualified swimmers expand knowledge of regularities of physical actions of sportsmen with consequences of ICP.*

Keywords: *biokinematic characteristics, technique of swimming, crawl on the chest, spastic diplegia, hemiparetic form, infantile cerebral paralysis.*

Introduction

Swimming is one of the most mass and popular sports among persons with disabilities. This fact is confirmed by high achievements of the Ukrainian swimmers on the international sports arena which more and more draws attention of the society [4; 7]. It is well-known that the sports result in swimming is defined by generally rational biokinematic characteristics which a sportsman is capable to reach in the course of training and competitive activity [8; 9]. Despite of the significant amount of scientific works concerning training of sportsmen with ICP, the evidence-based data on definition of biokinematic characteristics of technique of sports ways of swimming of such special group of people as sportsmen with consequences of ICP were not revealed in the available to us scientifically-methodical literature.

Taking into account the aforesaid, this problem acquires the extreme relevance in sports training of swimmers with ICP. All this became an incitement for carrying out by us the research in this direction.

Communication of the research with scientific programs, plans, subjects

The research is carried out within the subject 1.4 “Theoretic-methodical principles of the development of sport of disabled persons” of the Built plan of the research work in the sphere of physical culture and sport for 2011–2015 according to the Order No. 4525 of 20.12.2010 of the Ministry of Ukraine of family, youth and sport (number of the state registration is 0111U006470).

The purpose of the research:

to determine biokinematic characteristics of technique of swimming the crawl on the chest of disabled sportsmen with consequences of infantile cerebral paralysis of different forms.

We put the following *tasks of the research* for the achievement of the purpose:

1) to find biokinematic characteristics of technique of swimming the crawl on the chest of sportsmen with spastic diplegia and with hemiparetic form of ICP;

2) to compare certain characteristics of technique of labor movements in the course of swimming the crawl on the chest of sportsmen with consequences of ICP.

Material and Methods of the research

We used the following methods of the scientific research for the solution of the put tasks: analysis and synthesis of data of scientifically-methodical literature, video filming, computer video analysis, methods of mathematical statistics.

We used video filming in the frontal and sagital planes by means of two video cameras (Gopro HERO 3 + Silver Edition) for the quantitative assessment of indicators of motor actions of sportsmen. The received results were processed and analyzed by means of the computer program Kinovea®.

12 sportsmen with consequences of infantile cerebral paralysis of the level of sports qualification of the master of sports and candidate for the master of sports which belong to the class S7-S10 according to the classification norms and requirements of the Unified sports classification of Ukraine took part in the research.

Results of the research and their discussion

As a result of the analysis of scientifically-methodical literature [1; 2; 6; 8; 10], we established, that it is necessary to consider the main functional and biomechanical features of human body that define the structure, kinematics and dynamics of the executed swimming movements, especially swimmers with disabilities when forming the rational technique of sports ways of swimming. Therefore it was defined and characterized the main types of motive violations depending on features of assimilation of motor actions according to the forms of ICP in our previous researches [3].

We defined such biokinematic characteristics on the basis of these statements at sportsmen with consequences of ICP during swimming the crawl on the chest:1) postural pose of a swimmer in water: angle of attack, trunk angle of rotation around longitudinal axis; 2) situation and work of hands of a swimmer: angles of bending of the main joints and their movement; 3) situation and work of feet of a swimmer: angles of bending of the main joints and their movement; 4) integrated characteristics: cycle time, step, speed and the relation of these characteristics at the constant speed of a swimmer.

We generalized and presented the obtained data of the video analysis in tables 1–4. They characterize the main features of technique of swimming the crawl on the chest of sportsmen with consequences of ICP depending on its forms.

It was revealed by us by means of the computer video analysis what the postural pose is not streamline at sportsmen with consequences of ICP in the course of swimming the crawl on the chest, therefore the front resistance is increased. As the data of table 1 testify, the angle of attack at swimmers with spastic diplegia averages 13,5±0,62°. It is the consequence of bigger immersion of their lower extremities in water. This indicator is smaller for 13% and fluctuates ranging from 8° till 15° for swimmers with the hemiparetic form. The trunk carries out the fluctuation around longitudinal axis of body. The greatest angle of rotation 46° is recorded at swimmers with the hemiparetic form which is consequence of defeat of one side of body. The main driving planes of the swimmer are a hand and a forearm [5]. Therefore we measured the angle of attack of a hand and the angle of bending of an elbow joint (tab. 2).

The limited use of the struck side of body that results in asymmetry in the method of execution of rowing movements by arms and blows by legs is observed at swimmers with consequences of ICP. The constant spasticity of muscles of the struck party is characteristic for sportsmen with consequences of ICP, therefore contractures and numbers of motive restrictions appear. As a result, the range of a stroke by the affected hand is small; difficulties of maintenance of a hand in static position and its bringing over water exist.

The work of hands of swimmers with spastic diplegia is much more productive, than the work of hands of swimmers with the hemiparetic form of ICP. For example, the comparison of angles of bending of elbow joints at sportsmen with consequences of ICP testifies to the essential difference of these indicators. The difference of their values averages 15,6%. Also differences in indicators of angles of attack of a hand are observed, the recorded value of this characteristic by the affected extremity of swimmers with the hemiparetic form of ICP exceeds for 26,6%, the similar indicator at sportsmen with spastic diplegia. It is consequence of the existence of constant initial angle in joints of the affected extremities.

The main driving links at the performance by a swimmer of shock foot movements is a foot and a shin. Their arrangement under the optimum angle of bending provides the swimmer's resistance on water. Also it is necessary to notice that the violation of this requirement leads to the increase in a midship section of body, what directly proportional to the counter hydrodynamic resistance to body of the swimmer [5]. Therefore we measured the angle in coxofemoral, knee and talocrural joints. The results of measurements found their display in table 3.
It is noted as a result of processing of the received video records that the healthy leg or less affected carried out the continuous movements which provided advance forward. Blows by the affected legs had the insignificant driving force. All this leads to the problem of horizontal and lateral balances.

The work of legs of swimmers with spastic diplegia is complicated because of the damage of the lower extremities, any foot movements are often almost absent. Therefore the angles of bending of coxofemoral and knee joints is actually invariable, on average 172,4±0,98° and 161,3±1,12° respectively. Comparing the value of angle of bending of coxofemoral joint of the affected extremity of sportsmen to the form hemiparetic of ICP and sportsmen with spastic diplegia, we receive that it is bigger for 11%. The difference of average values of angles of bending of knee joint between the above-mentioned forms makes – 20%.

Rate, step and speed of a movement are the important characteristics of technique of swimming. They are the most individual indicators, especially for high-class sportsmen. But these indicators separately do not give the chance to judge the efficiency of technique of the swimmer, rationality of the movements which are carried out by him. The most total characteristic of quality of technique is the step relation to rate at certain constant speed of swimming, and it is applied to the assessment of movements of swimmers with the different level of physical preparedness, any qualification and age. The increase of the relation of step to rate is positive respectively at certain speed of the movement [6; 8; 10]. The results of measurements of these characteristics are presented in table 4.

The step of swimmers with spastic diplegiya makes from 1,6 m till 2,2 m, and swimmers with the hemiparetic form from 1,2 m till 2,1 m. As we see this indicator on average is smaller for 9,7% for the second form. It is explained the fact that upper extremities with the hemiparetic form at sportsmen are more affected. The rate of swimmers of both forms of ICP does not differ significantly, the difference makes only 6,5%. As a result, the relation of step to rate for swimmers with spastic diplegia and for swimmers with the hemiparetic form of ICP averages 0,053 and 0,045 respectively. But, the cycle time at sportsmen with spastic diplegia exceeds the similar indicator of swimmers with the form hemiparetic of ICP on 13,5%.

The receiving data demonstrate to the high specificity of the educational- training process of swimming of sportsmen with consequences of ICP that it is connected with the certain features of their motive violations. Spasm of muscles of extremities, violations of motive and sensitive functions, emergence

Table 1

Biokinematic characteristics of postural pose in water during swimming the crawl on the chest of swimmers with consequences of ICP (n=12)

Characteristics	Form of ICP	Meaning		$\bar{X}\pm S_x$
		min	max	
Angle of attack (degree)	SD	9	17	13,5±0,62
	HF	8	15	11,8±0,64
Trunk angle of rotation around longitudinal axis (degree)	SD	29	43	34,5±1,47
	HF	31	46	37,3±1,39

Note. *SD – spastic diplegia; HF – hemiparetic form.*

Table 2

Biokinematic characteristics of situation and work of hands during swimming the crawl on the chest of swimmers with consequences of ICP (n=12)

Characteristics	Form of ICP		Meaning		$\bar{X}\pm S_x$
			min	max	
Angle of bending of an elbow joint (degree)	SD	R	92	136	109,3±3,82
		L	88	134	110,5±4,04
	HF	Affected extremity	82	111	92,2±2,86
		Health extremity	85	115	98,6±3,40
Angle of attack of a hand (degree)	SD	R	12	25	17,3±1,14
		L	11	23	17,9±1,12
	HF	Affected extremity	10	34	23,6±1,85
		Health extremity	8	30	21,1±1,70
Length of a stroke (m)	SD	R	0,80	1,06	0,97±0,02
		L	0,82	1,04	0,96±0,02
	HF	Affected extremity	0,58	0,99	0,83±0,04
		Health extremity	0,68	1,01	0,87±0,02

Note. *SD – spastic diplegia; HF – hemiparetic form; П – right hand; L – the left hand.*

Table 3

Biokinematic characteristics of situation and footwork during swimming by crawl on breast of swimmers with consequences of cerebral palsy (n=12)

Characteristics	Form of ICP		Meaning		$\bar{X}\pm S_x$
			min	max	
Angle of bending of coxofemoral joint (degree)	HF	SD	167	177	172,4±0,98
		Affected extremity	126	170	153,1±3,73
		Health extremity	135	174	157,1±4,03
Angle of bending of knee joint	HF	SD	154	166	161,3±1,12
		Affected extremity	112	145	129,1±2,96
		Health extremity	114	150	135,4±3,85
Angle of bending of talocrural joint	HF	SD	131	168	153,6±2,89
		Affected extremity	121	160	134,4±3,82
		Health extremity	126	162	141,1±3,40

Note. *SD – spastic diplegia; HF – hemiparetic form.*

Table 4

Integrated biokinematic characteristics of swimming by crawl on breast of swimmers with consequences of ICP (n=12)

Characteristics	Form of ICP	Meaning		$\bar{X}\pm S_x$
		min	max	
Step (m)	SD	1,6	2,2	1,76±0,06
	HF	1,2	2,1	1,59±0,07
Rate (cycle/min)	SD	31	37	32,8±0,46
	HF	32	39	35,1±0,59
Time of cycle (s)	SD	1,91	2,56	2,29±0,06
	HF	1,75	2,33	1,98±0,04
Relation of step to rate	SD	0,048	0,057	0,053±0,001
	HF	0,042	0,050	0,045±0,001

Note. *SD – spastic diplegia; HF – hemiparetic form.*

of contractures, increase in muscle tone, decrease in animal force and working capacity in-coordination of movements are characteristic for the swimmers with consequences of ICP. As a result, features of the technique of swimming are the existence of the constant initial angle in joints of extremities, the expressed fluctuations of trunk of rather different planes.

Conclusions

1. The analysis of scientifically-methodical literature on this subject-matter confirms the lack of the evidence-based data from the research of biokinematic characteristics of the technique of sports ways of swimming of such special group of people as sportsmen with consequences of ICP. The results of the biomechanical analysis of movements of the qualified swimmers expand knowledge of biokinematic regularities of motor actions of sportsmen with consequences of ICP.

2. It was established as a result of carrying out the research that the angle of attack at swimmers with spastic diplegia is increased and averages 13,5±0,62°. It is consequence of the bigger immersion of their lower extremities in water therefore the postural pose is not streamline, the front resistance increases. This indicator makes 11,8±0,64° for swimmers with the hemiparetic form that is smaller on 13% of the above-mentioned similar indicator. The average value of step of swimmers with spastic diplegia made 1,76±0,06 m, this indicator is on average smaller on 9,7% and makes 1,59±0,07 m for sportsmen with the hemiparetic form. The difference of rate of swimmers of both forms of ICP makes only 6,5%. The difference of cycle time at sportsmen-swimmers with consequences of ICP makes 13,5% and makes – 2,29±0,06s for the form of spastic diplegia, 1,98±0,04s – for the hemiparetic form.

Prospects of the subsequent researches in this direction. It is necessary to consider the received biokinematic characteristics as the theoretical base for the foundation of new rational methods of study of the technique of sports ways of swimming in the subsequent researches.

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Vasiliy Bosko: *Sumy State Pedagogical University name is A. S. Makarenko: Romenskaya str. 87, Sumy, 40002, Ukraine.*
ORCID.ORG/0000-0002-8796-2362
E-mail: bosv@mail.ru

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Prediction algorithm of the functional state of women with postmastectomy syndrome

Yuriy Briskin[1]
Tatiana Odynets[2]

[1]*Lviv State University of Physical Culture, Lviv, Ukraine*
[2]*Zaporizhzhya National University, Zaporizhzhya, Ukraine*

Purpose: *to create an algorithm for prediction of functional status of women with postmastectomy syndrome in terms of the cardiovascular system.*

Material & Methods: *theoretical analysis of scientific and methodical literature, chest rheography, tonometry, methods of mathematical statistics. The study involved 165 women with postmastectomy syndrome who underwent radical mastectomy for Madden.*

Results: *It was developed a method for calculating the forecast level of the integral function of the cardiovascular system of women with postmastectomy syndrome, which took into account the value of an objective definition parameters of central hemodynamic, taking into account their weight coefficients in the structure of the integral index.*

Conclusions: *the proposed method allows a high degree of reliability to assess the level and conduct a quick monitoring of the functional state of the cardiovascular system of women with postmastectomy syndrome, as well as determine the effectiveness of treatment, rehabilitation, and make adjustments in the rehabilitation program.*

Keywords: *algorithm, postmastectomy syndrome, women, cardiovascular system.*

Introduction

According to many scientists, breast cancer and the associated postmastectomy syndrome, prolonged duration negatively to his notes on the functional state of the cardiovascular system [1; 2; 6–9], which attracts attention to itself by the rehabilitation. Evaluation of functional state has a crucial role in determining the capacity of women with postmastectomy syndrome to carry the load of different nature and can serve as a criterion for the efficiency of physical rehabilitation and the possibility of corrective training program.

Despite the considerable amount of research devoted to the study of functional status of persons of different age groups [3–5], remains unexplored issues for its women with postmastectomy syndrome. In addition, it is important to take into account the integral index of the cardiovascular system, which fully characterize the level of its functional state.

The foregoing definitely indicates the importance of development a method of evaluating the functional state of the cardiovascular system of women with the postmastectomy syndrome to monitor the effectiveness and appropriateness of the applied rehabilitation.

Relationship with the academic programs, plans, themes

The selected research direction corresponds to the research topic of Lviv State University of Physical Culture "Basis of physical rehabilitation of women with the postmastectomy syndrome" (state registration 0115U007008).

The purpose of the research:

to create an algorithm for prediction of functional status of women with postmastectomy syndrome in terms of the cardiovascular system.

Tasks:

1. To prove the criteria of the functional state of women with postmastectomy syndrome.

2. To develop a method of evaluation of the functional state of the cardiovascular system in women with postmastectomy syndrome on the basis of objective consideration of its performance.

3. To determine levels of projected functional state of the cardiovascular system in points.

Material and Methods of the research

The article used the following methods: theoretical analysis of scientific and methodical literature, chest rheography, tonometry, methods of mathematical statistics.

The study was conducted on the basis of Zaporizhzhya Regional Oncology Center. The study involved 165 women with postmastectomy syndrome, who underwent a radical mastectomy for Madden, the average age was 60,27±0,79 years.

Results of the research and their discussion

Algorithm of the development of the model equations to evaluate and verify the validity of the predicted functional status of women with postmastectomy syndrome was conducted in several stages. At the first stage was calculated physical con-

dition level (PCL) by the E. A. Pirogova, 1986 formula [5] and by building correlation matrix were selected multiple regression factors that correlated with the dependent variable (PCL) and explained its variation.

In the multiple regression model to assess the predictable level of the functional state (PLFS) were included those factors that were statistically significant correlation coefficients.

In particular, the following results were obtained calculating the parameters of the linear regression equation:

1. The coefficient of multiple correlation (R) – 0,9705;

2. The coefficient of determination (R^2) – 0,9420;

3. The adjusted coefficient of determination – 0.9406;

4. Estimated value of Fisher criterion (F) – 650,34, p<0,0000;

5. The standard error of the equation – 0.03;

6. Free member regression – 1,778981, p<0,0000;

7. Regression coefficients and their level of significance: age – –0,006520, p<0,0000; heart rate (HR) – –0,012944, p<0,0000; cardiac minute output (CMO) – 0,099369, p <0,0000; left ventricular stroke work (LVSW) – –0,076928, p<0,0000.

Normal distribution model residual for visual and statistical analysis indicated the adequacy of the model predictable functional state.

The resulting high coefficient of determination showed that variation of human functional state at 94.20% variation explained by the factors included in the regression equation and only at 5.80% variation explained by factors that were not included in the regression equation, in addition to the high significance of the estimated regression equation suggested Fisher's criterion – 650,34, p<0,0000.

The standard error was 0.03 and helped to determine the confidence interval for the estimated amount of functional state with a probability of 97%.

Thus it could be argued that obtained statistically significant regression equation (the hypothesis that the quantification of the connection between the dependent variable in the model and that it is essential to explain).

In this way, the calculated model of the predictable level of functional state is:

$$PLFS = 1{,}778 - 0{,}006\cdot(50+10\cdot(A-58{,}97)/5{,}47)) - 0{,}012\cdot(50+10\cdot(HR-73{,}38)/8{,}98)) + 0{,}099\cdot(50+10\cdot(CMO-3{,}35)/0{,}63)) - 0{,}076\cdot(50+10\cdot(LVSW-4{,}09)/0{,}79));$$

where PLFS – predictable functional state of the cardiovascular system;

A – age, years;
HR – heart rate, beats/min;
CMO – cardiac minute output, l/min;
LVSW – left ventricular stroke work, Kgm;
1.778 – free member regression; 0,006; 0,012; 0,099; 0,076 – multiple regression coefficients;
58.97; 5.47; 73.38; 8,98; 3.35; 0.63; 4.09; 0.79 – constants.

Thus, in the multiple regression model to evaluate the predictable level of the functional state of the cardiovascular system included objectively defined parameters of central hemodynamics, which had statistically significant correlation coefficients and their valuation in scores was by standard T-Scale. Based on the calculated PLFS conclude its qualitative and quantitative level (table).

The predictable level of the functional state of the cardiovascular system of women with the postmastectomy syndrome

№ c/n	Level of the functional state of the cardiovascular system	Value of the Level
1	Low	<1,63
2	Below average	1,64–1,86
3	Average	1,87–2,09
4	Above average	2,10–2,32
5	High	>2,33

To test the validity of the formula for calculating the estimated amount of the functional state of the cardiovascular system used results Ruf'e index, by determining the correlation coefficient between the actual value and its estimate calculated using regression equation.

As a result of checking the validity of the developed formula was obtained correlation coefficient r=–0,900, p<0,000, indicating that with increasing values predictable functional state decreased index Ruf'e or vice versa.

Conclusions

The proposed method allows a high degree of probability to assess the level and conduct rapid monitoring for the functional state of the cardiovascular system of women with postmastectomy syndrome and to determine the effectiveness of treatment, rehabilitation and make adjustments to the program of rehabilitation.

Prospects for further research include identifying features of the functional state of respiratory system of women with postmastectomy syndrome with different levels of the functional state of the cardiovascular system.

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Yuriy Briskin: *PhD (Physical Education and Sport), Professor, Lviv State University of Physical Culture: Kostushko str. 11, Lviv, 79000, Ukraine.*
ORCID.ORG/0000-0001-6375-9872
E-mail: y.briskin@ukr.net

Tatiana Odynets: *PhD (Physical Education and Sport), Associate Professor; Zaporizhzhya National University: Zhukovsky str. 64, Zaporizhzhya, 69000, Ukraine.*
ORCID.ORG/0000-0001-8613-8470
E-mail: puch1ik@mail.ru

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Evaluating the effectiveness of the integrated use of sporting plays to optimize the cardiorespiratory system functional state of students 18–19 years old

Inna Cherednichenko

Zaporizhzhya National University, Zaporizhzhya, Ukraine

Purpose: *to evaluate the effectiveness of the integrated use of sports in improving the functional state of the cardiovascular and respiratory systems of the 18–19 year-old students in the breakout sessions in terms of higher education.*

Materials & Methods: *the study included 25 female students aged 18–19 years who were engaged in sports games within the section physical education classes in high school. To assess the functional status cardiorespiratory physiological systems using traditional methods and computer program "Oberig".*

Results: *the study of students experimental group (n=11) who were involved in the program to the integrated use of means of sports (volleyball, basketball, handball) were recorded significantly higher, compared to the students in the control group (n=14) who engaged in one kind of sports (volleyball), indicators of functional status of their cardiorespiratory system of the body.*

Conclusions: *the author confirmed the high efficiency program of physical education for students 18–19 years of integrated use of sports facilities, which contributes to a substantial optimization of the functional state of their body.*

Keywords: *the process of physical education classes, sectional, sports, students 18–19 years, experimental program effectiveness.*

Introduction

It is conventional that now one of the most urgent problems in the field of physical education of student's youth is insufficient efficiency of traditional forms of the organization of physical education classes in higher education institution which do not promote the essential optimization of physical preparedness, functional condition and physical health of students of various sex and age [3; 4; 6; 13].

Rather large number of researches, which authors proved experimentally the efficiency of inclusion in programs on physical education of students of different types of physical exercises, in particular, step-aerobics, fitball-aerobics, futsal, basketball, table tennis, swimming, athletic gymnastics etc., is devoted to the problem of improvement of the process of physical education of student's youth [1; 5; 7; 10; 11; 14; 15].

At the same time, the last changes in the system of physical education in higher education institutions – emphasis on section studies after hours with the simultaneous reduction of obligatory classes, give the grounds for the search of new ways of improvement of the process of physical education of students.

According to the number of authors, the integrated approach to the organization of section studies of student's youth, in particular, inclusion in the program of section studies of different types of physical exercises can be the perspective direction in the solution of this problem [2; 9; 12; 16].

The analysis of literary data on this problem allowed stating its insufficient study that defines the relevance and the practical importance of the research.

Communication of the researches with scientific programs, plans, subjects

The work is the part of scientific programs of the department of physical education and the department of the theory and the technique of physical education and sport of Zaporizhzhya national university and is executed within the subject "Theoretical and methodical bases of the formation of healthy way of life of various segments of the population of Ukraine by means of physical culture and tourism" (number of the state registration is 0111U007743) of the Consolidating plan of the RW of the Ministry of Education and Science of Ukraine for 2011–2016.

The purpose of researches:

to give the assessment to efficiency of complex use of means of sports in the increase in functional condition of the cardiorespiratory system of girls of 18-19 years old in the course of the section studies in the conditions of higher educational institution.

Material and Methods of the research

The research was conducted on the basis of Zaporizhzhya national university. 25 female students of 18–19 years old were divided into the control group (n=14) and the experimental (n=11) of group.

Students of the control group were engaged according to the

physical education program providing section studies in volleyball, and students of the experimental group – according to the program with the complex use of means of sports (volleyball, basketball, and handball).

The program is presented in the form of 4 modules covering the academic year from September till June. The following means of preparation were used: theoretical, general physical, technical, tactical and game. Total of hours on year section studies made, also as well as in the control group, 160 hours.

4 hours were allocated for theoretical preparation, 12 hours – for overall physical fitness, 10 hours – for special physical training, 20 hours – for technical training and 2 hours – for tactical preparation within the first module (September-November) (the total amount of section studies – 48 hours). The volume of game preparation made 6 hours.

The emphasis on game training of students was placed in the second module (December-February) (total amount – 48 hours) for what 14 hours were allocated. Also it was allocated on 12 for general and special physical training of students, 18 hours – for technical, 4 hours – for tactical and 2 hours – for theoretical preparation.

18 hours were offered to allocate for technical training of students, 2 hours – for tactical preparation, 8 hours for general and 4 hours for special physical training within the third module (March-April) of the experimental program (total of hours – 32). The total amount of game preparation made 10 hours.

The volume of special and overall physical fitness made respectively 4 and 8 hours, technical – 20 hours in the fourth module (May-June) (total of hours – 32). The total amount of game preparation made 14 hours. Classes on theoretical and tactical preparation were not provided in this module.

It should be noted that the first two weeks of every month of each of modules was devoted to section volleyball classes, the third week – to basketball classes and final, 4th week – to section handball classes.

The following indicators were registered at the beginning and at the end of the academic year at all girls for the assessment of level of functional condition of the blood circulatory systems and external breath: heart rate (HR, bpm^{-1}); systolic (APs, mm Hg), diastolic (APd, mm Hg) arterial pressure; systolic (SBV, ml) and minute (MBV, $l \cdot min^{-1}$) blood volumes, coefficient of profitability of blood circulation (CPB, conventional units, c.u.), index of Robinson or the double work (IR, c.u.), cardiac index (CI, $l \cdot min^{-1} \cdot m^{-2}$), the general peripheral resistance of vessels (GPRV, $dyn \cdot s \cdot sm^{-5}$), the vital capacity of lungs (VCL, ml), breath holding time on inhalation (Tin, s) and exhalation (Texh, s), indexes of hypoxia (IH, c.u.) and Skibinsky (IS, c.u.), the level of functional state of the cardiovascular (LFScvs, points) and respiratory (LFCres, points) systems of organism and the level of physical health (LPH, points). The determination of sizes of LFScvs, LFCres and LPH carried out with the use of the computer program "Oberig" [8]. Traditional physiological indicators (HR, APs, APd, VCL, Tin, Texh), and also the main anthropometrical parameters (length and body weight) are registered according to inspection algorithm according to this program at the examinee in condition of relative rest. The registration of heart rate was carried out palpation, arterial pressure – the indirect method of N. S. Korotkov with the use of standard tonometer and phonendoscope, vital capacity of lungs – with the use of dry portable lung-tester, and breath holding time sizes on inhalation and exhalation with the use of tests of Stange and Genchi.

The automatic calculation of quantitative values of the following indicators is made after input of the listed indicators in active window of the program "Oberig".

The systolic volume of blood (SVB, ml) and minute volume of blood (MBV, $l \cdot min^{-1}$), were calculated by the following formulas:

$$SVB\ (ml) = 0{,}53 \cdot APs + 0{,}617 \cdot LB + 0{,}231 \cdot BW - 1{,}07 \cdot APd - 0{,}698 \cdot Age - 22{,}64,$$

where APs – arterial pressure systolic, mm hg; APd – arterial pressure diastolic, mm hg; LB – length of body, sm; BW – body weight, kg.

$$MBV,\ l \cdot min^{-1} = HR \cdot SVB,$$

where HR – size of heart rate, bpm^{-1}; SVB – systolic volume of blood, ml.

Size of index of Robinson (IR, c. u.) was calculated by the formula:

$$IR = HR \cdot APs / 100,$$

where IR – index of Robinson, c. u.; HR – heart rate, bpm^{-1}; APd – arterial pressure systolic mm Hg.

Coefficient of profitability of blood circulation (CPB, c.u.):

$$CPB = HR \cdot (APs - APd),$$

where CPB – Coefficient of profitability of blood circulation, c.u.; HR – heart rate, bpm^{-1}; APs – arterial pressure systolic mm Hg; APd – arterial pressure diastolic, mm Hg.

Values of the general peripheral resistance of vessels (GPRV, $dyn \cdot s \cdot sm^{-5}$) vessels and value of cardiac index (CI, $l \cdot min^{-1} \cdot m^{-2}$) were calculated by the following formulas:

$$GPRV\ (dyn \cdot s \cdot sm^{-5}) = (APd + 0{,}33 \cdot (APs - APd)) \cdot 1333 \cdot 60 / (MBV \cdot 1000)),$$

where APs – arterial pressure systolic, mm hg; APd – arterial pressure diastolic, mm hg; MBV – minute volume of blood, $l \cdot min^{-1}$.

$$CI\ (CI, l \cdot min \cdot m^{-2}) = MBV / (BW^{0{,}425} \cdot LB^{0{,}725} \cdot 0{,}007184),$$

where MBV – minute volume of blood, $l \cdot min^{-1}$; LB – length of body, sm; BW – body weight (kg).

IH (IH, conventional units, c.u.) and index of Skibinsky (IS, c.u.) were calculated on the following formulas for the assessment of functional condition of the system of external breath:

$$IH\ (c.u.) = Texh / HR,$$

where Texh – breath holding time on breath, s; HR – size of heart rate, bpm^{-1}.

$$IS\ (c.u.) = (VCL \cdot Texh)/HR,$$

where VCL –vital capacity of lungs, ml; Texh – breath holding time on breath, s; HR –size of heart rate, bpm^{-1}.

The level of functional condition of the cardiovascular system (LFScvs, points) was calculated as the total indicator of the score on each of the parameters characterizing activity of the cardiovascular system (SBV, MBV, GPRV, APs, APd, CI) divided into the total of indicators (there are 6 in this case).

LFScvs = {assessment for SBV (points) + assessment for MBV(points) + assessment for GPRV (points) + assessment of APs (points) + assessment of APd (points) + assessment for CI (points)} / 6.

The level of functional condition of the system of external breath (LFCres) was calculated as the total indicator of the score on each of the parameters characterizing activity of the system of external breath (size of VCL, IH, IS, Tin, Texh), divided into the total of indicators (there are 5 in this case).

LFCres = {assessment for VCL (points) + assessment for IH (points) + assessment of IS (points) + assessment for Tin (points) + assessment for Texh (points)} / 5

The received quantitative values of LFScvs and LFCres are formatted on the following qualitative functional levels:

- LFScvs ≤ 33,1 points. The level of functional condition of the cardiovascular system or the system of external breath is "low";
- LFScvs ≤ 49,6. The level of functional condition of the cardiovascular system or the system of external breath is "below the average";
- LFScvs ≤ 66,1. The level of functional condition of the cardiovascular system or the system of external breath is "average";
- LFScvs ≤ 82,6. The level of functional condition of the cardiovascular system or the system of external breath is "above the average";
- LFScvs > 82,6. The level of functional condition of the cardiovascular system or the system of external breath is "high".

All received results during the research were processed on the personal computer with the use of package of the program Statistika 6.0.

Results of the research and their discussion

The comparative analysis of functional condition of the cardiorespiratory system of organism of girls of the control and experimental groups was carried out at the beginning of the experiment which was made for the purpose of the assessment of efficiency of the developed by us comprehensive program of the use of means of sport games in the course of physical education of students.

The results of the comparative analysis of reference values of indicators of the cardiorespiratory system of students of 18-19 years old of the control and experimental groups allowed stating their relative uniformity (tab. 1).

Low sizes of coefficient of profitability of blood circulation (3998,57±119,47 c.u. and 4273,64±148,51 c.u.), below the average – hypoxia index (0,31±0,01 c.u. and 0,32±0,01 c.u.) and index of Skibinsky (831,04±48,64 c.u. and 933,61±63,76 c.u.) and averages – index of Robinson (81,21±1,07 c.u. and 84,21±1,64 c.u.), systolic (51,36±1,75 ml and 54,89±1,90 ml) and minute (3,69±0,14 l·min^{-1}and 4,00±0,14 l·min^{-1}) volumes of blood, the general peripheral resistance of vessels (1680,26±71,44 c.u. and 1543,23±62,13 c.u.), levels of functional condition of the blood circulatory systems (58,68±3,12 points and 59,40±3,83 points), external breath (54,46±4,62 points and 53,51±5,10 points) and the level of physical health (52,12±5,07 points and 49,69±4,93 points) were noted irrespective of the group characteristic and students.

It should be noted that values of HR meeting physiological standard, systolic and diastolic arterial pressure, but hypokinetic type of regulation of warm activity were characteristic of all examined students.

The assessment of influence of the offered by us comprehensive program of the use of means of sports in the course of physical education of students of 18–19 years old was carried out on the basis of the analysis of the dynamics of indicators of functional condition of the cardiorespiratory system of their organism within the experiment (tab. 2).

It is shown that the reliable positive decrease in sizes of HR, systolic and diastolic arterial pressure, index of Robinson or the double work (to 77,55±1,35 c.u.) and the general peripheral resistance of vessels (till 1422,26±36,56 c.u.), and also the reliable growth of time of breath holding on breath and exhalation (respectively to 0,42±0,03 s and 28,73±1,45 s), indexes of hypoxia and Skibinsky (respectively to 0,42±0,03 c.u. and 1275,85±97,91 c.u. were noted after the completion of the research at students of 18–19 years old which were engaged within the academic year according to the developed by us program of complex use of means of sports.

The reliable growth of the level of functional condition of the blood circulatory systems (to 78,10±1,89 points), external breath (to 79,25±3,41 points) and the level of physical health (to 71,52±4,44 points) became the result of the specified changes.

It is important to note that the levels of functional condition of the cardiovascular system, systems of external breath and physical health of students of the experimental group were considered as above the average after the completion of the experiment.

Also the results of the comparative analysis of indicators of the cardiorespiratory system of girls of the control and experimental groups after the completion of the experiment looked convincing (tab. 3).

It is shown that characteristic of students of the experimental group, than girls of the control group have sizes of diastolic arterial pressure (respectively 51,82±0,76 mm Hg and 55,00±1,17 mm Hg) and the general peripheral resistance of vessels (1422,26±36,56 c.u. and 1606,24±72,73 c.u.), but authentically higher values of vital capacity of lungs (respectively 3,05±0,093 l and 2,74±0,094 l), breath holding time on breath (45,45±1,57 s and 37,00±1,67 s), exhalation (28,73±1,45 s and 23,43±0,56 s), indexes of

Table 1

Indicators of functional condition of cardiovascular respiratory systems of organism of female students of 18–19 years old of the control and experimental groups at the beginning of the experiment, $\bar{X}\pm S$

Indicators	Control group (n=14)	Experimental group (n=11)
HR, bpm^{-1}	71,71±0,59	72,91±0,62
APs, mm Hg	113,21±0,85	115,45±1,71
APd, mm Hg	57,50±1,14	56,82±1,22
CPB, c.u.	3998,57±119,47 low	4273,64±148,51 low
IR, c.u.	81,21±1,07 average	84,21±1,64 average
VCL, ml	2692,86±99,15	2909,09±97,66
Tin, s	33,64±2,06	36,82±1,93
Texh, s	22,00±0,70	23,18±0,93
IH, c.u.	0,31±0,01 below the average	0,32±0,01 below the average
IS, c.u.	831,04±48,64 below the average	933,61±63,76 below the average
SBV, ml	51,36±1,75 average	54,89±1,90 average
MBV, l·min^{-1}	3,69±0,14 average	4,00±0,14 average
CI, l·min^{-1}·m^{-2}	2,25±0,07 hypokinetic	2,39±0,07 hypokinetic
GPRV, dyn·s·sm^{-5}	1680,26±71,44 average	1543,23±62,13 average
LFScvs, points	58,68±3,12 average	59,40±3,83 average
LFCres, points	54,46±4,62 average	53,51±5,10 average
LPH, points	52,12±5,07 average	49,69±4,93 average

Table 2

Indicators of functional condition of the cardiovascular and respiratory systems of female students of 18–19 years old of the experimental group at the beginning and after the experiment, $\bar{X}\pm S$

Indicators	Beginning	Ending
HR, bpm^{-1}	72,91±0,62	69,64±1,14*
APs, mm Hg	115,45±1,71	111,36±0,7*
APd, mm Hg	56,82±1,22	51,82±0,76**
CPB, c.u.	4273,64±148,51 low	4144,55±94,56 below the average
IR, c.u.	84,21±1,64 average	77,55±1,35** above the average
VCL, ml	2909,09±97,66	3050,00±93,66
Tin, s	36,82±1,93	45,45±1,57**
Texh, s	23,18±0,93	28,73±1,45**
IH, c.u.	0,32±0,01 below the average	0,42±0,03** average
IS, c.u.	933,61±63,76 below the average	1275,85±97,91** average
SBV, ml	54,89±1,90 average	58,07±1,04 average
MBV, l·min^{-1}	4,00±0,14 average	4,04±0,10 average
CI, l·min^{-1}·m^{-2}	2,39±0,07 hypokinetic	2,42±0,06 hypokinetic
GPRV, dyn·s·sm^{-5}	1543,23±62,13 average	1422,26±36,56 below the average
LFScvs, points	59,40±3,83 average	78,10±1,89*** above the average
LFCres, points	53,51±5,10 average	79,25±3,41*** above the average
LPH, points	49,69±4,93 average	71,52±4,44** above the average

Note. ** – p<0,05; ** – p<0,01; *** – p<0,001 in comparison with sizes of indicators at the beginning of the experiment.*

hypoxia (0,42±0,03 c.u. and 0,33±0,01 c.u.), Skibinsky (1275,85±97,91 c.u. and 913,53±45,68 c.u.), systolic (58,07±1,04 ml and 52,90±1,55 ml) and minute (4,04±0,10 l·min^{-1} and 3,73±0,12 l·min^{-1}) volumes of blood, cardiac index (2,42±0,06 c.u. and 2,28±0,07 c.u.) were lower at this investigation phase authentically.

Sizes of levels of functional condition of the cardiovascular system (78,10±1,89 points and 62,61±3,33 points), systems of external breath (79,25±3,41 points and 57,50±4,88 points) and physical health (71,52±4,44 points and 55,89±5,44 points) were also authentically higher at students of the experimental group.

Conclusions

In general the submitted data confirmed the undoubted positive influence of the complex use of means of sports on indicators of physical and functional fitness of students of 18–19 years old in the course of the section studies on physical education in higher education institution.

Prospects of further researches in this direction. Studying of the efficiency of use of the author's program of the complex use of means of sports in the course of physical education of female students of much senior courses is planned in future.

Table 3

Indicators of functional condition of the cardiovascular and respiratory systems of female students of 18–19 years old of the control and experimental groups after the experiment, $\bar{X}\pm S$

Indicators	Control group (n=14)	Experimental group (n=11)
HR, bpm^{-1}	70,43±0,43	69,64±1,14
APs, mm Hg	111,07±0,77	111,36±0,7
APd, mm Hg	55,00±1,17	51,82±0,76*
CPB, c.u.	3952,86±112,26	4144,55±94,56
IR, c.u.	78,23±0,74	77,55±1,35
VCL, ml	2,74±0,094	3,05±0,093*
Tin, s	37,00±1,67	45,45±1,57**
Texh, s	23,43±0,56	28,73±1,45**
IH, c.u.	0,33±0,01	0,42±0,03**
IS, c.u.	913,53±45,68	1275,85±97,91**
SBV, ml	52,90±1,55	58,07±1,04**
MBV, l·min^{-1}	3,73±0,12	4,04±0,10*
CI, l·min^{-1}·m^{-2}	2,28±0,07	2,42±0,06*
GPRV, dyn·s·sm^{-5}	1606,24±72,73	1422,26±36,56*
LFScvs, points	62,61±3,33	78,10±1,89***
LFCres, points	57,50±4,88	79,25±3,41***
LPH, points	55,89±5,44	71,52±4,44**

Note. ** – p<0,05; ** – p<0,01; *** – p<0,001 in comparison with sizes of indicators in the control group.*

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Inna Cherednichenko*: Zaporizhzhya National University: Zhukovsky str. 64, Zaporizhzhya, 69000, Ukraine.*
ORCID.ORG/0000-0002-9325-6405
E-mail: missis.theredni4enko@yandex.ru

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Application of the current control for the improvement of the training process of sportsmen-acrobats of 8–9 years old

Alfiya Deyneko

Kharkiv State Academy of Physical Culture, Kharkiv, Ukraine

Purpose: *to reveal the dynamics of changes of the level of development of special motive preparedness of children of 8–9 years old in acrobatics on the basis of the current control.*

Material & Methods: *materials of the research, which was conducted by means of pedagogical testing of acrobats of 8–9 years old on the basis of children's and youth sports school No. 6 of Kharkiv, are considered in the article.*

Results: *the developed experimental technique of improvement of special motive training of acrobats of 8–9 years old and the introduced in it amendments on the basis of the current control affected the level of development of special motive preparedness of acrobats.*

Conclusions: *the use of the systematic current control allows defining accurately to what special motive exercises and physical qualities in the training process is paid not enough attention and allows correcting it due to the increase in number of exercises and their variability.*

Keywords: *current control, sportsmen-acrobats, special motive preparation, testing.*

Introduction

Different approaches to the use of control in the training process are analyzed and offered in modern scientifically-methodical literature [5; 8; 10; 12]. It is caused by the fact that current trends in sports preparation are based on the subsequent growth of the total and special amounts of training and competitive loads, the individualization of the training process, the improvement of the system of selection of talented sportsmen, the increase in role of means of renewal and rehabilitation [9]. The solution of these tasks, according to V. N. Platonov [5], is possible only at the appropriate organization of control which provides the objectivity of management of the process of training of a sportsman. Its role significantly grows in modern conditions as the tendency to the rejuvation of sport and much earlier beginning of classes is observed, which makes much more strict requirements to the organization of the whole process of training of sportsmen.

Scientists (V. O. Sutulaya, V. G. Alabin, V. G. Nikitushkin) consider the concept of sports control as observation, test or survey of sportsmen which are conducted for the purpose of check or assessment of the level of their preparedness [10; 12]. In their opinion, the role of the main part in feedback chain is assigned to the control in sport that provides formation and correction of the training process [12]. V. N. Platonov considers that efficiency of the process of training of a sportsman in modern conditions is, in many respects, caused by the use of means and methods of complex control as to the instrument of management. It allows carrying out the return communication between a coach and a sportsman, and to increase the level of administrative decisions when training sportsmen on this basis [5]. In his opinion, the purpose of control is optimization of the process of preparation and competitive activity of sportsmen on the basis of the objective assessment of different parties of their preparedness and functionality of the major systems of organism.

The improvement of the competitive program which demands high reliability and stability of technical skill of sportsmen is characteristic for modern sports acrobatics [1; 6]. The technique and the organization of training of acrobats is based on the general principles of the modern system of sports training, features of technique of sport and wide practical experience of coaches [4; 7]. These factors cause the search of new ways of improvement of the training process of sportsmen-acrobats which can be reached due to the increase in level of their physical, technical, tactical, mental, integrated sports training and level of special motive preparedness. The structure and the content of control of the training process at different stages of preparation in acrobatics have to change according to regularities of the biological development of sportsmen, depending on their abilities and growth of sports results. The accounting of all these features is provided with the organization of control as the complete system which organically logs in long-term training of sportsmen-acrobats. The efficiency of functioning of such system at all stages is defined by the quality of control at the selection of perspective sportsmen, and also the professionalism of their preparation [5; 10; 12]. The chosen subject is urgent as efficiency of the training process of acrobats, especially at the stage of initial preparation, is defined by the quality of control. At the same time modern researches demonstrate the existence of problem of not systematic use of control in the training process of young acrobats.

The purpose of the research:

to find dynamics of changes of the level of development of special motive preparedness of children of 8–9 years old in acrobatics on the basis of the current control.

Material and Methods of the research

The researches were conducted on the basis of children's and youth sports school No. 6 of Kharkiv, in which 12 acrobats of 8–9 years old took part. The testing of physical qualities of young sportsmen was conducted by means of the current control at the beginning of the experiment, on the basis of which the technique of improvement of special motive preparation was developed. This technique was used in the training process within half-year. The current control was carried out in 12 weeks of trainings with application of the offered technique by which results amendments in the training process of young acrobats were introduced. The following current control was carried out for the detection of efficiency of the offered technique and brought corrections at the end of the experiment.

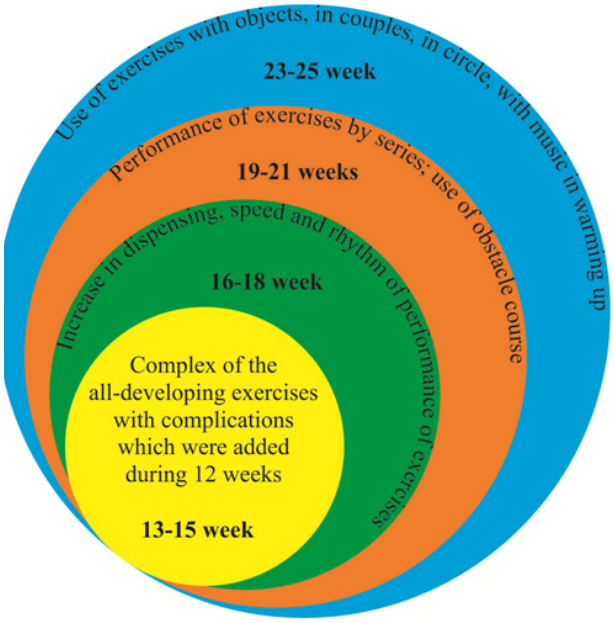
Research methods: analysis and generalization of scientifically-methodical literature, pedagogical testing, pedagogical experiment, methods of mathematical statistics.

Results of the research and their discussion

The testing of their physical qualities was held for the purpose of the determination of level of special motive preparedness of sportsmen-acrobats. The following tests were used for the detection of high-speed and power abilities during the research: "Standing long jump (sm)"; "Jump up from the place (sm)"; "Outleaps in a row on height (number of times)". For the definition of power abilities: "Holding of the provision "angle" (s)"; "Trunk raising on floor (number of times)"; "Bending and extension of hands in emphasis, lying (number of times)". For the definition of flexibility: "Trunk bending forward from situation, sitting (sm)"; "Exercise of "bridge" (sm)"; "Splits (points)". For the definition of coordination abilities: "Jump on 360° (points)"; "Coordination exercise (points)"; "Throwing over (points)". The analysis of the received results allowed developing the technique of improvement of special motive preparation of acrobats at the stage of initial preparation (pic. 1).

Pic. 1. The technique of improvement of the training process of acrobats of 8–9 years old at the expense of complication of means of special motive preparation

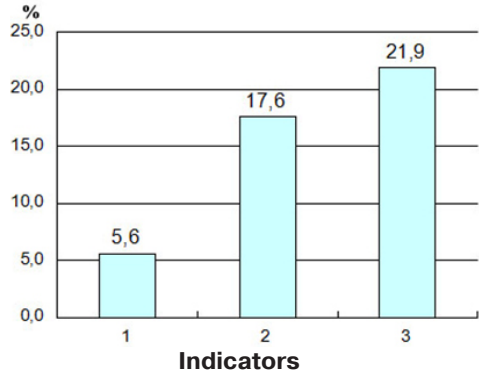
The following current control was exercised which allowed to estimate the efficiency of the chosen technique and to introduce amendments in the training process of acrobats for its optimization in 12 weeks of trainings (pic. 2).



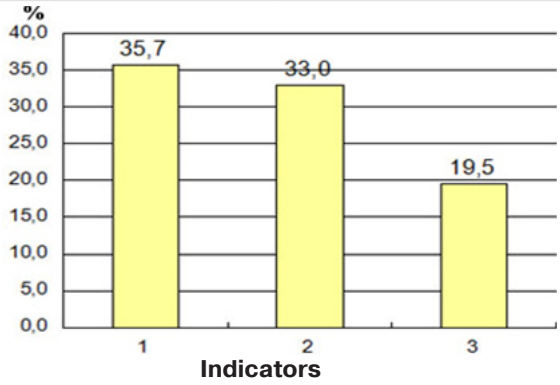
Pic. 2. Amendments of the technique of improvement of the training process of acrobats of 8–9 years old

The following current control was carried out for the confirmation of efficiency of the offered technique at the end of the experiment. The received results presented in pictures 3–6 testify to the efficiency of use of the developed sets of exercises and confirm the need of use for the training process of the current control. So, the improvement of results of the development of high-speed and power abilities, which can be explained with application of various jumps, increase in number of their repetitions, and at the expense of complication of starting positions, is shown in pic. 3 [2; 11].

The gain of results of the development of power abilities of acrobats of 8–9 years old at the end of the experiment is shown in pic. 4. The improvement of the level of development of power qualities can be explained with the fact that young acrobats performed various exercises (squat, jumps, bendings and extensions of hands, in emphasis, lying but other); exercises with encumbrance, partner's resistance exercises and so on during the experiment [2; 3; 11].

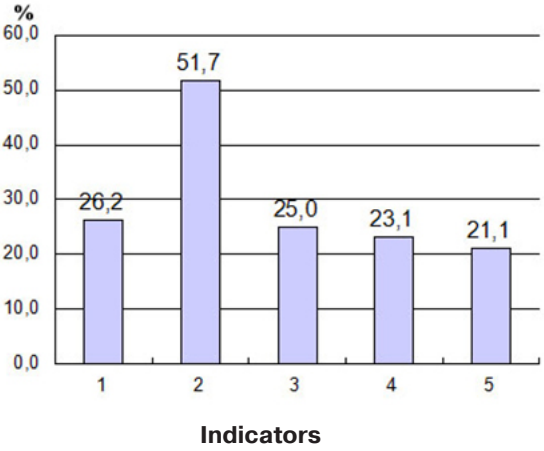


Pic. 3. Changes of the level of development of high-speed and power preparedness of young acrobats during the experiment: *1 – "Standing long jump"; 2 –"Jump up from the place"; 3 –"Outleaps in a row on height"*

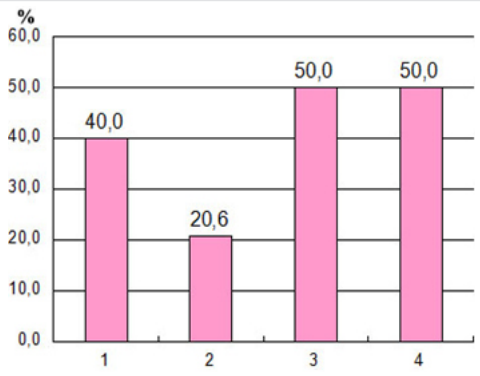


Pic. 4. Changes of the level of development of power preparedness of young acrobats during the experiment: *1 – "Holding of the provision "angle" 3 s"; 2 – "Trunk raising on floor for 30 s"; 3 – "Bending and extension of hands in emphasis, lying"*

The gain of results of the development of flexibility of acrobats at the end of the experiment is shown in pic. 5. Considering that the age of 8–9 years is sensitive for the development of flexibility, the experimental technique provided the systematic performance by sportsmen-acrobats of stretching exercises of muscles: active exercises (slow, elastic, swing movements); passive exercises (with use of mass of own body, with delights, by means of the partner) [2; 11].



Pic. 5. Changes of the level of development of flexibility of young acrobats during the experiment: *1 – "Trunk bending forward"; 2 – "Exercise "bridge""; 3 – "Split on the right leg"; 4 – "Split on the left leg"; 5 – "Cross split"*



Pic. 6. Changes of the level of development of coordination abilities of young acrobats during the experiment: *1 – "Jump on 360°"; 2 – "Coordination exercise"; 3 – "Throwing over forward "; 4 – "Throwing over backward"*

The gain of results of the development of coordination abilities of acrobats at the end of the experiment is shown in pic. 6. Exercises without visual control, and also exercise which consisted of the combined movements, were applied for the development of coordination during the experiment [2; 3; 11].

Conclusions

The results of the research demonstrate that the developed experimental technique and the introduced amendments in the training process of acrobats of 8-9 years old affected the level of the development of their special motive preparedness. It is connected both with the all-developing influence of the picked-up exercises, and with the fact that the movements of sportsmen have got accuracy for the performance of test exercises at the highest technological level. Thus, the systematic current control gives the chance to accurately define to what physical qualities and special motive exercises in the training process is paid not enough attention and gives the chance to correct it due to the increase in number of exercises and their variability.

Prospects of the subsequent researches. It is planned to estimate the influence of the developed technique of improvement of special motive preparation of young sportsmen in other gymnastic sports in the subsequent.

Conflict of interests. *The author declares that there is no conflict of interests which can be perceived as such that can do harm to impartiality of the article.*
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Alfiya Deyneko: *PhD (Physical Education and Sport); Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0001-7990-7999
E-mail: ulija_d@mail.ru

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Interaction of a physician and a specialist on physical rehabilitation at violations of activity of the musculoskeletal system

Andrii Hertsyk

Lviv State University of Physical Culture, Lviv, Ukraine

Purpose: *the improvement of cooperation and the interaction of an attending physician and a specialist on physical rehabilitation at violations of activity of musculoskeletal system.*

Material & Methods: *physical rehabilitation is considered as a difficult system with the hierarchically-ordered structure. The analysis of references and the system analysis are applied.*

Results: *the modern approaches to coordination of centers of decision-making and the management in hierarchical systems are analyzed. The ways of the interlevel coordination in organizational systems are revealed. The need of coordination of activity of an attending physician and a specialist on physical rehabilitation is proved. The content and the direction of coordination signals for the system of physical rehabilitation at violations of activity of the musculoskeletal system are determined.*

Conclusions: *the coordination of activity of an attending physician and a specialist on physical rehabilitation at violations of activity of the musculoskeletal system has to occur in certain ways: on purposes, on restrictions, in time, on input and output parameters.*

Keywords: *physical rehabilitation, musculoskeletal system, coordination signal.*

Introduction

Physical rehabilitation can be considered as the difficult hierarchical system which works in variable conditions. The increase in efficiency and flexibility of the mechanism of coordination in adoption of operational, tactical and strategic decisions [1] is one of the directions of the improvement of functioning of such systems.

Providing rehabilitation services in medical institutions is regulated by the order of the Ministry of Health of Ukraine No. 176 of 29.03.2011. Such duties are assigned to a doctor on medical physical culture and a nurse (instructor) on medical physical culture [2; 3].

The analysis of duty regulations showed that the task and duties of an instructor and a doctor of physical therapy, which directly concern holding rehabilitation actions, considerably coincide. The exception is made by the control function of a doctor of medical physical culture and its task – to introduce new effective techniques on medical physical culture. The existence of several centers of decision-making among which there is an attending physician, a doctor of medical physical culture, an instructor of medical physical culture, a patient, puts the problem of their effective cooperation and interaction [4].

Experts, who have the higher sports education, can be appointed to the instructor's position on medical physical culture. These experts are considered such which have special preparation on physical therapy [3]. Thus, specialists on physical rehabilitation can hold the instructor's on position physical therapy. In medical institutions they very often directly interact with attending physicians as positions of doctors of physical therapy are absent in most medical institutions and offices. For this reason establishing of the effective cooperation of a specialist on physical rehabilitation and an attending physician is the important scientific and practical problem.

Communication of the research with scientific programs, plans, subjects

The work was performed within the Built plan of the research work in the sphere of physical culture and sport for 2011–2015 on the subject 4.2 "Physical rehabilitation of disabled persons with violations of activity of the musculoskeletal system".

The purpose of the research:

the improvement of cooperation and interaction of the attending physician and the specialist on physical rehabilitation at violations of activity of the musculoskeletal system.

Research task:

1. To open modern approaches to the solution of the problem of coordination of activity in social systems with the constant hierarchically-ordered structure.

2. To analyze practical and theoretical aspects of cooperation of the doctor and specialist on physical rehabilitation at violations of activity of the musculoskeletal system.

3. To offer ways of the improvement of cooperation and interaction of the attending physician and the specialist on physical rehabilitation at violations of activity of the musculoskeletal system.

Material and Methods of the research

Physical rehabilitation is considered as difficult system with hierarchically-ordered structure. Research methods: analysis of references, system analysis.

Results of the research and their discussion

The principle of hierarchy (multilevel, co-subordination) is one of the universal principles of the organization of difficult systems [5]. Hierarchy is called the arrangement of parts and elements in certain order: from higher till lower. The distribution of administrative functions between authorities or subsections of different level is in systems with hierarchical structure. The operating body of some level of hierarchy can direct one or several authorities of the lowest level which submit to it, and itself is guided by the body of the higher level [6].

The large number of simple tasks is solved in hierarchical structures of management at the lowest level, and at the highest levels – small amount of complex challenges. Usually, the general task of optimum control of hierarchical systems is set as the static optimizing task that is the problem of functioning is considered on rather wide intervals of time during, which it is possible to neglect the dynamics of the course of system processes [7].

The certain autonomy of separate governing bodies of intermediate and lower levels has to be provided in the sense that each of them independently, within the powers determined by the functions and the set restrictions charged to it operates the subsections subordinated to it in hierarchical systems with distribution of functions of management behind levels. The operating body (the operating system) makes the operating information (orders, instructions, teams), sends it to venue of management (the operated system), and then obtains and analyzes the return information on his behavior. The new operating information which is sent by the operating body is corrected or made depending on results of the analysis of information on condition of venue of management. If people or social systems act as venues of management, it is transferred in type of oral or written orders, or by means of telecommunication means: phone, fax, e-mail [6].

The control system is formed by such main components:

– the subject management (the operating body, the operating system) which generates the operating influence performs functions of the management, that is influences venue for the purpose of its transfer to a new state;

– the venue management (the operated venue, the operated system) which functions under the operating influence of the subject;

– the operating influence, or direct connections, – complex of purposeful and organizing teams, actions, techniques, methods by means of which influence on venue is carried out and are reached real changes in it;

– feedback that is information for the subject of management on result of the operating influence on venue and changes in it [8].

The studied interaction can be effective only in case when it will be built taking into account the general features of functioning of hierarchical structures. Such belong to them:

– vertical submission;

– priority of actions of subsystems of the highest level (right of intervention);

– interdependence of actions of the highest and lower levels of structure;

– elements of the top level of hierarchy deal with big subsystems and with broader aspects of behavior of the system in general;

– decision-making periods for elements of the top level are more, than for elements of the lowest levels;

– top levels deal with slower manifestations of system;

– description of problem at the top level is less structured and formalized, contains more uncertainty [6].

Physical rehabilitation is the open difficult system as consists of separate subsystems, such as the specialist in physical rehabilitation, the patient, the rehabilitation purpose. At the same time it can be considered as subsystem in health system and as venue of its management. The health care in this case acts as the system of the highest level (meta-system) which element is the attending physician. He plays the role of the subsystem which carries out the operating influence that is the control system for the operated system – physical rehabilitation. As physical rehabilitolog and the patient treat the system of physical rehabilitation, and interact of the doctor and the rehabilitolog should be considered through the prism of management of the studied system.

The purpose of functioning of system of physical rehabilitation is renewal of motive functions, activity and health of the patient. The purpose is achieved by the realization of rehabilitation potential of the patient. It is the complex of biological and psychophysiological characteristics of individual, and also the socially-surrounded factors which allow realizing in this or that degree its potential abilities [9].

Rehabilitation potential and its realization are connected with resources which are at the disposal of system of physical rehabilitation: material, financial, power, human, organizational, information, time. Physical rehabilitation as any other system, functions in the conditions of deficiency of resources therefore their effective use is condition of timely realization of rehabilitation potential and achievement of purposes of rehabilitation.

Mutual influence of subsystems in the course of their functioning happens in the presence of the general restrictions which can be the general resources. Strengthening of activity of one subsystem will entail the reduction of part of resources another and vice versa. Resources can be distributed under the influence of random factors, or the compromise solution will be made for subsystems. The governing body of the highest level has to make decisions in that case for the benefit of the whole system [6].

Cooperation and interaction of the doctor and physical re-

habilitolog consists in the general effective use of system resources, especially the patient's resources. Such general resources, which predetermine mutual influence of meta-system and the studied system, are time and energy in medical and rehabilitation processes.

The resource of energy concerns reserve opportunities of organism of the patient and is shown by the individual reaction to conservative or expeditious treatment and therapeutic exercise stresses. It is connected with the work of immune system, functional potential of life support systems, adaptation reserve and compensatory opportunities of cardiovascular and respiratory systems. The resource of energy enters the rehabilitation potential of the patient.

The resource of time of the energy is closely connected with the resource. First, it limits the simultaneous or parallel solution of the different purposes of treatment and rehabilitation, forces, to define priorities and to plan activity taking into account the speed of recovery processes in each case. Secondly, longer periods of renewal and vice versa provide big expenses of physical energy the patient.

The purpose of coordination of activity of the attending physician and physical rehabilitolog is expeditious adoption of the optimal solution of rather rehabilitation process by the exchange of information of management of different levels between centers: the attending physician – the highest, physical rehabilitolog – lower. Such approach is applied concerning all difficult hierarchical systems which function in the multitask mode in dynamic conditions [1].

The exchange of information between meta-system of health protection and its system of physical rehabilitation is carried out through the communication "attending physician – physical rehabilitolog". It needs to be formed as the close vertical connection of management (functioning) and interactions (coordination) by means of which the leading function of the attending physician is implemented in the medical-rehabilitation process.

The cooperative nature of this communication has to provide the agreement (coordination) of the purposes of rehabilitation and treatment when the first submit to the second. The synergy effect of cooperation of the attending physician and the physical rehabilitolog will be lost without such submission.

The task of definition of the optimum coordinating signal that allows directing activity of the centers of decision-making of different levels to the achievement of the global purpose of functioning of system appears in difficult systems from rather constant hierarchically-ordered structure [7; 10].

The inter-level coordination can happen in such a way in organizational systems:

– coordination on purposes: criterion function of subsystem is formed by the highest level, and for the planned period the control system of the highest level establishes quantitative values of certain indicators of functioning for subsystem;

– coordination on restrictions: the system of the highest level imposes restriction from system positions on number of parameters of functioning of subsystem taking into account its purposes;

– coordination in time: work of subsystem is synchronized with the work of system;

– coordination on input or output parameters [7; 11; 12; 13].
The problem of inter-level coordination and interaction of meta-system (system) of health protection and system (subsystem) of physical rehabilitation needs to be resolved in all described ways. It is very important to physical rehabilitolog to obtain from the attending physician the relevant information for the coordination of the purposes of rehabilitation with the purposes of treatment and accurate coordination of the rehabilitation process with medical in time.

The attending physician has to provide to physical reabilitolog information on the whole treatments with which it is necessary to coordinate the whole rehabilitations for *coordination on the purposes*. Rehabilitolog works on the achievement of the purposes by means of rehabilitation technologies and if it is possible, defines result quantitatively. Examples which concern the musculoskeletal system can be such:

– reduction of hypostasis: measure grasp by centimetric tape;

– reduction of pain: measure points on visual analog scale of pain;

– improvement of mobility in joints: measure in degrees by the goniometer;

– renewal of force: define in points by manual muscular testing or dynamometer in newton.

Coordination on restrictions consists in the accurate formulation by the attending physician of individual contra-indications and cautions to performance of rehabilitation actions at violations of activity of the musculoskeletal system. Restrictions mainly concern the range of movements, postural poses, power and functional loadings. Let's give examples of possible contra-indications:

– restriction for performance of active or passive movements of certain range of rather certain axes which could entail damage of postoperative hems (the doctor specifies the resolved range of movement in joint in degrees);

– prohibition of partial or full transferring of weight through the injured lower extremity at gait with supportive applications (the doctor can define the resolved loading as light touch, partial, half of body weight or to emergence of sensations of pain);

– performance of passive movements or adoption of separate provisions after the carried out metalloosteosynthesis of spine, pelvis or extremities;

– restriction of encumbrances when performing power exercises which can entail repeated injury of muscles of sinews or bones (the doctor specifies the most resolved power loading in kilograms);

– restriction of functional loadings for patients with the accompanying pathology of cardiovascular and respiratory systems (the doctor limits duration and intensity of loadings) [14].

Physical rehabilitolog has to obtain such data for *coordination*

in time:

– the predicted duration of individual application of techniques of conservative treatment of the musculoskeletal system: skeletal endurance, plaster immobilization;

– to give the planned operative measures;

– the predicted individual terms of healing;

– the predicted terms of stay in medical institution.

The noted information will make possible synchronization of rehabilitation actions with medical.

Coordination on input or output parameters needs specification of these concepts for the system of physical rehabilitation.

The data from the case history which concern, first of all, the course of disease, the carried-out treatment, and their possible influence on the motive sphere of the patient, are the input parameters:

– passport data;

– date of hospitalization;

– profession;

– main diagnosis, date of establishment, clinical picture (set of displays of disease), complication;

– associated diseases;

– data on the executed surgeries.

Input parameters have to be surely considered by physical rehabilitolog already at the stage of planning of all rehabilitation actions.

Concerning the output parameters, aggregation of information, which is transferred to the top level of management, is one of the features of hierarchical systems [15]. The center of decision-making of the highest level interests not current state of all elements or systems of the lowest level, and only the main indicators of their activity on certain interval of time. This information helps to solve effectively coordinating problem of management [16].

Coordination on output parameters is the main feedback thanks to which the meta-system of health protection is informed on activity of the system of physical rehabilitation. Output parameters can rearrange the work of the attending physician. The achievement or not achievement of the planned (desirable) indicators of renewal of range, force, function, the new stage of treatment (conservative, surgical) gives the chance to begin, or not to begin, for example:

– the translation of discordant contracture by means of rehabilitation technologies in concordant will remove the need of operative measure in joint and will make possible conservative treatment;

–the requirement of operative measure will disappear at renewal by physical exercises of force of the acceptable level which is partially broken off to muscle;

– the impossibility to functionally compensate articulate instability as a result of the partial rupture of forward crossed ligament of knee actualizes the question of its plasticity.

It is inexpedient to physical rehabilitolog to inform the attending physician on the current functional state of the patient constantly. His task – is to collect, to aggregate, and write down professional information and in certain time or on demand to transfer the main indicators. It will be in such a way provided to the feedback, and the doctor as the center of decision-making of the highest level, will be able to solve the effectively coordinating problem of management of the medical-rehabilitation process.

Conclusions

1. Timely realization of rehabilitation potential of the patient and the achievement of purposes of physical rehabilitation are possible on condition of the realization of modern approaches to the coordination of activity and to the management in hierarchically-ordered systems.

2. The coordination of activity of the attending physician and the specialist in physical rehabilitation at violations of activity of the musculoskeletal system has to happen in certain ways: on purposes, on restrictions, in time, on input and output parameters.

3. The improvement of cooperation and interaction of the doctor and the specialist in physical rehabilitation can happen in several ways:

1. Study to features of professional interaction of future doctors and specialists in physical rehabilitation at the stage of receiving basic education.

2. Study of the practicing experts at the stage of post-degree education.

3. Improvement of official instructions and regulations.

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Andrii Hertsyk: *PhD (Physical Education and Sport); Lviv State University of Physical Culture Street. Kosciuszko, 11, Lviv, 79000, Ukraine.*
ORCID.ORG/0000-0003-1764-5625
E-mail: ahertsyk@gmail.com

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Algorithm of rehabilitation examination of children with bronchopulmonary diseases

Nataliya Ivasyk

Lviv State University of Physical Culture, Lviv, Ukraine

Purpose: *to develop the algorithm of rehabilitation examination for children with bronchopulmonary diseases.*

Material & Methods: *analysis, generalization, systematization and comparison of data of scientific and methodical literature on problems of physical rehabilitation at bronchopulmonary diseases.*

Results: *the offered algorithm of rehabilitation examination of children with bronchopulmonary diseases provides the consecutive application of such methods as: poll, physical examination, functional examination and method of indexes, which analysis allows defining the rehabilitation diagnosis, which is the basis of technology of the rehabilitation process.*

Conclusions: *rehabilitation examination is the compound of physical rehabilitation which is carried out for the purpose of definition of the rehabilitation diagnosis and is based on subjective, objective assessments and data of supervision. The consecutive carrying out of the complex rehabilitation examination on the offered algorithm and the detailed analysis of its results will promote the determination of rehabilitation potential, the reasons of violations from various systems of organism and individualization of the rehabilitation process of children with bronchopulmonary diseases.*

Keywords: *rehabilitation examination, bronchopulmonary diseases.*

Introduction

Physical rehabilitation is the integral part in treatment of diseases of respiratory organs. The display to its carrying out are sharp and chronic respiratory diseases which result from infection, inflammation, trauma, violation of mechanics of breath, deformation and operative measures on organs of a chest [15]. Renewal of the respiratory system at children and teenagers is a specific part of physical rehabilitation at bronchopulmonary diseases, at which the integrated approach has to be, which considers not only the requirements, caused by a disease, but also considering separate stages of physical and intellectual development of a child and natural physical activity [12].

The prime and integral component in the course of physical rehabilitation is carrying out rehabilitation examination for the purpose of definition of functional violations and establishment of the rehabilitation diagnosis [2; 7; 10] which will allow to create further the individual program of physical rehabilitation which adequate to needs of a patient [2; 8].

There is a change of focus of therapy on renewal of function at physical rehabilitation [11]. Therefore to understand functional problems of a patient and to define how to reduce these violations, it is necessary to define all factors which influence activity, especially those which can influence improvement of condition of a patient. And it demands the system approach to the analysis of dysfunction from this patient [14]. The certain departmental lack of regulation in respect of limits of its office competence and the available opportunities, which concern problems of purpose of additional methods of examination of a patient immediately, which completely are defined by a doctor, exists for today in practical activities of the Ukrainian specialists in physical rehabilitation [1]. However physical rehabilitolog has to exercise constantly control of physical condition of a patient in the course of work with a patient for the purpose of correction of the program of physical rehabilitation according to condition of a patient at the time of intervention. Therefore the rehabilitation diagnosis is formed on the basis of comprehensive examination of a patient who includes as the clinic-functional diagnosis (what is established by a doctor) but displays character and expressiveness of anatomic-physiological and functional violations, ratios pathogenetic and sanogenetic mechanisms at this stage of a disease (according to the clinical picture, the anamnesis and the nature of disease), and the characteristic of violations of habitual activity [2].

Communication of the research with scientific programs, plans, subjects

The work is performed on the subject of the Built plan of the research work in the sphere of physical culture and sport for 2011–2015, subject 4.2. "Physical rehabilitation of disabled persons with violation of activity of the musculoskeletal system" (number of the state registration is 0111U006471).

The purpose of the research:

to develop the algorithm of rehabilitation examination for children with bronchopulmonary diseases.

Material and Methods of the research

Research methods: analysis, generalization, systematization and comparison of data, scientifically-methodical literature on problems of physical rehabilitation at bronchopulmonary diseases.

Results of the research and their discussion

The expert of physical rehabilitation has to establish the rehabilitation diagnosis, respectively for this purpose he needs to conduct the examination of the patient in the clinical activity before starting the implementation of the rehabilitation program [7]. And here it should be noted that the patient comes to the specialist of physical rehabilitation in the conditions of sharp diseases for the direction of the doctor after the establishment of the diagnosis by it [11]. Therefore the rehabilitation examination has to help to find out the localization of the reason of the respiratory problem [13] and functional restrictions to physical rehabilitolog.

Carrying out the detailed analysis of application of the rehabilitation examination for persons with diseases of the musculoskeletal system, A. Hertsik notes three components of examinations, namely: observation, objective and subjective estimations [3].

Concerning the rehabilitation examination of children with bronchopulmonary diseases, it also includes both objective and subjective estimates, and observations which are interconnected among themselves.

The algorithm of the rehabilitation examination of children with bronchopulmonary diseases provides the consecutive application of such methods as: poll, physical examination, functional examination and method of indexes, which analysis allows defining the rehabilitation diagnosis, which is the subsoil of technology of the rehabilitation process (pic).

The poll is the subjective estimation of condition of the patient generally which includes complaints of the patient (main and additional), case history, life story, and existence of associated diseases, quality of life, psycho-emotional condition and addictions of an examined. The objective component of this method of examination is only the definition of passport data. Systematizing the data of the anamnesis of the child with respiratory diseases, it is necessary to pay special attention to the main complaints of the patient (cough, allocation of sputum, short breath, asthma, pain in the site of thorax). However you should not underestimate also the general complaints of the child which are connected with weakness, fatigue and so forth. In general all obtained data during the poll will significantly influence drawing up the program of physical rehabilitation of the child with bronchopulmonary diseases.

The objective tests give information on severity of disease and forecast concerning the function of lungs in addition to usual clinical data (cough, expectoration, frequencies of sharpening, state ofhealth, etc.) [9]. Speaking about objective data of examination, physical methods of the research are used which include the review, palpation, percussion and auscultation at bronchopulmonary diseases immediately [5]. However there is a wish to note that such methods as percussion and auscultation, the specialist in physical rehabilitation uses not on the purpose of the establishment of the clinical diagnosis (the doctor does it), and for the purpose of the definition (understanding) of the reasons which break the function of external breath and for the purpose of the definition of efficiency of the rehabilitation intervention and, if necessary, timely correction of the program of physical rehabilitation.

Carrying out the review of the child with bronchopulmonary diseases, physical rehabilitolog has to pay special attention to the examination of pasture [4; 15], form and symmetry of thorax (as at rest, and at deep breath), participations in the work of auxiliary respiratory muscles and the nature of breath (nasal/oral, free/hard, breath type, breath frequency and so forth). If it is necessary, it is possible to specify its form and movements, and also localization and degree not only pains in thorax, but also to define the existence of painful muscular consolidations, which are very important at the selection of exercises, and in particular respiratory, by the palpation method except the definition of resistance (elasticity) of thorax. And also to define indicators of HR.

The importance is taken away by the functional violation in pathogenesis of bronchopulmonary diseases [6]. Therefore spirometry (both static, and dynamic) which allows to understand better causes of infringement of function of external breath is widely applied, to define how involved reserve opportunities of organism of the child with respiratory diseases are; hypoxic tests, tests with exercise stress which give as the objective assessment of tolerance to exercise stress help to deal with the short breath reasons at exercise stress (e. g., as a result of detraining or factors which are connected with problems of actually respiratory system), and not less important the subjective estimation in the general understanding of functional condition of the child concerning the postponed loading and short breath by the patient in arsenal of physical rehabilitolog from functional tests.

The method of indexes supplements the data of the conducted examination and helps to individualize the program of physical rehabilitation for the specific child.

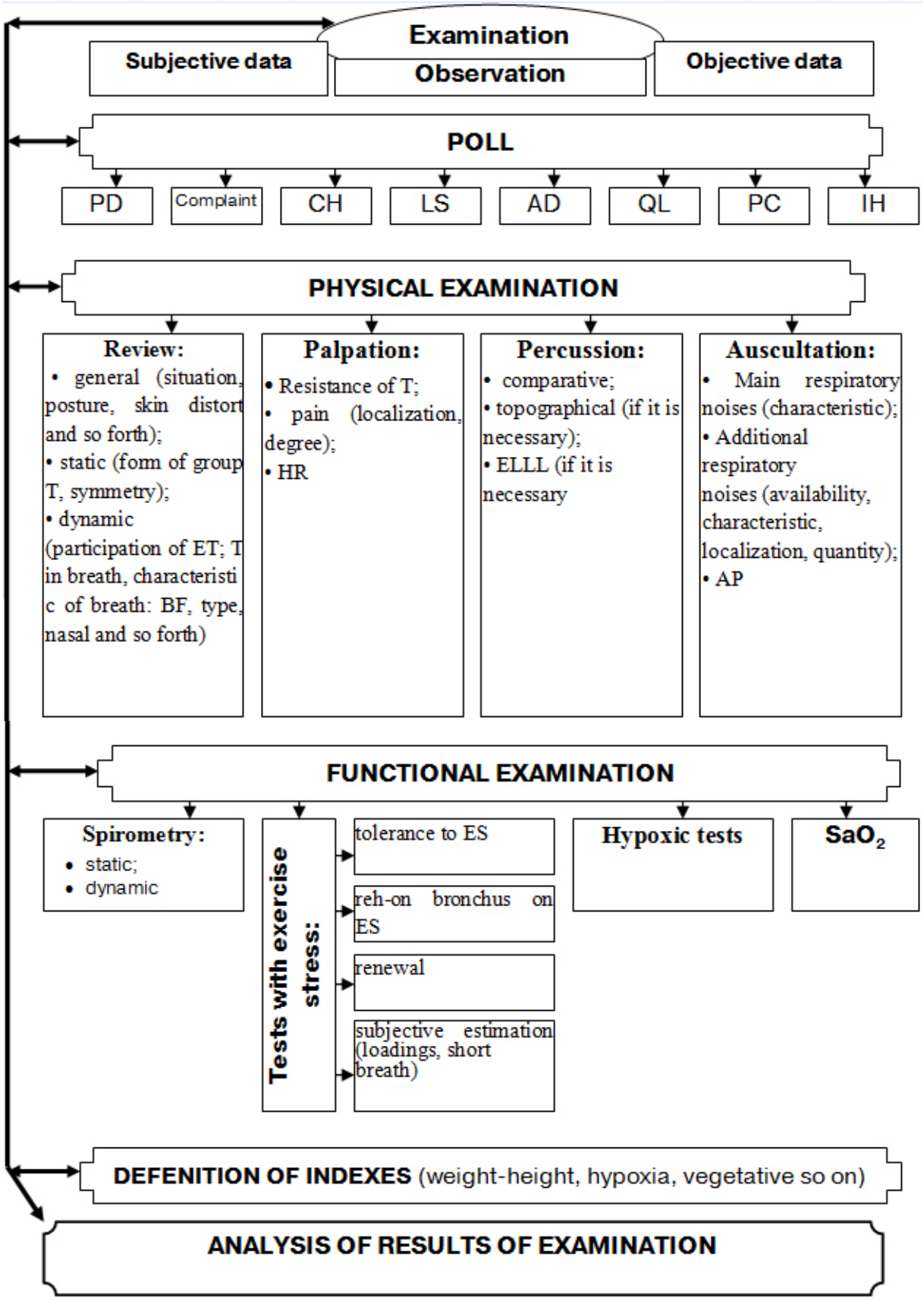
Concerning the observation, it begins with the moment when the rehabilitolog comes into chamber to the patient whether the patient to the hall to rehabilitolog also lasts constantly during the whole process of physical rehabilitation. And there is a wish to pay attention that these polls can sometimes contradict because we can observe (e. g., concerning the assessment of painful muscular consolidations, the patient can underestimate it, e. g., but its movements and mimicry will tell about a real condition).

If the condition of the patient is heavy, then we cannot conduct the whole examination for 1 time (for some patients even the ordinary conversation can you will be wearisome), then we need to correct as appropriate the activity and to come in addition for the purpose of the additional examination of this patient.

Conclusions

Rehabilitation examination is the component of physical rehabilitation which is carried out for the purpose of definition of the rehabilitation diagnosis and is based on the subjective, objective estimations and the data of observation. The consecutive carrying out of the comprehensive rehabilitation examination on the offered algorithm and the detailed analysis of its results will promote the determination of rehabilitation potential, the reasons of violations from different systems of organism and individualization of the rehabilitation process of children with bronchopulmonary diseases.

The prospect of the subsequent researches consists in the development of technology of physical rehabilitation for children with bronchopulmonary diseases.



Pic. Algorithm of examination of children with bronchopulmonary diseases: *PD – passport data; CH – case history; LS – life story; AD – associated diseases; QL – quality of life; PC – psycho-emotional condition; IH – injurious habits; T – thorax; ET – excursion of t; ELLL – excursion of lower lines of lungs; ES – exercise stress; AP – arterial pressure, HR – heart rate; BF – breath frequency; SaO_2 – oxygen saturation.*

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Nataliya Ivasyk: *PhD (Physical Education and Sport), Associate Professor; Lviv State University of Physical Culture: Kosciusko Str. 11, 79007, Lviv, Ukraine*
ORCID.ORG/0000-0002-0053-2854
E-mail: Ivasyk_N@i.ua

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Motive activity as the criterion of efficiency of introduction of the technology which is aimed at the development of professionally significant physical qualities of pupils of clothing manufacture in vocational-technical schools

Vitaly Kaszuba
Lolita Denysova
Natalia Golovanova

National University of Physical Education and Sport of Ukraine, Kiev, Ukraine

Purpose: *to carry out the analysis of results of researches of the forming experiment, and in particular, indicators of motive activity of respondents.*

Material & Methods: *contingent: pupils of "Balty vocational-technical agrarian school" of Balty of the Odessa Region – 40 girls of the I course who do not go in for sports; methods: analysis of literature, pedagogical methods of the research, questioning, methods of mathematical statistics.*

Results: *the data are analyzed, which are obtained in the forming experiment on the determination of level of motive activity by means of Framingham technique as one of the criteria of efficiency of introduction of the technology, which is directed to the improvement of professionally significant physical qualities of pupils of vocational-technical schools of clothing manufacture. Results of the questioning, which is directed to the identification subjective opinions of respondents concerning their motive activity, are analyzed. The results of questioning of pupils about the main conditions are presented, which are necessary for the involvement of students to the active physical improvement.*

Conclusions: *the received results confirm the efficiency of the developed and introduced technology.*

Keywords: *technology, professionally applied physical preparation, motive activity, professionally significant physical qualities, pupils.*

Introduction

The tendency to the decrease in motive activity and the increase in psycho-emotional tension in the course of study is observed every year at modern student's youth [1; 3; 6]. Physical culture (PC) exerts the considerable impact on memory strengthening, increase in working capacity, increase of mental abilities due to the activation of all psychophysiological processes of organism. Traditional techniques of the training process are focused on the performance of standard set of exercises that does not allow opening physical qualities of students completely. As a result, the decrease in motivation of students to physical activity appears [9].

N. V. Fomicheva, A. G. Polivayev, N. A. Volokhina, A. N. Rodionov see one of the directions of the improvement of system of physical education and the organization of educational process for physical culture in the development and implementation of such programs of physical education, which are directed to the formation of the creative relation to PC on the basis of the developing training, since preschool age and finishing with students, result of what has to become education at the engaged responsible attitude to themselves, to health as to the guarantor of vital, professional wellbeing. Universal promotion of HLS, social advertizing, demonstration of opportunities of physical culture for preservation, maintenance of health, and also, in many cases can become mechanisms of the implementation of programs for PC, also can be presented as remedies and rehabilitations; the saturation of programs of PC for the improving techniques allowing to level influence of such negative factors as catarrhal diseases, vision disorders, typical home accidents, smoking, etc.; the use of the latest technologies for the increase in interest and formation of motivation to PC; the integrated nature of training with use of means of PCS [2; 5; 10].

Communication of the researches with scientific programs, plans, subjects

The subject of the article is developed according to the Consolidating plan of the RW in the sphere of physical culture and sport for 2016–2020 on the subject 3.13. "Theoretic-methodical bases of health-forming technologies in the course of physical education of different groups of the population", the number of the state registration is 0116U001615.

The purpose of the researches:

to check the efficiency of introduction of the technology which is aimed at the development of professionally significant physical qualities of pupils of clothing manufacture of technical schools.

Task of the researches. To define and to analyze the level of

motive activity of pupils as one of the criteria of the efficiency of introduction of the technology.

Material and Methods of the research

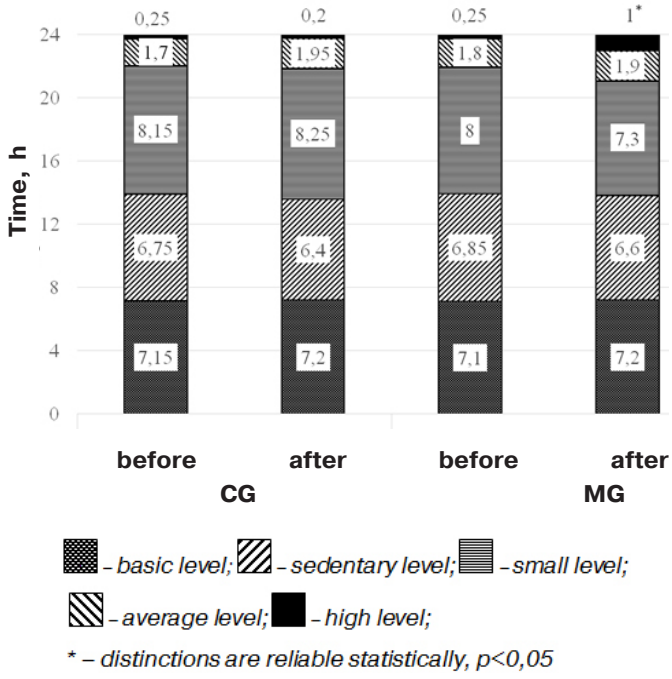
The researches were conducted on the basis of the state educational institution of "Balty vocational-technical agrarian school" of Balty of the Odessa Region. 40 girls of the I course (16–17 years old), who do not go in for sports, distributed on the main and control groups on 20 people in everyone, participated in the experiment.

Research methods: analysis of scientific and methodical literature, pedagogical methods of the research, questioning, assessment of the level of the motive activity (MA) by the Framingham technique. Methods of mathematical statistics (Shapiro–Wilk test was used for check of selections on compliance to the normal law of distribution, parametrical criterion of Student – for the definition of reliability of distinctions between selections).

Results of the research and their discussion

Within carrying out researches on the subject "Professionally applied physical preparation of pupils of technical schools of sewing production" We developed and approved the technology in the educational process, which is aimed at the development of professionally significant physical qualities of pupils of technical schools of clothing manufacture [7] (pic. 1).

The analysis of the data, which were obtained as a result of the forming experiment, was carried out after the development and approbation of technology. One of the criteria of efficiency of the offered technology, in our opinion, is the indicator of the level of motive activity (LMA) [8] (pic. 2). The following dynamics of indicators of the structure of daily motive activity in the control group was received: the average value of



Pic. 2. Comparative analysis of the structure of daily motive activity of the control and the main groups

time which is carried out on the classification as the basic IMA before the experiment made 7,15 h, after – 7,2 h; sedentary level during the experiment decreased from 6,75 h till 6,4 h. At the same time the average values of small level increased from 8,15 h till 8,25 h, the average level increased from 1,7 h till 1,95 h, and high decreased from 0,25 h till 0,2 h.

In the main group: the spent time on classification as basic IMA made 7,1 h before the experiment, after – 7,2 h. Indicators of the sedentary and the small levels decreased — sedentary from 6,85 h till 6,6 h, and small – from 8 h till 7,3 h respectively. The values describing the average and the high levels increased: average – of 1,8 h till 1,9 h, and high – from 0,25 h till 1 h. At the same time distinctions between groups did not differ before the experiment statistically, distinctions in the control group between indicators before and after the experiment changed statistically doubtfully, and in the main group – statistically reliable changes of indicators IMA are confirmed ($t=3,99$, $p<0,05$).

As well as in the stating experiment [4], the subjective estimate of motive activity was carried out in the CG and MG by means of the questioning (tab. 1).

Results of the poll of CG didn't change considerably in comparison with the data of the survey, which was conducted in the stating experiment and showed that 70% "very seldom, never" do morning exercises, at the same time 25% do it "sometimes" and 5% of examinees – "always, regularly". 80% of girls do evening gymnastics "very seldom, never", 15% – "sometimes" and 5% – "always, regularly". 80% of respondents answered the question about the visit of classes by physical exercises in volume of 4 h per week "very seldom, never", 10% – "sometimes" and 10% – "always, regularly". The same results gave the answers to the question about classes by recovery gymnastics (after study, work).

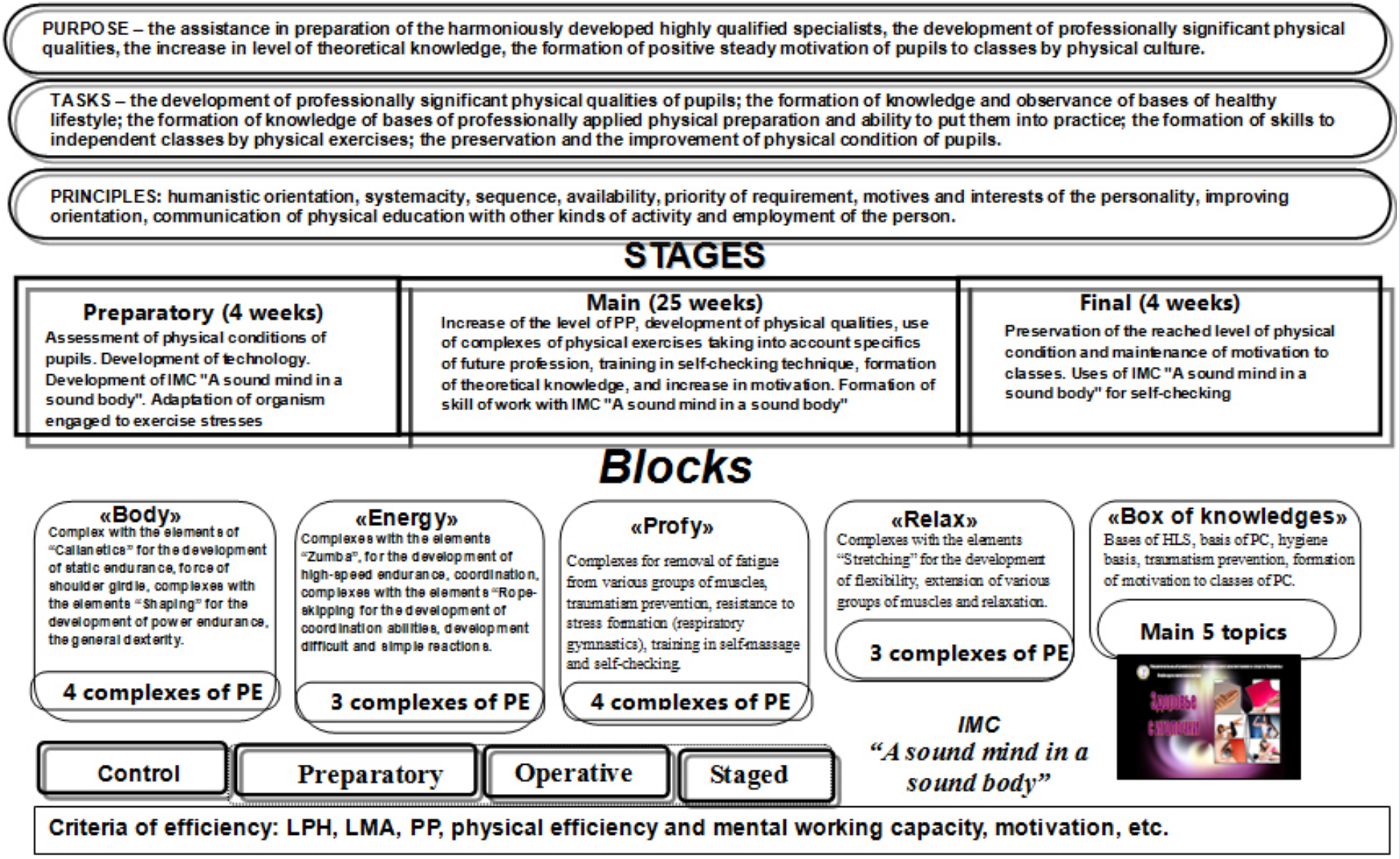
The information on visit by girls of sports or improving trainings was the following: 75% attend classes "very seldom, never", 15% – "sometimes" and only 10% – "always, regularly".

The data on regularity of passing training (the accelerated walking to school in combination with various physical exercises) at girls were distributed as follows: only 25% of pupils are engaged in passing training "very seldom, never", 40% – "sometimes" and 35% – "always, regularly".

At the same time the questions of introduction gymnastics (before study, work) and sports pauses during study, employed the present data: 5% of examinees hold these events "always, regularly", 10% – "sometimes" and 85% – "very seldom, never".

In the subjective opinion of respondents the week volume of rational motive activity, equal 8–10 h, made at 25% of girls "always, regularly", 30% – "sometimes" and 45% – "very seldom, never".

Along with it, the poll in MG after introduction of the offered technology showed that 25% of pupils do morning exercises "always, regularly", 25% – "very seldom, never" and 50% – "sometimes". The evening gymnastics is done by 20% "always, regularly", 50% – "sometimes" and 30% – "very seldom, never". 80% of girls attend classes by physical exercises "always, regularly" in volume of 4 h per week – 10% "sometimes"



Pic. 1. The flowchart of the technology, which is aimed at the development of professionally significant qualities of pupils of clothing manufacture

Table 1

Results of the poll of respondents of the forming experiment on rational motive activity, %

Rational motive activity	CG, n=20			MG, n=20		
	Always, regularly	Sometimes	Very seldom, never	Always, regularly	Sometimes	Very seldom, never
Morning exercises	5	25	70	25	50	25
Evening gymnastics	5	15	80	20	50	30
Classes by physical education in volume of 4 h per week	10	10	80	80*	10	10
Sports or improving training	10	15	75	25	65	10
Passing training (the accelerated walking to school in combination with various physical exercises)	35	40	25	55	40	5
Introduction gymnastics (before study, work)	5	10	85	80*	15	5
Sports pauses during study, work	5	10	85	90*	10	-
Recovery gymnastics (after study, work)	10	10	80	80*	15	5
The week volume of rational motive activity – 8–10 h	25	30	45	75*	15	10

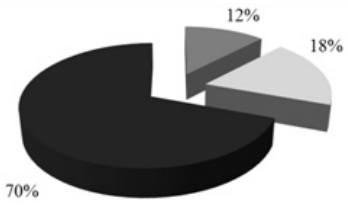
Note. ** – distinctions are reliable statistically, p<0,05.*

and 10% "very seldom, never".

25% of girls answered the question about visit of sports or improving trainings in MG "always, regularly", 65% – "sometimes" and 10% – "very seldom, never". The data on regularity of passing training (the accelerated walking to school in combination with various physical exercises) were distributed as follows: only 5% of pupils are engaged in this way "very seldom, never", 40% – "sometimes" and 55% do it "always, regularly".

The answers to the questions about visit of introduction gymnastics (before study, work) and recovery gymnastics (after study, work) showed the identical results: 80% of girls – "always, regularly", 15% – "sometimes" and 5% – "very seldom, never". 90% of examinees did pauses during study, works "always, regularly" and 10% – only "sometimes".

In the subjective opinion of respondents (pic. 3) the week volume of rational motive activity – 8–10 h deserved the answer "always, regularly" at 75% of people, 15% – "sometimes" and 10% – "very seldom, never".



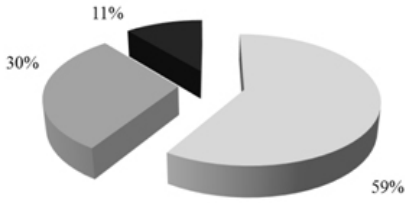
Pic. 3. Distribution of respondents by results of the questioning in CG (classes by rational motive activity), %:

■ – very seldom, never; □ – sometimes;

▒ – always, regularly.

By the consideration of the overall picture of motive activity of girls in CG (pic. 2) it is possible to note that 70% of respondents have no systematic motive activity, 18% are engaged sometimes and only 12% are engaged regularly.

We received the following results at the creation of the general MA in MG, pic. 4.



Pic. 4. Distribution of respondents by results of the questioning in MG (classes by rational motive activity), %:

■ – very seldom, never; □ – sometimes;

▒ – always, regularly.

Results of the poll of MG showed that only 11% of respondents are not engaged in motive activity, 30% are engaged sometimes and 59% are engaged in MA always and regularly.

Conclusions

The reliable improvements of the level of motive activity are revealed (p<0,05) as a result of the introduction of the developed technology in the educational process at girls of the main group. At the same time girls of the control group had no statistically significant positive dynamics of indicators (p>0,05). The presented results confirm the efficiency of the developed and introduced technology, which is aimed at the development of professionally significant physical qualities of pupils of technical schools of clothing manufacture.

Prospects of further research in this direction. To carry out the check of all criteria of the efficiency of introduction of the technology, which is aimed at the development of professionally significant physical qualities of pupils of technical schools of clothing manufacture.

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Vitaly Kaszuba: *Doctor of Science (Physical Education and Sport), Professor, National University of Physical Education and Sport of Ukraine: Phyzkul'tury str. 1, Kyiv, 03680, Ukraine.*
ORCID.ORG/0000-0001-6669-738X
E-mail: vkashuba@list.ru

Lolita Denysova: *PhD (Pedagogy), National University of Physical Education and Sport of Ukraine: Phyzkul'tury str. 1, Kyiv, 03680, Ukraine.*
ORCID.ORG/0000-0002-7045-9912
E-mail: kineziology@gmail.com

Natalia Golovanova: *National University of Physical Education and Sport of Ukraine: Phyzkul'tury str. 1, Kyiv, 03680, Ukraine.*
ORCID.ORG/0000-0002-8837-7501
E-mail: nav_gts@mail.ru

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Assessment of technique of tennis players of ten years old

Dmitriy **Krilov**
Lydmyla **Shesterova**

Kharkiv State Academy of Physical Culture, Kharkov, Ukraine

Purpose: *to define the simplest and informative methods of assessment of technique of young tennis players on the basis of the analysis of references and the experience of coaches.*

Material & Methods: *the following methods were used during the research: analysis and synthesis of references, syntheses of pedagogical experience of coaches.*

Results: *the processing of information, which is provided in references, allowed defining the most informative techniques of testing of technical preparedness of tennis players of 10 years old.*

Conclusions: *it is defined that the most informative and suitable techniques of assessment of technical preparedness of tennis players for this age are techniques which include subjective and objective indicators.*

Keywords: *tennis, assessment of technique, young sportsman.*

Introduction

Tennis – is a many-sided game with the set of movements and techniques which improvement is the result of long-term training. Questions of training in technique of playing tennis concern both sportsmen, and coaches. Two problems come up at experts in the course of training: training of a sportsman in ideal technique and criteria of its assessment.

The approach to the elementary education of young tennis players in Ukraine changed essentially last decade. Tennis balls of various diameters (more standard diameter, applied in tennis to adult players) and various degree of rigidity (50% and 75% of pressure of standard) appeared according to the recommendation of the International federation of tennis.

Change of rigidity of a ball leads to change of height of its bounce from the surface of the court, flight speed from a racket to the point of landing, rotation force in various axes, spots of contact with the string surface of a racket. These changes (introduction of "soft" and "big" balls) allow young sportsmen quicker and without additional load of the musculoskeletal system and the muscular system to master technical arsenal of tennis. The International federation of tennis recommends passing to training with standard balls in ten years. Tennis tournaments are also held by standard balls for players older than 10 years in Ukraine and around the world. In this regard a sportsman and a coach have problems, which are connected with the creation of the training process in the changed conditions.

Enough scientific works are devoted to the assessment of various parties of preparedness of tennis players. So, L. P. Sergienko (2013) offers for the evaluation criteria of special physical preparation of tennis players on the basis of the analysis of foreign press. V. V. Mulik, V. S. Loboda (2012) investigated the level of physical and technical preparedness of young tennis players. Questions of assessment of technique of tennis players were developed by M. Krespo, D. Miley (1998), V. A. Golenko, by A. P. Skorodumova (2005), T. S. Ivanova (2007).

However, offering test programs of assessment of technique, the above-mentioned experts not always considered the level of physical preparedness and the extent of possession of young sportsmen of technical arsenal of tennis.

The purpose of the research:

to define the simplest and informative techniques of assessment of technique of young tennis players on the basis of the analysis of references and experience of coaches.

Material and Methods of the research

The following methods were used during the research: analysis and synthesis of references, synthesis of pedagogical experience of coaches.

Results of the research and their discussion

There is the set of ways and playing styles in modern tennis, each of which, under certain conditions, can be productive. Respectively, the assessment of technique of the game represents certain complexity at stages of the maximum realization of individual opportunities and preservations of achievements. It is necessary for sportsmen of 10 years old, first of all, from opportunity positions to qualitatively master elements of technique and further productively to apply them in the course of the game.

So, T. S. Ivanova [1] offers the tests for the assessment of technique of the player, which are presented in table 1.

The contents of the table show that the assessment of tech-

nique is carried out on subjective and objective indicators. The subjective component demands the involvement of several experts that causes certain difficulties.

The objective component assumes the assessment of each complex by the number of effectively executed shots or serves.

The exercises, which are rather well mastered by them within the academic year, are offered young tennis player for the technique assessment.

The control exercises are grouped in two complexes taking into account the degree of complexity of performance.

The control complex 1 includes volleys and ground strokes on diagonals, and also a serve. The control complex 2 includes volleys and ground strokes on lines, overheads.

It is recommended to begin tests with the performance of exercises of the complex 1. Testing should be held in conditions, identical to examinees, it is desirable with the same rather qualified sparring-partner able to throw a ball unmistakably. When performing each task the young sportsman has to send a ball to the platform.

The assessment of ground strokes and with volley is carried out on the number of the executed in a row of faultless shots: 15 and more – is «excellent», 10–14 is «good», and 7–9 is «satisfactory».

The assessment of serves is carried out on the accuracy hit rate (10 attempts) to the set field of a serve: 10 – «excellent», 9–8 – «good», 7 – «satisfactory». The assessment of shots over the head is carried out on the number of unmistakably executed shots from 10 attempts: 10 – «excellent», 9–8 – «good», 7 – «satisfactory».

Grip at a serve – universal for children age up to 10 years old, universal, continental – up to 12 years old is estimated expertly on the five-point system (taking into account relevant requirements). At backhand – is universal or continental up to 12 years old, continental – after 12 years old. The strike zone at ground strokes of 20–30 sm ahead of a trunk and is not lower than the level of a knee.

Control complex 1: the partner and the examinee carry out volleys, from left to left, from right to right, the partner carries out the volley, the examinee plays with a bounce from left to left, from right to right, the partner carries out ground strokes, the examinee plays with volley: from left to left, from right to right, the partner and the examinee carry out ground strokes: from left to left, from right to right, the examinee carries out 10 serves to the first field of serve and to the second field of serve.

Control complex 2: the partner and the examinee carry out volleys from left to right, from right to left, the partner carries out volleys, the examinee plays ground strokes from left to right, from right to left, the partner carries out ground strokes tested plays from volley: from left to right from right to left, the partner and the examinee carry out ground strokes: from left to right, from right to left, tested carries out 10 overheads in the left corner and in the right corner.

It is offered to estimate the technique on visual perception in the program of sports preparation for children's and youth sports schools and specialized schools of the Olympic reserve [4] for children and young people, as well as in "The textbook of the advanced coach" [2].

The technique of the player is estimated by experts in points and has a subjective character in the program for children's and youth sports schools and specialized schools of the Olympic reserve for children and young people. Assessments are entered in the table similar to the offered by T. S. Ivanova, however there is no objective component of estimation that puts the assessment of technique of the young player into dependence on the degree of professionalism and objectivity of the expert.

The test sheets of correction of separate technical elements, which are recommended by authors of "The textbook of the advanced coach "allow not only to estimate the performance of the movement, but also offer recommendations of the expert in elimination of shortcomings of this or that technical action (tab. 2).

Similar test sheets are filled in for each shot.

Thus, the method of assessment of technique, which is offered by M. Krespo and D. Miley [2], comprises the methodical component which will allow the coach to correct technical training of the young sportsman.

The testing is held by precision tests, which have more directed character in the system of estimation developed by the International federation of tennis for assignment of the international tennis number. The short description of tests and the table for entering of results are given below (pic. 1).

The estimation is carried out by the following criteria for the definition of the international tennis number:

1. The assessment of depth of ground stroke from the court including power aspect (on 5 serial ground strokes on the right and at the left);

2. The assessment of depth of volley including power aspect (on 4 serial shots on the right and at the left);

3. The assessment of accuracy of ground strokes on diagonal including power aspect (on 6 serial shots on the right and at the left on diagonal);

4. The serve assessment including power aspect (12 serves, on 3 serves to each target platform of serve);

5. Mobility assessment measures, time which is necessary for the player to lift 5 tennis balls and to return them to everyone to a special zone.

We developed the following option of testing of technique of tennis players on the basis of personal experience and experience of the coaches working with sportsmen of 10-year old.

It is offered to estimate the technique of tennis players by the number of hits at the square of 60x60 sm outlined on game wall. Ground strokes are carried out from distance of 5 m, volley – from distance of 1,2 m.

Table 1

Assessment of technique of tennis players (according to T. S. Ivanova)

Action	Swing-up	Approach to a ball	Removal of a racket to a ball	Moment of a shot	Finish of a shot	Exit from a shot	Overall score
I. Ground strokes – in average point: 1. Flat strokes from the backline on the right/at the left: – in average point; – in high point; – in high point inside the court.							
2. Topspin strokes from the backline on the right/at the left: – in average point; – in low point; – in high point; – inside the court with the advance to the net.							
3. Slices from the backline on the right/at the left: – in average point; – in low point; – in high point; – inside the court with the advance to the net.							
4. Drop shots from the backline on the right/at the left							
5. "Lob»: – passing topspin on the right/at the left; – passing slice on the right/at the left.							
II. Volleys: – in average point; – in low point; – in high point; – drop shot.							
III. Overheads: – with the place with volley; – with withdrawal back in jump; – with withdrawal back with a bounce; – with advance a knee forward.							
IV. Serve 1. In 1 square in different zones: – flat; – topspin; – slice.							
2. In the 2nd square in different zones– flat; – topspin; – slice.							

The number of hits in square from 15 shots at ground strokes: 12–15 shots – excellent, 9–12 shots – good, 5–7 shots – satisfactory. Testing is held separately for shots with top spin on the right and at the left.

Shots on the right and at the left in the same square alternate at a game from volley. The assessment of technique is carried out by the following criteria: 26–30 hits – are excellent, 22–26 – is good, 18–22 – are satisfactory.

Serves are estimated by the number of hits from 10 of the first and from 10 second serves, at each of squares of serves. Hit of 34-40 balls is estimated as excellent, 28–34 – is good, 22–28 – is satisfactory.

The testing was held in all above-stated ways for the definition of the most acceptable system of assessment of technique of sportsmen of 10 years old. Sportsmen were engaged in the group of the fifth year of training, each of players had sufficient play experience and national rating in the age group older than 10 years old. The group consisted of sportsmen who study the first year game balls with standard pressure.

The analysis of results of testing showed that the most informative, from the point of view of the received assessments, are T. S. Ivanova's techniques and the technique, which is offered by us.

The technique, which was given by T. S. Ivanova, gives the full

Table 2
Test sheets of correction of a serve

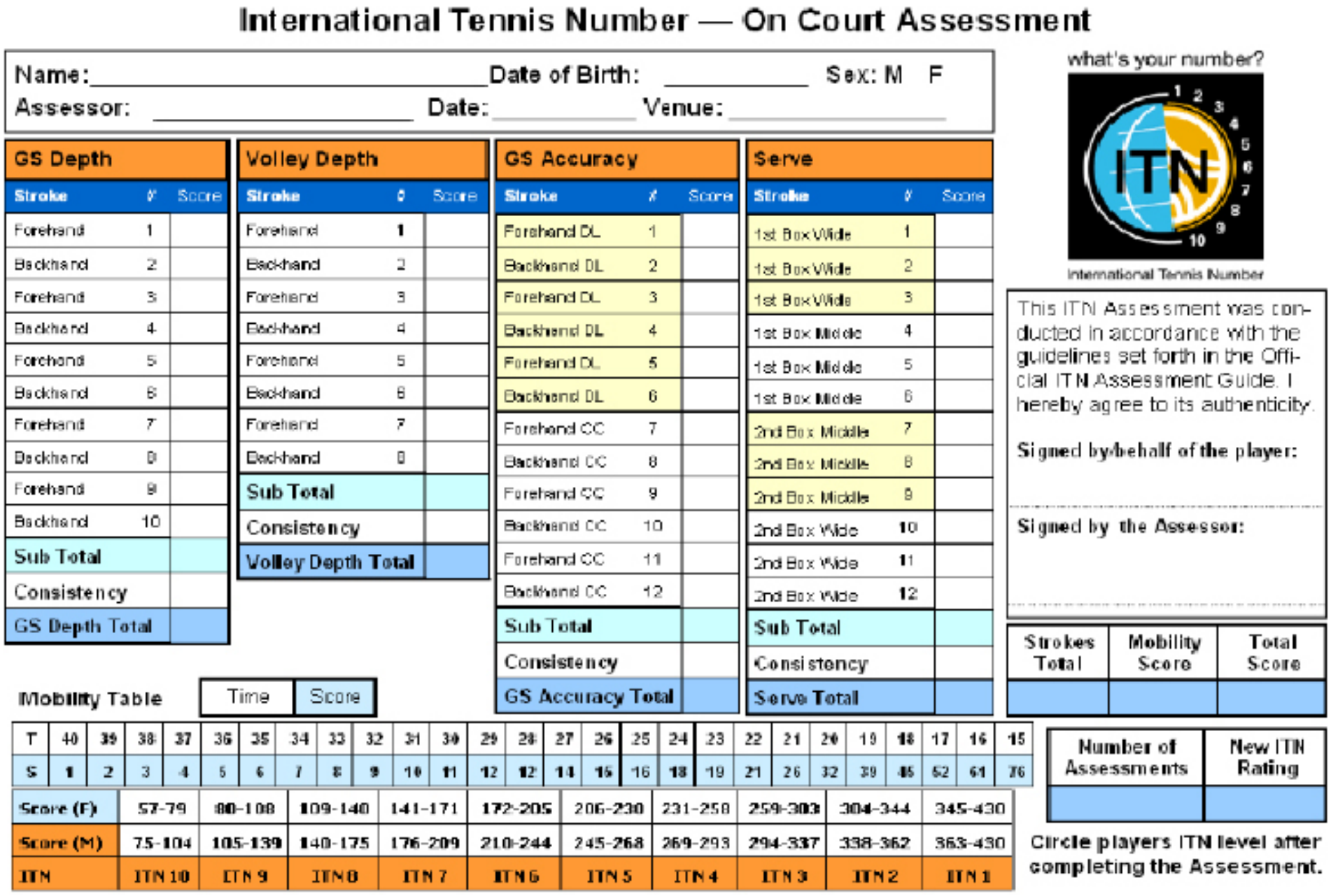
Motor action	Assessment	Evaluation guidelines
Preparation: Constant ritual before a serve Time before a serve Accurate purpose of a serve		
Balance: In start of motion At contact During maintenance		
Swing: Long movement without a delay Action of a hand (throwing movement) Speed of the movement of a hand Acceleration of a racket Transfer of body weight Use of the whole body for creation of power Turn of shoulders Bending of knees At contact head up Pronation of a hand Shot to a ball up		
Control: Percentage ratio of the first serves. Percentage ratio of the second serves. Depth. Rotation.		
Upcast. Constancy. Height (too low or too high) The movement of the throwing hand in relation to body: – here and there – forward or back		
General type: As the attacking weapon. Variety of a serve. Disguise. Wide underspin. Flat serve. Change of a grip		
Summery		

objective assessment of technique for this age what results of testing in the experimental group testify to. The received estimates well give in to comparison and are informative for sportsmen of 10-years old.

The testing technique, which was developed by us, also showed the objectivity and informational content of assessment of technique of sportsmen of this age. In comparison with the technique, which was offered by T. S. Ivanova, its convenience consists in simplicity of carrying out. The dependence of assessment on the level of preparedness and accuracy of game of sparring is excluded. The test is very convenient for monthly assessment of technique of tennis players of 10-years old.

Testing for obtaining the international tennis number gives the wide information on technical preparedness of the player and precision characteristics of its realization. However the existence of zone of doubling of points in this system significantly influences estimates of players. Sufficient length and force of shots and also high forward rotation of ball are necessary for receiving appreciation. Especially it concerns a serve performance. This test is difficult for ten-year-old sportsmen and qualitatively only leaders of national rating at this age coped with it. Informational content of testing for assessment of technique of players is very high, but it is possible to apply it to only well prepared players using balls with standard pressure.

The assessment of technique, which was offered by M. Krespo and D. Miley [2], and in the program for children's and youth sports schools and specialized schools of the Olympic reserve [5] for children and young people has a subjective character as tables are filled in on the basis of visual perception of the coach or the expert, and in view of lack of any standards, depend on the technique image by the specific expert. At the same time the above-stated types of testing are necessary for the coach for more accurate fixing of features of technique of the specific player and definition of the direction of the further improvement of his technique. The testing op-



International Tennis Number — On Court Assessment

Name: _____ Date of Birth: _____ Sex: M F

Assessor: _____ Date: _____ Venue: _____

what's your number?

International Tennis Number

GS Depth		
Stroke	#	Score
Forehand	1	
Backhand	2	
Forehand	3	
Backhand	4	
Forehand	5	
Backhand	6	
Forehand	7	
Backhand	8	
Forehand	9	
Backhand	10	
Sub Total		
Consistency		
GS Depth Total		

Volley Depth		
Stroke	#	Score
Forehand	1	
Backhand	2	
Forehand	3	
Backhand	4	
Forehand	5	
Backhand	6	
Forehand	7	
Backhand	8	
Sub Total		
Consistency		
Volley Depth Total		

GS Accuracy		
Stroke	#	Score
Forehand DL	1	
Backhand DL	2	
Forehand DL	3	
Backhand DL	4	
Forehand DL	5	
Backhand DL	6	
Forehand CC	7	
Backhand CC	8	
Forehand CC	9	
Backhand CC	10	
Forehand CC	11	
Backhand CC	12	
Sub Total		
Consistency		
GS Accuracy Total		

Serve		
Stroke	#	Score
1st Box Wide	1	
1st Box Wide	2	
1st Box Wide	3	
1st Box Middle	4	
1st Box Middle	5	
1st Box Middle	6	
2nd Box Middle	7	
2nd Box Middle	8	
2nd Box Middle	9	
2nd Box Wide	10	
2nd Box Wide	11	
2nd Box Wide	12	
Sub Total		
Consistency		
Serve Total		

This ITN Assessment was conducted in accordance with the guidelines set forth in the Official ITN Assessment Guide. I hereby agree to its authenticity.

Signed by/behalf of the player:

Signed by the Assessor:

Strokes Total	Mobility Score	Total Score

Mobility Table

T	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15
S	1	2	3	4	5	6	7	8	9	10	11	12	12	14	15	16	18	19	21	26	32	39	45	52	61	76

Time	Score

Score (F)	57-79	80-108	109-140	141-171	172-205	206-230	231-258	259-303	304-344	345-430
Score (M)	75-104	105-139	140-175	176-209	210-244	245-268	269-293	294-337	338-362	363-430
ITN	ITN 10	ITN 9	ITN 8	ITN 7	ITN 6	ITN 5	ITN 4	ITN 3	ITN 2	ITN 1

Number of Assessments	New ITN Rating

Circle players ITN level after completing the Assessment.

Pic. 1. **The system of assessment, which is developed by the International federation of tennis for the assignment of the international tennis number [6]**

tion, which was offered by M. Krespo and D. Miley [2] is more informative, than offered in the program for children's and youth sports schools and specialized schools of the Olympic reserve for children and young people [5].

Conclusions

The analysis of the methods of assessment of technique of young tennis players demonstrates that they are equivalent not all of them and are suitable for concrete age. In our opinion, the technique of T. S. Ivanova and the technique which was offered by us, which are assuming both subjective and objective assessment of elements of technique, are the most informative and accepted for children of 10 years old.

Prospects of further researches. The research and the assessment of technique of young tennis players with the use of computer technologies.

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Dmitriy Krilov: *Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0002-7606-0638
E-mail: d_krilov@mail.ru

Lydmyla Shesterova: *PhD (Physical Education and Sport); Assosiate Professor, Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0001-8777-6386
E-mail: shesterova1@mail.ru

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Improvement of the technique of performance of the main course by sportsmen in acrobatic rock'n'roll by means of choreography at the stage of the specialized basic preparation

Petro Kyzim[1]
Yuliya Lutsenko[1]
Larisa Lutsenko[2]
Nataliya Batieieva[3]

[1]*Kharkov State Academy of Physical Culture, Kharkov, Ukraine*
[2]*Law University named after Yaroslav the Wise, Kharkov, Ukraine*
[3]*Kiev National University of Culture and Arts, Kiev, Ukraine*

Purpose: *to prove experimentally the technique of improvement of technique of performance of the main course by sportsmen in acrobatic rock'n'roll by means of choreography at the stage of the specialized basic preparation.*

Material & Methods: *the following methods of the research were used: theoretical analysis and synthesis of data of special scientific and methodical literature; pedagogical supervision; pedagogical testing; methods of mathematical statistics. 28 sportsmen (14 male partners and 14 female partners) are tested before and after the pedagogical experiment.*

Results: *the estimated results of the method of execution of the main course are received on the basis of the rating scale (The rule of WRRC, 2016). The dynamics of level of technical skill of execution of the main course is defined by each sportsman separately.*

Conclusions: *it is established that the additional resources of choreography influence significantly the level of performance of the main course by sportsmen in acrobatic rock'n'roll.*

Keywords: *acrobatic rock'n'roll, main course, sportsmen, choreography.*

Introduction

The rapid development of world sport constantly demands the incessant search of more and more effective means, methods and forms of training of sportsmen.

Acrobatic rock'n'roll is one of the most beautiful, dynamic, spectacular and popular sports. It is the part of the program of World Games since 2005, the World Cups and Europe, competition on the World Cup and other prestigious international tournaments are held constantly.

Choreography is the technical basis of many sports; choreographic exercises join in the program of training of representatives of different sports disciplines. Choreography gives not only certain technical skills, but also is the mean of educational of flexibility, sense of equilibrium, coordination of movements [2; 6; 9; 10].

As the analysis of scientifically-methodical literature showed, acrobatic rock'n'roll experienced the considerable changes both in the improvement of technical skill of sportsmen, the assessment of internal structure of the competitive program, and separately in the assessment of method of execution of the main course by a male partner and a female partner in recent years. So, our research concerning the influence of means of choreography on the level of the method of execution of the main course by sportsmen in acrobatic rock'n'roll is relevant [3; 5; 11].

Communication of the research with scientific programs, plans, subjects

The research was conducted in the implementation of the complex scientific project for 2015–2017. "Theoretic-methodical bases of the formation of culture of physical health at student's youth"

The purpose of the research:

to prove experimentally the technique of improvement of the method of execution of the main course in acrobatic rock'n'roll by means of choreography at the stage of the specialized basic preparation.

Research tasks:

1. To learn the problem of improvement of the method of execution of the main course in acrobatic rock'n'roll by means of choreography.

2. To prove the efficiency of technique of improvement of the method of execution of the main course by means of choreography and to analyze the dynamics of indicators of the level of choreographic preparedness of sportsmen of acrobatic rock'n'roll.

Material and Methods of the research

The research was conducted from January, 2016 till June, 2016, the following methods of the research were used in the research: theoretical analysis and synthesis of data of special scientifically-methodical literature; pedagogical observation; pedagogical testing; methods of mathematical statistics. 28 sportsmen (14 male partners and 14 female partners) are

tested before and after the pedagogical experiment. Musical material according to the requirements of Rules of the World confederation of rock'n'roll is used (WRRC).

14 sportsmen (7 male partners and female 7 partners) of 12–17 years old of the control group (CG) and 14 sportsmen (7 male partners and 7 female partners) of 12–17 years old of the experimental group (EG) participated in the researches. The research was conducted for the identification of level of the method of execution of the main course.

Results of the research and their discussion

The statistic indicators of the testing of sportsmen of acrobatic rock'n'roll of 12–17 years old were received at the beginning of the pedagogical experiment (EG, $n_1=n_2=7$) (CG, $n_1=n_2=7$).

The statistic indicators of the testing of sportsmen of acrobatic rock'n'roll (EG, male partners, n=7) are shown in pic. 1.

One sportsman showed the closer to maximum result (the general reduction of 10%)*, three sportsmen – the average result (the general reduction of 50%)* and three sportsmen – the result more than average (the general reduction of 25%)* in the test *kick and ball change***.** Individual results in the group are very different – from 5 points till 9 points (V – 24,5%).

One sportsman showed the closer to maximum result (the general reduction of 10%)*, one sportsman – the average result (the general reduction of 50%)* and four sportsman – the result more than average (the general reduction of 25%)* in the test *kick + kick.*

One sportsman showed the closer to maximum result (the general reduction of 10%)*, two sportsmen – the average result (the general reduction of 50%)* and five sportsmen – the result more than average (the general reduction of 25%)* in the test *kick and ball change, turn en dehors*.

Two sportsmen showed the average result (the general reduction of 50%)* and five sportsmen – the result more than average (the general reduction of 25%)* in the test *kick and ball change, turn en dedans*.

Two sportsmen showed the average result (the general reduction of 50%)* and five sportsmen – the result more than average (the general reduction of 25%)* in the test *kick and ball change + kick+ kick in the right turn.*

One sportsman showed the average result (the general reduction of 50%)* and six sportsmen - the result more than average (the general reduction of 25%)* in the test *kick and ball change + kick+ kick in the left turn*. The difference of individual results in the group are from 5 points till 7,5 points (V – 13,1%).

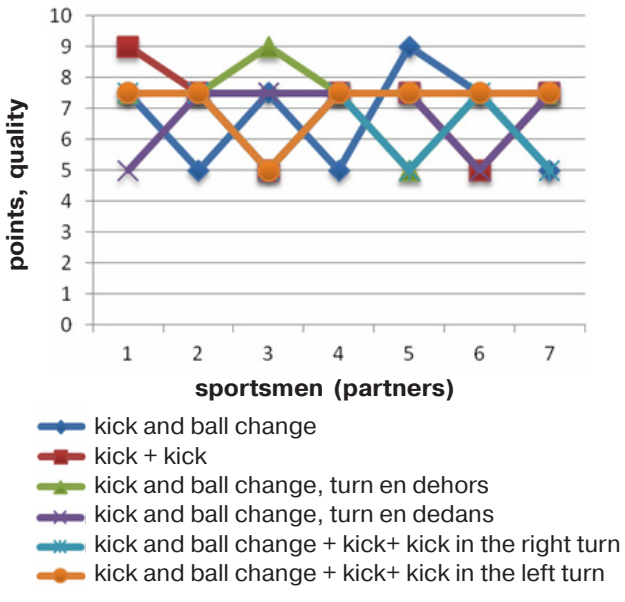
The statistic indicators of the testing of sportsmen of acrobatic rock'n'roll of the category (EG, female partners, n=7) are shown in pic. 2.

Five sportswomen showed the closer to maximum result (the general reduction of 10%)* and two sportswomen – the result more than average (the general reduction of 25%)*, (V – 8,5%) in the test *kick and ball change*.

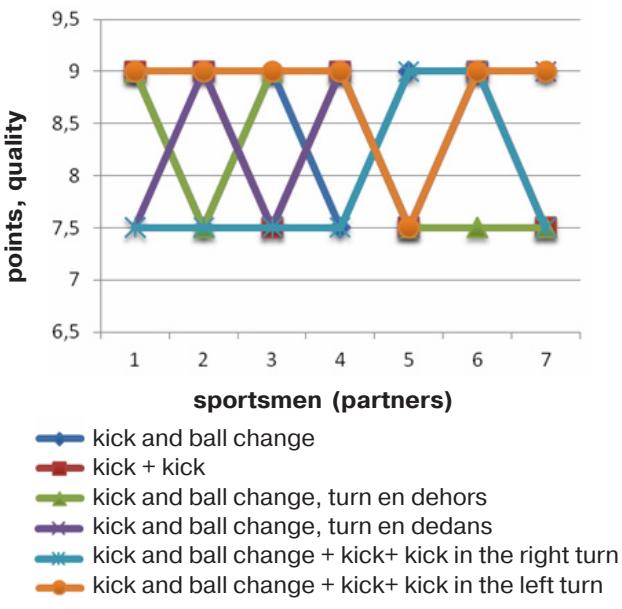
Four sportswomen showed the closer to maximum result (the general reduction of 10%)* and three sportswomen – the result more than average (the general reduction of 25%)*, (V – 9,5%) in the test *kick + kick*.

Three sportswomen showed the closer to maximum result (the general reduction of 10%)* and four sportswomen – the result more than average (the general reduction of 25%)*, (V – 9,8%) in the test *kick and ball change, turn en dehors*.

Four sportswomen showed the closer to maximum result (the general reduction of 10%)* and three sportswomen – the re-



Pic. 1. Indicators of the testing of sportsmen of acrobatic rock'n'roll before carrying out the pedagogical experiment (EG, male partners, n=7)



Pic. 2. Indicators of the testing of sportsmen of acrobatic rock'n'roll before carrying out the pedagogical experiment (EG, female partners, n=7)

Note. *– The rule of WRRC, 2016.

sult more than average (the general reduction of 25%)*, (V – 9,5%) in the test *kick and ball change, turn en dedans*.

Two sportswomen showed the closer to maximum result (the general reduction of 10%)* and five sportswomen – the result more than average (the general reduction of 25%)*, (V – 9,8%) in the test *kick and ball change + kick+ kick in the right turn.*

Six sportswomen showed closer to maximum result (the general reduction of 10%)* and one sportswoman – the result more than average (the general reduction of 25%)*, (V – 6,4%) in the test *kick and ball change + kick+ kick in the left turn.*

The difference of individual results in the group – from 7,5 points till 9,0 points. The coefficient of variation showed that the group is uniform.

The statistic indicators of the testing of sportsmen of acrobatic rock'n'roll (CG, male partners, n=7) are shown in pic. 3.

Three sportsmen showed the average result (the general reduction of 50%)* and four sportsmen – the result more than average (the general reduction of 25%)* in the test *kick and ball change*. Individual results in the group are very different – from 5 points till 7,5 points (V – 20,8%).

One sportsman showed the closer to maximum result (the general reduction of 10%)*, one sportsman – the average result (the general reduction of 50%)* and five sportsmen - the result more than average (the general reduction of 25%)*, (V – 16,0%) in the test *kick + kick*.

One sportsman showed the closer to maximum result (the general reduction of 10%)* and six sportsmen - the result more than average (the general reduction of 25%)*, (V – 7,4%) in the test *kick and ball change, turn en dehors*.

One sportsmen showed the average result (the general reduction of 50%)* and six sportsmen – the result more than average (the general reduction of 25%)*, (V – 13,2%) in the test *kick and ball change, turn en dedans*.

Two sportsmen showed the average result (the general reduction of 50%)* and five sportsmen – the result more than average (the general reduction of 25%)*, (V – 17,9%) in the test *kick and ball change + kick+ kick in the right turn*.

One sportsmen showed the average result (the general reduction of 50%)*, two sportsmen showed the closer to maximum result (the general reduction of 10%)* and four sportsmen – the result more than average (the general reduction of 25%)*. The difference of individual results in the group – from 5 points till 9,0 points (V – 17,7%) in the test *kick and ball change + kick+ kick in the left turn*.

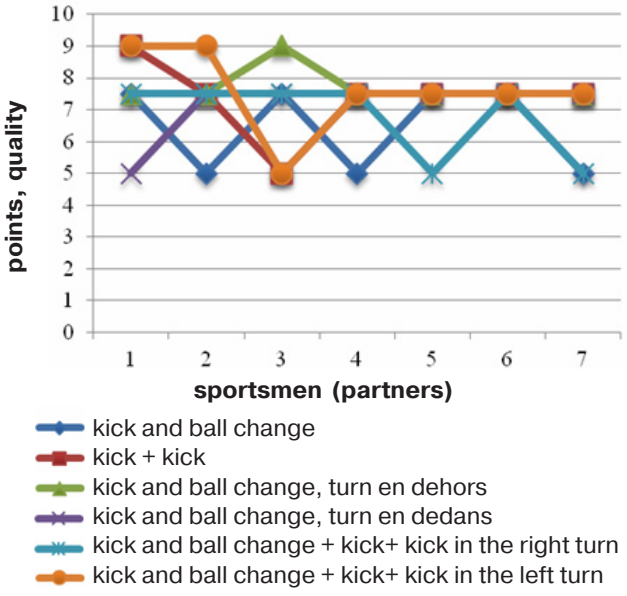
The statistic indicators of the testing of sportsmen of acrobatic rock'n'roll (CG, female partners, n=7) are shown in pic. 4.

One sportswoman showed the closer to maximum result (the general reduction of 10%)* and six sportswomen – the result more than average (the general reduction of 25%)*, (V – 7,4%) in the test *kick and ball change*.

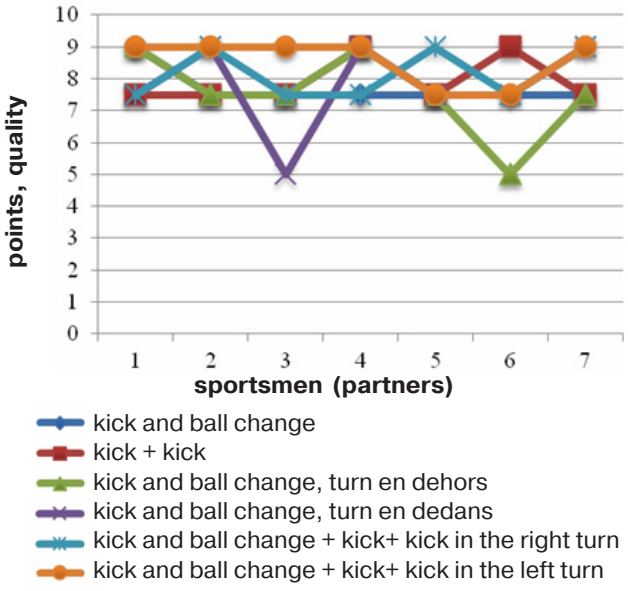
Two sportswomen showed the closer to maximum result (the general reduction of 10%)* and five sportswomen – the result more than average (the general reduction of 25%)*, (V – 9,2%) in the test *kick + kick*.

Two sportswomen showed the closer to maximum result (the general reduction of 10%)*, one sportswoman – the average result (the general reduction of 50%)* and four sportswomen – the result more than average (the general reduction of 25%)*, (V – 17,6%) in the test *kick and ball change, turn en dehors*.

Three sportswomen showed the closer to maximum result (the general reduction of 10%)*, one sportswoman – the average result (the general reduction of 50%)* and three sportswomen – the result more than average (the general reduction



Pic. 3. Indicators of the testing of sportsmen of acrobatic rock'n'roll before carrying out the pedagogical experiment (CG, male partners, n=7)



Pic. 4. Indicators of the testing of sportsmen of acrobatic rock'n'roll before carrying out the pedagogical experiment (CG, female partners, n=7)

of 25%)*, (V – 18,5%) in the test *kick and ball change, turn en dedans*.

Three sportswomen showed the closer to maximum result (the general reduction of 10%)* and four sportswomen – the result more than average (the general reduction of 25%)*, (V – 9,8%) in the test *kick and ball change + kick+ kick in the right turn.*

Five sportswomen showed the closer to maximum result (the general reduction of 10%)* and two sportswomen – the result more than average (the general reduction of 25%)*, (V – 8,5%) in the test *kick and ball change + kick+ kick in the left turn.*

The results of six tests indicate that sportsmen did not use the special exercises earlier on the performance of basic (rock'n'roll) turns and rotations. The received wide intervals of results answer specific features of training of sportsmen.

The technique of the improvement of the method of execution of the main course by the sportsmen of 12–17 years old in acrobatic rock'n'roll was developed by us on the basis of the conducted research. Choreographic exercises on the increase in skill of performance of basic turns and rotations in acrobatic rock'n'roll are included to it for the first time.

We applied the technique of the improvement of the method of execution of the main course in the experimental group (EG, $n_1=n_2=7$). The educational-training process in the control group (CG, $n_1=n_2=7$) was on the traditional technique of training of sportsmen. Choreographic exercises were used in preparatory, main and final part of training.

We received the statistic indicators of the testing of sportsmen of acrobatic rock'n'roll at the end of the pedagogical experiment.

The statistic indicators of the testing of sportsmen of acrobatic rock'n'roll after the pedagogical experiment (EG, male partners, n=7) are shown in pic. 5.

One sportsman showed the closer to maximum result (the general reduction of 10%)*, two sportsmen – the average result (the general reduction of 50%)*, four sportsmen – result more than average (the general reduction of 25%)* in the test *kick and ball change*. Individual results in the group are from 5,0 points till 9,0 points (V – 21,0%).

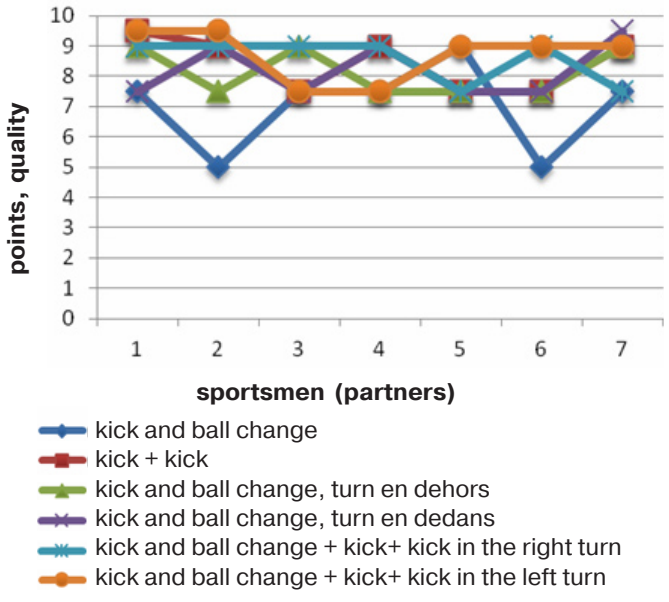
One sportsman showed the result with the general reduction of 5%*, four sportsmen – the result closer to maximum (the general reduction of 10%)* and two sportsmen – the result more than average (the general reduction of 25%)* in the test *kick + kick.* Individual results in the group are from 7,5 points till 9,5 points (V – 9,2%).

One sportsman showed the result with the general reduction of 5%*, five sportsmen – the closer to maximum result (the general reduction of 10%)*, and one sportsman – the result more than average (the general reduction of 25%)* in the test *kick and ball change, turn en dehors*. Individual results in the group – from 7,5 points till 9,5 points (V – 7,1%).

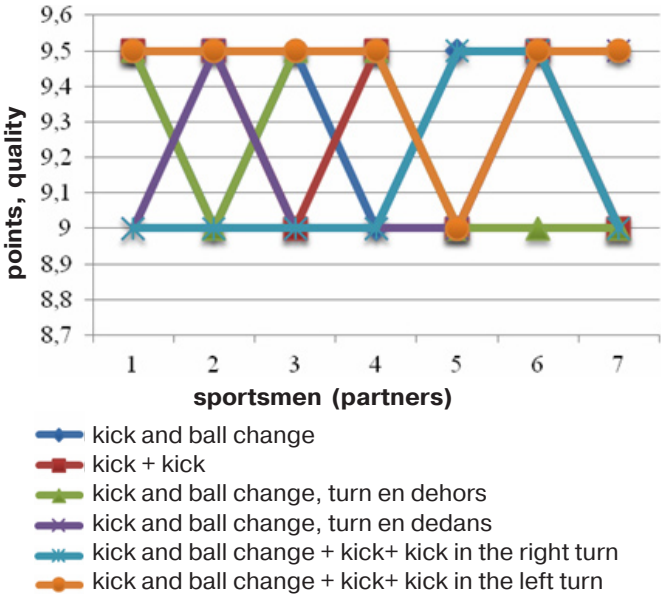
Five sportsmen showed the closer to maximum result (the general reduction of 10%)* and two sportsmen – the result more than average (the general reduction of 25%)* in the test *kick and ball change, turn en dedans*. Individual results in the group – from 7,5 points till 9,0 points (V – 8,5%).

Four sportsmen showed the closer to maximum result (the general reduction of 10%)*, and three sportsmen – the result more than average (the general reduction of 25%)* in the test *kick and ball change + kick+ kick in the right turn*. Individual results in the group – from 7,5 points till 9,0 points (V – 9,5%).

Two sportsmen showed the result with the general reduction of 5%*, three sportsmen showed the closer to maximum result (the general reduction of 10%)* and two sportsmen – the result more than average (the general reduction of 25%)* in the test *kick and ball change + kick+ kick in the left turn*. The



Pic. 5. Indicators of the testing of sportsmen of acrobatic rock'n'roll after carrying out the pedagogical experiment (EG, male partners, n=7)



Pic. 6. Indicators of the testing of sportsmen of acrobatic rock'n'roll after carrying out the pedagogical experiment (EG, female partner, n=7)

difference of individual results in the group – from 7,5 points till 9,5 points (V – 9,8%). The coefficient of variation showed that the group is uniform.

The statistic indicators of the testing of sportsmen of acrobatic rock'n'roll (EG, female partners, n=7) are shown in pic. 6.

Five sportswomen showed the result with the general reduction 5%* and two sportswomen showed the closer to maximum result (the general reduction of 10%)* in the test *kick and ball change*. Individual results in the group – from 9,0 points till 9,5 points (V – 2,5%).

Four sportswomen showed the result with the general reduction 5%* and three sportswomen showed the closer to maximum result (the general reduction of 10%)* in the test *kick + kick*. Individual results in the group – from 9,0 points till 9,5 points (V – 2,9%). Three sportswomen showed the result with the general reduction 5%* and four sportswomen showed the closer to maximum result (the general reduction of 10%)* in the test *kick and ball change, turn en dehors*. Individual results in the group – from 9,0 points till 9,5 points (V – 2,9%).

Three sportswomen showed the result with the general reduction 5%* and four sportswomen showed the closer to maximum result (the general reduction of 10%)* in the test *kick and ball change, turn en dedans*. Individual results in the group – from 9,0 points till 9,5 points (V – 2,9%).

Two sportswomen showed the result with the general reduction 5%* and five sportswomen showed the closer to maximum result (the general reduction of 10%)* in the test *kick and ball change + kick+ kick in the right turn*. Individual results in the group – from 9,0 points till 9,5 points (% V – 2,9).

Six sportswomen showed the result with the general reduction 5%* and one sportswoman showed the closer to maximum result (the general reduction of 10%)* in the test *kick and ball change + kick+ kick in the left turn*. Individual results in the group – from 9,0 points till 9,5 points. The coefficient of variation showed that the group is uniform.

The statistic indicators of the testing of sportsmen of acrobatic rock'n'roll (CG, male partners, n=7) are shown in pic. 7.

Four sportsmen showed the closer to maximum result (the general reduction of 10%)* and three sportsmen showed the result more than average (the general reduction of 25%)* in the test *kick and ball change*. Individual results in the group – from 7,5 points till 9,0 points (V – 9,2%).

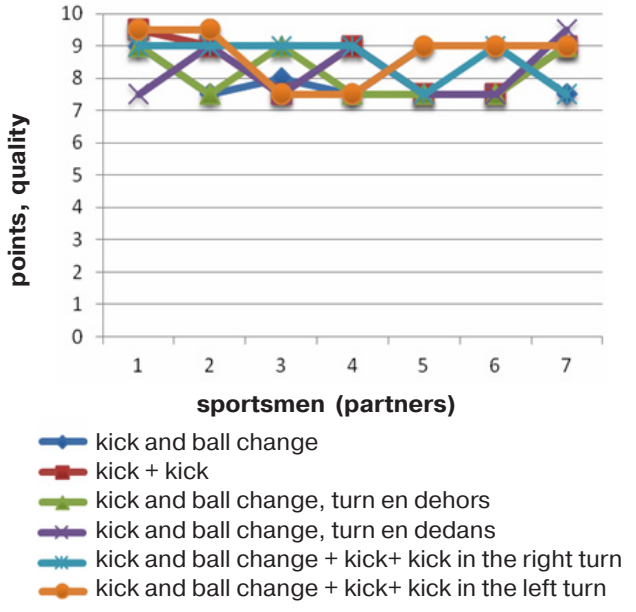
One sportsman showed the result with the general reduction of 5%*, three sportsmen showed the closer to maximum result (the general reduction of 10%)*, and three sportsmen – the result more than average (the general reduction of 25%)* in the test *kick + kick*. Individual results in the group – from 7,5 points till 9,5 points (V – 10,5%).

Three sportsmen showed the closer to maximum result (the general reduction of 10%)*, and four sportsmen – the result more than average (the general reduction of 25%)* in the test *kick and ball change, turn en dehors*. Individual results in the group – from 7,5 points till 9,0 points (V – 9,8%).

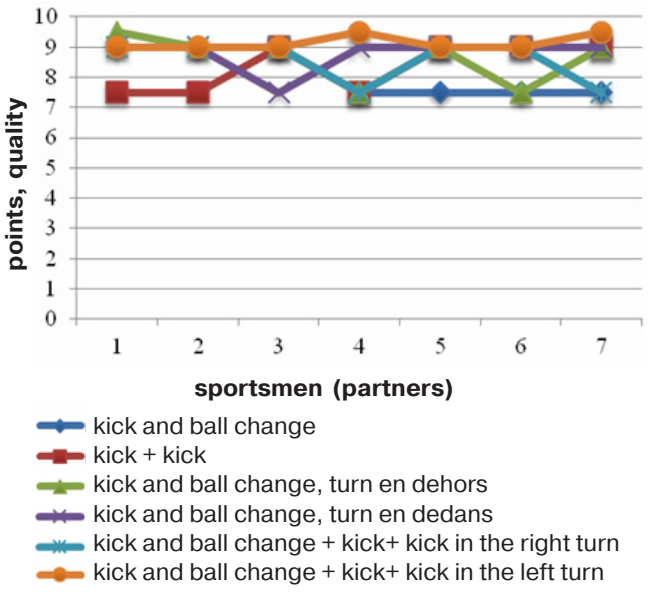
One sportsman showed the result with the general reduction of 5%*, two sportsmen showed the closer to maximum result (the general reduction of 10%)*, and four sportsmen – result more than average (the general reduction of 25%)* in the test *kick and ball change, turn en dedans*. Individual results in the group – from 7,5 points till 9,5 points (V – 11,1%).

Five sportsmen showed the closer to maximum result (the general reduction of 10%)*, and two sportsmen – the result more than average (the general reduction of 25%)* in the test *kick and ball change + kick+ kick in the right turn*. Individual results in the group are from 7,5 points till 9,0 points (V – 8,5%).

Two sportsmen showed the result with the general reduction of 5%*, three sportsmen showed the closer to maximum re-



Pic. 7. Indicators of the testing of sportsmen of acrobatic rock'n'roll after carrying out the pedagogical experiment (CG, male partners, n=7)



Pic. 8. Indicators of the testing of sportsmen of acrobatic rock'n'roll after carrying out the pedagogical experiment (CG, female partners, n=7)

sult (the general reduction of 10%)*, and two sportsmen – the result more than average (the general reduction of 25%)* in the test *kick and ball change + kick+ kick in the left turn*. Individual results in the group – from 7,5 points till 9,5 points (V – 9,9%). The statistic indicators of the testing of sportsmen of acrobatic rock'n'roll (CG, female partners, n=7) are shown in pic. 8.

Three sportswomen showed the closer to maximum result (the general reduction of 10%)*, and four sportswomen showed the result more than average (the general reduction of 25%)* in the test *kick and ball change*. Individual results in the group – from 7,5 points till 9,0 points (V – 9,8%).

Four sportswomen showed the closer to maximum result (the general reduction of 10%)*, and three sportswomen showed the result more than average (the general reduction of 25%)* in the test *kick + kick*. Individual results in the group – from 7,5 points till 9,0 points (V – 9,5%).

One sportswoman showed the result with the general reduction of 5%*, four sportswomen showed the closer to maximum result (the general reduction of 10%)*, and two sportswomen showed the result more than average (the general reduction of 25%)* in the test *kick and ball change, turn en dehors*. Individual results in the group – from 7,5 points till 9,5 points (V – 9,2%).

Six sportswomen showed the closer to maximum result (the general reduction of 10%)*, and one sportswoman showed the result more than average (the general reduction of 25%)* in the test *kick and ball change, turn en dedans*. Individual results the in group – from 7,5 points till 9,0 points (V – 6,5%).

Five sportswomen showed the closer to maximum result (the general reduction of 10%)*, and two sportswomen showed the result more than average (the general reduction of 25%)* in the test *kick and ball change + kick+ kick in the right turn*. Individual results in the group – from 7,5 points till 9,0 points (V – 8,5%).

Two sportswomen showed the result with the general reduction 5%* and five sportswomen showed the closer to maximum result (the general reduction of 10%)* in the test *kick and ball change + kick + kick in the left turn*. Individual results in the group – from 9,0 points till 9,5 points (V – 2,6%). The coefficient of variation showed that the group is uniform.

The statistic indicators of the level of choreographic preparedness of sportsmen of acrobatic rock'n'roll of EG (n=7), CG (n=7), at the beginning and at the end of the pedagogical experiment are shown in tables 1–4.

Using methods of mathematical statistics, we can say that:

– the difference of average values on the whole experimental group (EG-male partners) grew – on 24,7%; the difference of average values on the whole control group (CG- male partners) grew – on 16,9%;
– the difference of average values on the whole experimental group (EG-female partners) grew – on 10,9%; the difference of average values the whole control group (CG – female partners) grew – on 8,2%;
– the difference of differences of average values of the experimental and control groups of the pedagogical experiment makes: male partners – 7,8%; female partners – 2,7%

The average value of percentage ratio of the deviation from the initial expert assessment in indicators of tests is improved by means of the offered technique of improvement of the method of execution of the main course (*Kick and ball change + kick + kick*) of sportsmen of acrobatic rock'n'roll in the experimental group:

– *kick and ball change* – male partners on 26,9%, female partners on 9,2%;
– *kick + kick* – male partners on 23,4%, female partners on 11,1%.

The worst result is shown considerably in the control group:

– *kick and ball change* – male partners on 8,8%, female partners on 5,5%;
– *kick + kick* – male partners on 14,5%, female partners for 5,4% that confirms the efficiency of the offered technique of improvement of the method of execution of the main course in the experimental group during the pedagogical experiment.

Conclusions

1. The analysis of scientifically-methodical literature confirms the insufficient level of the researches of perspective of the method of execution of the main course in acrobatic rock'n'roll.

2. The content of the educational-training process, which are directed to the improvement of the method of execution of the main course in acrobatic rock'n'roll, is developed. The level of choreographic preparedness of sportsmen of 12–17 years old is defined in EG and CG.

3. The technique of improvement of the method of execution of the main course by sportsmen of 12–17 years old in acrobatic rock'n'roll is developed.

4. The offered experimental technique took the effective action on the increase in the level of the method of execution of the main course of sportsmen of acrobatic rock'n'roll at the stage of the specialized basic preparation. Using the methods of mathematical statistics, we can say that:

– the difference of average values on the whole experimental group (EG-male partners) grew on 24,7%; the difference of average values on the whole control group (CG- male partners) grew on 16,9%;
– the difference of average values on the whole experimental group (EG-female partners) grew on 10,9%; the difference of average values on the whole control group (CG-female partners) grew on 8,2%;
– the difference of differences of average values of the experimental and control groups of the pedagogical experiment makes:
- male partners – 7,8%;
- female partners of – 2,7%.

The positive dynamics of indicators of the average value of the percentage deviation ratio from the initial expert assessment in indicators of tests is found during the pedagogical experiment in the experimental group:

Table 1

The statistic indicators of the level of choreographic preparedness of sportsmen of acrobatic rock'n'roll before the pedagogical experiment (P<0,05)

Tests	Experimental group (female partners, n=7) $\bar{X}\pm m$	Control group (female partners, n=7) $\bar{X}\pm m$	t	$t_{gr.}$	p
1. Kick and Ball Change, points	6,64±0,66	6,43±0,55	0,24	2,36	>0,05
2. Kick-kick, points	7,0±0,6	7,36±0,48	0,47	2,36	>0,05
3. Kick and Ball Change, turn en dehors, (points)	7,36±0,48	7,71±0,23	0,66	2,36	>0,05
4. Kick and Ball Change, turn en dedans, (points)	6,79±0,5	7,14±0,397	0,55	2,36	>0,05
5. Kick and Ball Change + kick-kick in the right turn, (points)	6,43±0,55	6,79±0,5	0,48	2,36	>0,05
6. Kick and Ball Change + kick-kick in the left turn, (points)	7,14±0,39	7,57±0,55	0,64	2,36	>0,05

Table 2

The statistic indicators of the level of choreographic preparedness of sportsmen of acrobatic rock'n'roll before the pedagogical experiment (P<0,05)

Tests	Experimental group (female partners, n=7) $\bar{X}\pm m$	Control group (female partners, n=7) $\bar{X}\pm m$	t	$t_{gr.}$	p
1. Kick and Ball Change, points	8,57±0,3	7,71±0,23	2,28	2,36	>0,05
2. Kick-kick, points	8,36±0,33	7,93±0,3	0,96	2,36	>0,05
3. Kick and Ball Change, turn en dehors, (points)	8,14±0,33	7,57±0,55	0,89	2,36	>0,05
4. Kick and Ball Change, turn en dedans, (points)	8,36±0,33	7,79±0,59	0,84	2,36	>0,05
5. Kick and Ball Change + kick-kick in the right turn, (points)	7,93±0,3	8,14±0,33	0,47	2,36	>0,05
6. Kick and Ball Change + kick-kick in the left turn, (points)	8,79±0,23	8,57±0,3	0,58	2,36	>0,05

Table 3

The statistic indicators of the level of choreographic preparedness of sportsmen of acrobatic rock'n'roll after the pedagogical experiment (P<0,05)

Tests	Experimental group (female partners, n=7) $\bar{X}\pm m$	Control group (female partners, n=7) $\bar{X}\pm m$	t	$t_{gr.}$	p
1. Kick and Ball Change, points	8,43±0,36	7,0±0,60	2,04	2,36	>0,05
2. Kick-kick, points	8,64±0,33	8,43±0,36	0,43	2,36	>0,05
3. Kick and Ball Change, turn en dehors, (points)	8,86±0,26	8,14±0,33	1,71	2,36	>0,05
4. Kick and Ball Change, turn en dedans, (points)	8,57±0,3	8,21±0,37	0,76	2,36	>0,05
5. Kick and Ball Change + kick-kick in the right turn, (points)	8,36±0,33	8,57±0,3	0,47	2,36	>0,05
6. Kick and Ball Change + kick-kick in the left turn, (points)	8,71±0,35	8,71±0,35	0,00	2,36	>0,05

Table 4

The statistic indicators of the level of choreographic preparedness of sportsmen of acrobatic rock'n'roll after the pedagogical experiment (P<0,05)

Tests	Experimental group (female partners, n=7) $\bar{X}\pm m$	Control group (female partners, n=7) $\bar{X}\pm m$	t	$t_{gr.}$	p
1. Kick and Ball Change, points	9,36±0,1	8,14±0,33	3,54	2,36	<0,05
2. Kick-kick, points	9,29±0,11	8,36±0,33	2,67	2,36	<0,05
3. Kick and Ball Change, turn en dehors, (points)	9,21±0,11	8,64±0,333	1,64	2,36	>0,05
4. Kick and Ball Change, turn en dedans, (points)	9,21±0,11	8,79±0,23	1,65	2,36	>0,05
5. Kick and Ball Change + kick-kick in the right turn, (points)	9,14±0,1	8,57±0,3	1,80	2,36	>0,05
6. Kick and Ball Change + kick-kick in the left turn, (points)	9,43±0,08	9,14±0,1	2,26	2,36	>0,05

– *kick and ball change* – male partners on 26,9%, female partners on 9,2%;
– *kick* + *kick* – male partners on 23,4%, female partners on 11,1%.

The worst result is shown considerably in the control group:

– *kick and ball change* – male partners on 8,8%, female partners on 5,5%;
– *kick* + *kick* – male partners on 14,5%, female partners on 5,4% that confirms the efficiency of the offered technique of improvement of the method of execution of the main course in the experimental group during the pedagogical experiment.

Prospects of the subsequent researches will be sent to the search for new means and methods of choreographic and technical training of sportsmen in acrobatic rock'n'roll.

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Petro Kyzim: *Associat Professor; Kharkov State Academy of Physical Culture: Klochkovskaya 99, Kharkov, 61058,Ukraine.*
ORCID.ORG/0000-0001-5094-3988
E-mail: kyzim@mail.ru

Yuliya Lutsenko: *Kharkov State Academy of Physical Culture: Klochkovskaya 99, Kharkov, 61058,Ukraine.*
ORCID.ORG/0000-0001-6443-0470
E-mail: yhemade@mail.ru

Larisa Lutsenko: *PhD (Physical Education and Sport), Associat Professor; Law University named after Yaroslav the Wise: Pushkinskaya Str. 77, Kharkov, 61000,Ukraine.*
ORCID.ORG/0000-0002-2761-872X
E-mail: E-L.S.lutsenko@mail.ru

Nataliya Batieieva: *PhD (Physical Education and Sport), Associate Professor; Kiev National University of Culture and Arts: Shchorsa 36, Kiev, 01133, Ukraine.*
ORCID.ORG/0000-0001-8575-5506
E-mail: kyzim@mail.ru

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Basic provisions of the program of increase of efficiency of technique of rowing movements of sportswomen in synchronized swimming

Jury Litvinenko

National University of Physical Education and Sport of Ukraine, Kyiv, Ukraine

Purpose: *the development and the check of efficiency of the program, which is directed to the improvement of technique of rowing movements in "horizontal" basic positions of the obligatory program of sportswomen of 11–12 years old, who specialize in synchronized swimming.*

Material & Methods: *theoretical analysis and synthesis of data of special literature, pedagogical experiment, anthropometry, methods of registration and analysis of movements, qualimetry and mathematical statistics.*

Results: *the program, which is directed to the improvement of technique of "standard" rowing movement in "horizontal" basic positions of the obligatory program of sportswomen of 11–12 years old, who specialize in synchronized swimming, is proved and approved experimentally.*

Conclusions: *the assessment of experts for the performance of "horizontal" basic positions at sportswomen of the experimental group grew statistically significantly as a result of the made forming experiment ($p<0,05$). Positive changes were also noted on indicators of the biomechanical structure of technique in the experimental group. The nature of the noted change is connected with the approach of features of motive actions by the second way of "standard" rowing movement.*

Keywords: *synchronized swimming, sports technique, models, improvement, program.*

Introduction

The modern level of the development of difficult-coordination sports requires the solution of the main problems of the development of the theory of management of the training process, the development of effective remedies and methods of all parties of training of sportsmen including technical [6].

The sports result in synchronized swimming is defined by judicial estimates upon the performance by sportswomen of the competitive program. Its major component is technical difficulty of the shown elements. In this regard questions of technical skill of the sportswomen, who specialize in synchronized swimming, are relevant that is confirmed by not indifferent relation of the research associates to this perspective and expressed in the corresponding scientific works [1–5, 7–9].

The experience of the advanced practice, and also these literatures [4; 9] indicate the need of the formation of system of knowledge in the sphere of training and improvement of basic elements of technique of the compulsory program in synchronized swimming as a reliable base for the further progressing and increase in complexity of the technical program of sportswomen.

At the time the detailed studying of questions of the improvement of basic elements of technique of the compulsory program in available information sources is presented fragmentary.

The stated above defined the direction of our researches, which are focused on the development of the program for sportswomen of initial grades in the improvement of technique of rowing movements.

Communication of the research with scientific programs, plans, subjects

The work is performed on the subject 2.32 "Technical training of the qualified sportswomen on the basis of rationalization of technique of performance of competitive exercises" (number of the state registration is No. 0116U002571).

The purpose of the research:

the development and the check of efficiency of the program, which is directed to the improvement of technique of rowing movements in "horizontal" basic positions of the compulsory program of sportswomen of 11–12 years old, who specialize in synchronized swimming.

Material and Methods of the research

16 sportswomen of 11–12 years old, who specialize in synchronized swimming, participated in the researches. *Research methods:* theoretical analysis and synthesis of data of special literature, pedagogical experiment, anthropometry, methods of registration and analysis of movements, qualimetry and mathematical statistics.

Results of the research and their discussion

The earlier developed by us [1; 3] average models of technique of the performance of the "standard" rowing movement of the highly skilled sportswomen, who specialize in synchronized swimming and also indicators of technique, which had

the close interrelation with model characteristics by results of the correlation analysis formed on the basis of the program for the improvement of t technique of motive actions.

The offered program, which is directed to the improvement of technique of the "standard" rowing movement for sportswomen of 11–12 years old, who specialize in synchronized swimming, includes: purpose and tasks, didactic and specific principles, complexes of physical exercises, methods and forms of the organization of the engaged, control.

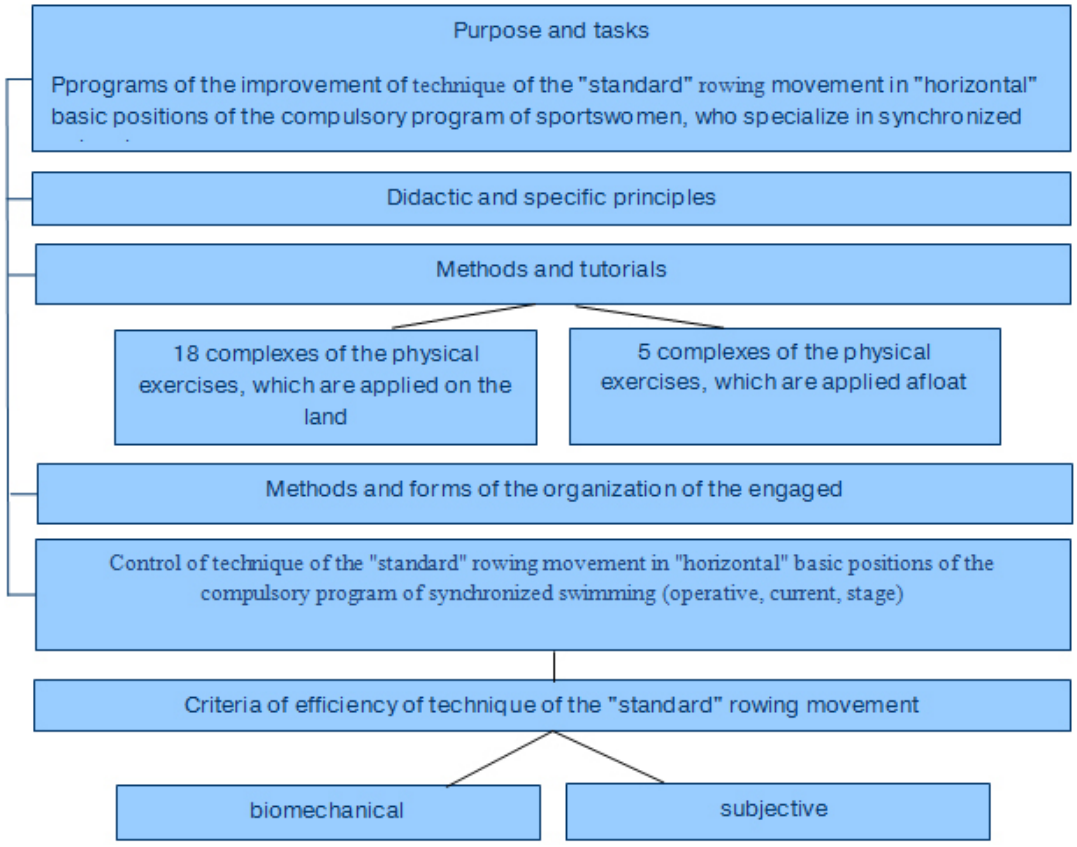
The developed flowchart of the improvement of technique of the "standard" rowing movement, which is applied in "horizontal" basic positions of the compulsory program of synchronized swimming, is given below (pic.).

The most important problems of technical training of sportswomen, on which it was specified repeatedly in the works of V. N. Platonov [6], we adapted under the specifics of synchronized swimming:

– achievement of stability and rational variability of the specialized motive actions, making the basis of technique of rowing movements in synchronized swimming;
– consecutive transformation of the mastered inclusion in various "horizontal" basic positions of the compulsory program in the effective implementation of figures of the compulsory program;
– improvement of structure of motive actions, their dynamics and kinematics taking into account specific features of sportswomen that assumed, in some cases, the individual selection of special exercises, the number of their repetitions, individual tasks;
– improvement of technical skill of sportswomen, proceeding from the requirements of performance of the "standard" rowing movement, and also "horizontal" basic positions of synchronized swimming.

In the program It was offered to use the bringing and imitating exercises in the hall and afloat, the exercises, which are aimed at the development of muscular strength and flexibility in the joints (involved in the implementation of this motive action) and also the exercises, which are directed to the improvement of rhythm structure of the separate indicators (entered the developed by us models) of kinematic structure of technique of performance of rowing movements.

Intermediate skills were applied to the facilitate development of sports technique by systematic, stage-by-stage performance of the simple motive actions, providing performance of the main movement. Imitating exercises were used at the improvement of technical skill as they allow to create the idea of technique of the "standard" rowing movement, provide the optimum control of coordination structure of movements just before competitions and promote the control of optimum coordination structure of the "standard" rowing movement.
We considered the fact that when performing the "standard" rowing movement, the conditions are provided, which facilitate the development of motive actions that renders positive effect at the initial stages. For example, as the facilitating conditions such positions of the compulsory program as standard position "On back", "Group" were applied both in the hall, and on water. "Horizontal" basic positions of the compulsory program on water were carried out by sportswomen with the use



Pic. The block diagram of the implementation of the experimental program for the improvement of technique of the "standard" rowing movement of sportswomen of 11–12 years old, who specialize in synchronized swimming

of additional stock, and also the material means providing the facilitating influence ("noodles", swimming boards, creation of support for sportswoman about pool side, swimming track, etc.). Conditions, which make the complicating impact when performing these physical exercises, were applied (both in the hall and on water) at later stages of the process of the improvement of technique of rowing movements of the sportswomen, who specialize in synchronized swimming.

The complicated conditions of the performance of these motive actions in the hall were provided with the application of rubber tube and the making heavier dumbbells (weighing up to 0,5–1 kg) when performing the exercises, which are directed to the improvement of technique of rowing movements. Imitating exercises in "horizontal" basic positions of the compulsory program were mainly used at the same time.

Restriction or expansion of spatial borders of the performance of techniques and actions was reproduced us due to fixing of corners when performing the "standard" rowing movement (in particular, the tapes providing fixing of corners in joints were applied). These rowing movements were applied when performing figures of the compulsory program.

The ways, complicating the performance of motive actions (the exercises performed both in the hall and on water) in conditions were also applied in the course of improvement of technology of the fungal movements of the sportswomen specializing in synchronized swimming: the increased emotional pressure (as a rule, before or in the course of competitive activity), the derivation or the distributed attention, the complicated activity of separate analyzers (first of all, due to the performance of the set motive actions without visual control), etc.

The offered exercises, which are directed to the improvement of technique of the "standard" rowing movement, depending on their complexity and orientation on the correction of separate "technical" elements, were included in the structure of complexes of physical exercises, which were integrated into the process of training of sportswomen.
Operating control by correctness and stability of the performance by sportswomen of elements of technique, which are improved, was carried out by the coach by means of the method of visual observation.

The current control with the application of method of video filming was carried out at the end of each mesocycle. The analysis of video records and discussion of the technical mistakes, which were made by sportswomen, were carried out individually with each sportswoman. Such analysis of the data gave the operational information about the progress of improvement of technique of rowing movements.

The stage control was carried out at the end of the preparatory period of the annual cycle of preparation. Methods of video filming and the video computer analysis were used.

The developed by us model biomechanical indicators of technique of the "standard" rowing movement, when performing "horizontal" basic positions of the compulsory program, and also subjective criteria were used as the criteria of efficiency by the process of improvement of technique of rowing movements of the sportswomen, who specialize in synchronized swimming [1; 3].

The implementation of the program, which is directed to the improvement of technique of motive actions, was carried out in the preparatory period of the annual cycle of the training process of sportswomen of the experimental group (n=8) of 11–12 years old, who specialize in synchronized swimming. The control group of sportswomen (n=8) was engaged according to the standard program of preparation.

In view of the recommendations, which are submitted in special literature [6] and also current trends of the development of synchronized swimming, by drawing up the annual cycle of preparation, and also complexes of physical exercises, the need was considered, at this stage of long-term sports improvement, to provide conditions for mastering sportswomen comprehensive and various motive actions, creations of extensive base of the motive abilities promoting the successful development of the engaged more difficult technical elements at the subsequent stages of long-term preparation.

Nine trainings were planned within the week, according to recommendations of the training program about synchronized swimming for CYSS, SCYSOR, SHSS and SECSS. The offered complexes of physical exercises were applied three times a week in the main part of classes, and the mastered complexes were applied daily in special warm-up, both on the land, and on water.

The considerable or average loading was, as a rule, planned in classes. The mastered complexes of physical exercises were applied at the same time in special warm-up of each training classes.

The assessment of experts for the performance of "horizontal" basic positions at sportswomen of the experimental group increased statistically significantly ($p<0,05$) as a result of the made forming experiment. The dynamics of change of these indicators (on the example of "horizontal" basic position "Ballet leg") before carrying out the forming experiment is characterized by the increase in estimates for: reduction of swims of body of a sportswoman (in longitudinal, cross, diagonal, circular directions) – from $\bar{X}=5,1$ ($S=0,2$) till $\bar{X}=6,1$ ($S=0,1$) point; deduction of level of height of body over water surface – from $\bar{X}=5,06$ ($S=0,02$) till $\bar{X}=6,25$ ($S=0,2$) point; reduction of fluctuations of legs (vertical and horizontal) – from $\bar{X}=5,03$ ($S=0,1$) till $\bar{X}=6,18$ ($S=0,2$) point; decrease in intensity of waves on water surface – from $\bar{X}=5,08$ ($S=0,04$) till $\bar{X}=6,09$ ($S=0,04$) point; improvement of «geometry» of body – from $\bar{X}=5,21$ ($S=0,4$) till $\bar{X}=6,3$ ($S=0,1$) point. The general assessment for performance of this «horizontal» basic position increased statistically authentically from $\bar{X}=5,09$ ($S=0,12$) up to $\bar{X}=6,19$ ($S=0,1$) point ($p<0,05$).

The noted positive dynamics on these indicators sportswomen of the control group before carrying out experiment wasn't statistically reliable ($p>0,05$).

Positive changes in the experimental group were also noted on indicators of the biomechanical structure of technique which nature of change is connected with the approach of features of motive actions by the second way of the «standard» rowing movement that was reflected on statistically significant ($p<0,05$): reduction of length trajectory of CM of a hand in the horizontal plane on $\bar{X}=0,07$ m ($S=0,02$); reduction of duration of rowing cycle by $\bar{X}=0,08$ s ($S=0,01$); reduction of the corner formed by transverse axis of hand and horizontal on $\bar{X}=71^{o}$

(S=4); increase in resultant speed of CM of a hand throughout the whole rowing cycle on $\bar{X}$=0,58 m·s^{-1} (S=0,02), etc.

Conclusions

The developed experimental program for the improvement of technique of the «standard» rowing movement in «horizontal» basic positions included 23 complexes of physical exercises, which orientation is focused as on the increase in the efficiency of technique of the «standard» rowing movement, and on the expansion of arsenal of motive abilities of sportswomen of 11–12 years old, who specialize in synchronized swimming and which main components are: purpose and tasks, didactic and specific principles, means and methods of training, methods and forms of the organization of the engaged, control, taking into account the received biomechanical and subjective criteria of the efficiency as a result of the researches.

The approbation of the program in the educational training process of the annual cycle of the training of sportswomen of 11–12 years old which is directed to the improvement of technique of the "standard" rowing movement in "horizontal" basic positions showed the efficiency that affected as the increase in estimates for the performance of "horizontal" basic positions, and the change of number of model biomechanical indicators of technique of rowing movements.

Prospects of further researches are connected with the development of programs of the improvement of technique of "vertical" basic positions of the sportswomen, who specialized in synchronized swimming at the stage of the specialized basic preparation.

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Jury Litvinenko: *PhD (Physical Education and Sport); Assosiate Professor, National University of Physical Education and Sport of Ukraine: Phyzkul'tury str. 1, Kyiv, 03680, Ukraine.*
ORCID.ORG/0000-0003-1137-9952
E-mail: ylitvinenko@mail.ru

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Indicators of physical condition of women who are engaged in health-improving aerobics

Olga Martynyuk

State Higher Educational Institution "National Mining University", Dnipropetrovsk, Ukraine

Purpose: *to learn physical condition of women for the increase of efficiency of sports and health-improving classes.*

Material & Methods: *20 women of 21–35 years old who are engaged in health-improving aerobics took part in the stating experiment. The assessment of physical condition is carried out by means of the method of indexes and the equations of regression.*

Results: *it is established in the course of the researches that 45% of participants of the experiment have the level of physical condition "below the average", and 55% – "low", at the same time persons with the highest indicators are not registered.*

Conclusions: *results of the research added and expanded the existing conclusions about morphofunctional characteristics of physical condition of women who are engaged in different types of sports and health-improving classes.*

Keywords*: aerobics, physical condition, women.*

Introduction

Aerobics is one of the popular types of health-improving physical culture, to what the numerous number of the research works testifies, which are devoted to the problems of the effective organization of classes by health-improving aerobics and to studying of their influence on physical condition of the engaged [2; 5; 6; 10; 17, etc.].
Health-improving aerobics as symbiosis of various means and methods of physical education is fully capable to satisfy the requirement of the engaged in physical activity and, the most important, to provide the achievement of socially important results: due level of physical health, optimum physical development, culture of movements, and esthetics of physical image [1].

It is well known that the solution of health-improving tasks in the course of the classes by physical exercises depends on the adequate selection of means and methods of impact on organism of the engaged. But at the same time the data [2; 19; 21] demonstrate that the effective creation of training loads with women needs to be carried out not only from the position of sexual dimorphism and the related physiological features of a female body, not only from the position of age features, but it is necessary also to consider actual morphological state and functional preparedness of organism of the engaged.

It is follows from the above that carrying out the stating pedagogical experiment, which is directed to obtaining information on physical condition of women, is expedient and relevant.

Communication of the research with scientific programs, plans, subjects

The work is performed according to the consolidating plan of the research state budgetary work of the chair of physical education and sport of State Higher Educational Institution "National Mining University" for 2013–2015.

Purpose of the researches:

to study physical condition of women for the increase in efficiency of sports and health-improving classes.

Material and Methods of the research

The stating pedagogical experiment is conducted for the achievement of the purpose on the basis of department of physical training and sport of State Higher Educational Institution "National Mining University" (Dnipropetrovsk) with the participation of 20 women of 21–35 years old (X=27,05 of years old) from them 5 people – students of higher education institution and 15 people – employees.

Results of the pedagogical experiment were registered in «The diary of control of state of health in the course of classes by physical exercises of health-improving orientation». «The diary ...» is developed for each participant of the program and introduced in the recreational process; it is calculated for the implementation of stage-by-stage and current control of physical control with fixing, analysis and assessment of the received results of the pedagogical testing.

They were guided by the data of references [7; 11; 13; 19; 22], and also results of own researches and long-term experience of carrying out researches in this area at the choice of methods of assessment of physical condition [14–17; 25, etc.]. So, the final judgment of physical condition of women is based on the results, which were received by means of method of indexes, and the equations of regressions, which often use at mass inspections and have number of advantages, namely: do not create any organizational and material difficulties, but they are informative at the same time.

It is used for the assessment of physical development:

– *body weight index* (BWI) – for the determination of norm of body weight, orientation and intensity of health-improving trainings with the corresponding food mode;
– *vital index* – for the definition of functionality of the organs of external respiration, showing what volume of air from the vital capacity of lungs is the share of each kilogram of body;
– *indicator of percentage of animal force* to body weight (power index).

It is noted in references [8; 22; 24] that studying of the component structure of body is a widely applied procedure which results supplement information on physical development of a person, level of his motor activity and on about food status, and, above all it is one of the main indicators of efficiency of sports and health-improving classes.

Besides, on observations of S. D. Runenko [24] indicators of BWI which are often used for the assessment of physical development are not informative in practice of health-improving training as do not reflect the structure of body. Therefore indicators of maintenance of fatty and musculoskeletal components of body are much more important also informative as [22]:

– maintenance of fat in organism is basic at the choice of intensity of the mode of sports and health-improving classes and their orientation;
– musculoskeletal bulk defines need of use in the course of the classes of the exercises and methods, which are aimed at the development of muscle bulk.

Gallagher formula et al was used for the definition of percentage of fat in organism, and for the determination of musculoskeletal bulk – Baumgartner equation. The received values are compared with age norms [22].

The importance of morphological data increases in combination with the assessment of functionality of organism [20], and are used in these researches:

– *index of Robinson* which defines the degree of econominization of the cardiovascular system at the integrated level;
– *shock index*, allows to define possibility of dysfunctions in activity of the cardiovascular system which are followed by the deterioration in the system hemodynamics;
– *index of Ruffier* – adaptation of the cardiovascular system to standard exercise stress;
– *adaptation potential* – assessment of functional reserves of organism.

Mathematic-statistical processing of the received results was made on the personal computer with use of the program Microsoft Office Excel 2007 taking into account the existing recommendations [4].

Results of the research and their discussion

The statistical characteristics and assessment of indicators of

Table 1

The statistical characteristics and assessment of indicators of physical condition of women, which were received during the stating experiment (n=20)

Statistical characteristics of indicators			Assessment
Body weight index, g·sm^{-1}	$\bar{X}$	22,47	body weight in normal
	σ	3,13	
	V, %	13,92	
Content of fat in organism, %	$\bar{X}$	28,19	"moderately high" level of percentage of fat in organism
	σ	5,52	
	V, %	19,58	
Content of musculoskeletal bulk, %	$\bar{X}$	35,87	norm
	σ	3,68	
	V, %	10,26	
Power index, %	$\bar{X}$	51,47	"average" indicator of percentage of animal force to body weight
	σ	8,85	
	V, %	17,20	
Vital index, ml·kg^{-1}	$\bar{X}$	48,53	"below the average" indicator of functionality of the organs of external respiration
	σ	7,78	
	V, %	16,04	
Index of Robinson, s. u.	$\bar{X}$	97,40	"below the average" level of econominization of the cardiovascular system
	σ	14,36	
	V, %	14,74	
Shock index, s. u.	$\bar{X}$	0,66	possibility of dysfunction of activity of cardiovascular system is absent
	σ	0,10	
	V, %	15,04	
Adaptation potential, s. u.	$\bar{X}$	2,40	satisfactory adaptation, sufficient reserves of organism
	σ	0,29	
	V, %	12,06	
Index of Ruffier, s. u.	$\bar{X}$	9,78	"good" adaptation of the cardiovascular system to standard exercise stress
	σ	4,17	
	V, %	42,68	

physical condition of women of 21–35 years old, which were received during the stating pedagogical experiment, are submitted in tab. 1.

Generalizing the obtained data, it is possible to draw conclusion about "below the average" level of physical development of women to what the indicators which are not meeting age standards testify. Namely, excess body weight is observed (in 40% of cases); high percent of content of fat in organism (at 60% of women); below the average level of functionality of the organs of external respiration (at 70% of participants) are observed at this category of persons. But at the same time indicators, which characterize the development of musculoskeletal bulk and animal force correspond to the due level.

The registered results of calculations of the functional equations supplement information on features of physical condition of women. So, indicators of index of Robinson certify that «below the average» level of functional condition of the cardiovascular system is diagnosed for participants of the experiment. However indicators of index of Ruffier, index of shock and adaptation potential specify that actual state of functional systems of female body will react adequately to standard exercise stress.

Further, we will note throughout the discussion of results of researches that information for the development of contents and technique of classes is analyzed by health-improving aerobics at the individual and group method of the organization, and the level of physical condition (LPC) is chosen as criterion in this work for the distribution of women to groups. Rather known scientific approach to programming of sports and health-improving classes on the accounting of LPC which are engaged [9] formed the basis for this purpose.

We paid attention to results of the scientific research by N. O. Goglyuvataya at the choice of method of assessment of LPC of women [3] that the assessment of physical condition according to Ye. A. Pirogova is rather informative and has a high correlation communication with morphofunctional indicators. So, these researches of morphofunctional status are added with the assessment of level of physical condition of women (tab. 2).

The received results of the stating experiment allowed to define the main orientation of sports and health-improving classes with women of 21–35 years old – to promote the achievement of the due LPC. And some morphofunctional indicators which do not have reliable differences ($p>0,05$) between groups of persons with different UFS – index of Ruffier, vital index, indicate that the priority of the planned classes are to promote the increase in the level of functional condition of the cardiovascular and respiratory systems.

Besides, the decrease in body weight – is for the achievement of the main purpose, which is set before themselves by women at the beginning of the training process [15] and to promote the correction of constitution, not rather only regularly and to attend classes systematically for the solution of task. In this case it will be effectively to recommend to these persons to balance diet, to follow norms and the rules of food in the course of the classes by physical exercises. And this indispensable condition of the effective implementation of programs of the correction of figure.

So, results of these researches added and expanded the existing numerous conclusions [12; 16; 23, etc.] about the morphofunctional features of the women who are engaged in different types of sports and health-improving classes will also be coordinated in many respects with the conclusions of S. V. Sologubova [19], namely that, despite "low" and "below the average" levels of physical condition, morphofunctional characteristics of participants of the experiment are generally within indicators of the general health.

Conclusions

The development of the content and the technique of classes by health-improving aerobics taking into account the established level of physical condition will be directed to the correction of constitution of women of 21–35 years old due to the decrease in body weight, the decrease in percentage of fat in organism, and also on the increase in the level functional condition of the cardiovascular and respiratory systems of the engaged on the basis of results of the stating experiment.

Prospects of further researches: to prove the content and the technique of classes by health-improving aerobics of the complex type experimentally at the expense of the combination of exercises of aerobic and power orientation for the purpose of the increase in level of physical condition of women.

Table 2

The statistical characteristics morphofunctional of indicators depending on the level of physical condition of women, which was established during the stating experiment (n=20)

Indicators	Level of physical condition		t	p
	below the average (n=9)	low (n=11)		
	$\bar{X}\pm\sigma$			
Age, years	26,22±4,97	27,23±5,46	0,49	>0,05
Body weight index, kg·m^{-2}	20,06±2,38	24,44±2,14	3,86	≤0,01
Content of fatty body weight, %	23,82±10,23	31,76±3,05	4,41	≤0,001
Content of musculoskeletal bulk, %	38,18±2,08	33,82±3,84	3,22	≤0,01
Power index, %	55,54±5,86	48,15±9,72	2,099	≤0,1
Vital index, ml·kg^{-1}	49,57±9,92	47,68±5,58	0,50	>0,05
Index of Robinson, s. u.	85,11±5,78	107,45±10,87	5,87	≤0,001
Shock index, s. u.	0,66±0,12	0,67±0,08	0,14	>0,05
Index of Ruffier, s. u.	8,93±4,93	10,47±3,53	0,79	>0,05
Adaptation potential, s. u.	2,13±0,14	2,82±0,36	5,89	≤0,001

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Olga Martynyuk: *PhD (Physical Education and Sport); State Higher Educational Institution "National Mining University": Karl Marx Av., 19, 49600, Dnipropetrovsk, Ukraine.*
ORCID.ORG/0000-0002-2024-5326
E-mail: daomart@mail.ru

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Improvement of artistry at the qualified sportswomen in rhythmic gymnastics

Alla Mullagildina

Kharkiv State Academy of Physical Culture, Kharkiv, Ukraine

Purpose: *to define influence of means of modern choreography on artistic abilities of the qualified sportswomen in rhythmic gymnastics.*

Material & Methods: *art-aesthetic requirements by the technique of V. S. Avanesov were defined at eight candidates of master of sports, choreographic priorities were found out by means of questioning and conversation, the level of coordination abilities of gymnasts by motive tests was defined.*

Results: *classes by choreography, communication with music are priority in art- aesthetic needs of gymnasts. Most of gymnasts gave their advantage to the use of techniques of contemporary dance and jazz-modern from means of modern choreography.*

Conclusions: *the level of musically-rhythmical preparedness, coordinate movements by different parts of body, expressiveness of movements improved considerably under the influence of means of modern choreography at gymnasts that promoted the improvement of artistry of sportswomen.*

Keywords: *contemporary dance, jazz modern, art requirements, gymnast.*

Introduction

Assessing performance of competitive athletes in rhythmic gymnastics exercises carried out by the judges on the technical and artistic parameters [4]. Indicators of technical skill gymnasts is harmonious and unerring execution of movements by various parts of the body at high speed and maximum amplitude in combination with a masterly work items [7]. In the assessment of artistic expression affects the exercises, musicality and versatility of performance skills of athletes. Dancing training plays a key role in shaping the performance skills of athletes [1; 8; 10]. Currently, the training of qualified gymnasts actively introducing various types of modern choreography [2; 3]. Many experts in rhythmic gymnastics argue that modern choreography, this contributes to the development of skills expressive movements, liberation, mastery of a variety of styles, the development of artistry gymnasts. For the effective use of modern choreography necessary to study their impact on the specially trained athletes

The purpose of research:

to determine the influence of the modern choreography at the artistic abilities of qualified athletes in rhythmic gymnastics.

Research objectives:

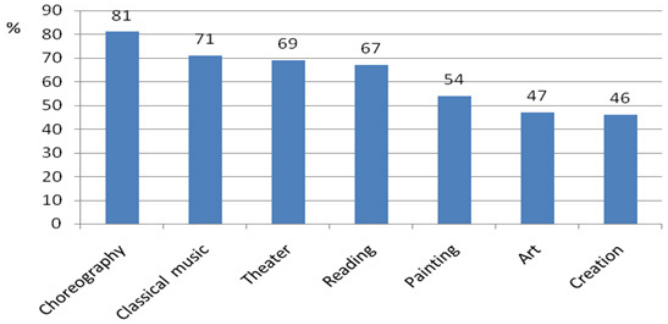
1. To study the artistic and aesthetic needs of the gymnasts and their priorities for the types of choreography.
2. Determine the influence of the modern choreography at the coordination abilities of qualified athletes in rhythmic gymnastics.

Material and Methods of the research

In the experiment, participated 8 athletes, candidates for master of sports in artistic gymnastics, extending the program of masters of sports. Artistic and aesthetic needs of the gymnasts were detected by the method of V. S. Avanesov, 32 claims [9]. Choreographic athletes priorities were determined by the developed questionnaire and during the conversations. The level of coordination abilities determined by the results of the gymnasts asymmetric movements jobs rhythm, tests for the differentiation of muscle effort and the vestibular apparatus.

Results of the research and their discussion

Artistic and aesthetic needs of the gymnasts were interpreted on possible initiation athletes to different types of art and creativity. Since, according to the preferred direction of artistic and aesthetic needs of gymnasts in the questionnaire had a different number of allegations, and, consequently, different maximum possible score, the results were converted into percentages. In Picture 1, in order of importance are presented gymnasts artistic and aesthetic requirements (pic. 1).



Pic. 1. Priorities in the artistic and aesthetic needs of gymnasts

The priority of artistic and aesthetic needs of sportswomen study group are dance (81%). Girls have a positive attitude to the classical choreography and sports ballroom dances. In second place is the need to communicate with a serious music (71%), which is based on a positive attitude and the ability to listen to classical music, as evidenced by the ability for most women to get rid of a bad mood by listening to classical music.

The next most important need to identify the theater and reading (69% and 67%). If possible, athletes try to go to the theater and to spend time reading, but the theater is possible to visit only partially, and some prefer the adaptation of literary works. Requirements for the admission to the art of painting in athletes is not high (54%). Girls are less expanding their knowledge in the painting, do not go to art galleries and exhibitions. Athletes believe that modern man can not do without the dialogue with the works of art (47%). Do gymnasts modest skills in art (46%), but they have a desire to develop their creative abilities.

With the help of questionnaires and interviews were defined preferences in the kinds of choreographic art. It should be noted that the process of training in rhythmic gymnastics athletes all have experience training Exercises classical dance and familiarity with some directions in the choreography. Three gymnasts training in addition to studying classic, sports ballroom and folk dances. Most gymnasts means of modern choreography preferring the use of techniques Contempo dance and modern jazz.

To implement the tools of modern choreography in athletes through questionnaires and interviews were defined their competence and preferences in styles of music and nature [2; 6]. Based on the fact that the musical style includes the totality of the means of expression of artistic and ideological content of the musical work, gymnasts considered their preferences for the following musical styles: Classical, folk, Dance music, pop, rock, alternative rock, and others have determined that the four athletes like classical music, three – rock music. With the help of questionnaires and interviews gymnasts defined priorities in terms of the nature of music and music is offered the following nature: a tragic, romantic, lyrical, heroic, patriotic, sad and funny. Regarding the preferred nature of the music of the girls they were very diverse: from the romantic, lyrical to heroic. Most women – romance. Some lyrical romance or romance heroic.

Thus, as a result of studying the artistic and aesthetic needs of the gymnasts it was found that the gymnasts are addicted to dancing, interested in a variety of styles of music, theater and literature. Do female athletes to be creative desires and needs. It is determined that the most competent athletes in classical dance, modern choreography in the priority areas for the gymnasts are Contempo technology and modern jazz.

Motor coordination in gymnastics characterized by a pronounced specific motor and sensory asymmetry. The high rate of asymmetry does not allow athletes to perform competitive elements of the high "cost" at the appropriate level and to include them in its program, thus limiting the variety and technical complexity of the composition competition [5]. As a result, testing coordination abilities gymnasts had identified problems, namely the low level of co-ordination of the various movements of the body parts (4 to 7.4 errors). Least of all gymnasts made mistakes in carrying out asymmetric movements of arms and legs during the 20 s, the average – four errors. Harder athletes were given the asymmetrical movement of the upper limbs, from six to 7.4 errors to demonstrate perfect execution. Gymnasts have successfully coped with the method of distance using the corresponding movements of the hands and feet, from 5.8 seconds to 6.8 seconds. Do athletes did not cause difficulty running backwards, which they managed to 4 seconds. Some gymnasts experienced significant difficulties in tests for orientation in space without visual control, deviations of up to 45°. We do not have caused difficulties sportswomen simple tests on the sense of rhythm (from 0 to 2 error error). In the test to reproduce the musical rhythmic pattern in athletes had difficulties, only one athlete coped without errors. It is determined that the majority of girls kinetic sensitivity is well developed, departing from 11% to 18%, except for gymnasts under the number 5 (38% and 36%) (table. 1).

Thus, the athletes have been identified problems in the implementation of asymmetrical movements with his hands and feet, and with two hands. Athletes have experienced difficulties in the tests on the orientation in space without visual control and allow for deviations in the differentiation of muscle sensations tests. Gymnasts coped better with simple rhythmic and tests showed a low result in the reproduction of musical rhythmic pattern.

Modern dance was used as a tool for the development of coordination abilities of gymnasts and improve artistic skills of athletes [2; 8]. With the help of modern choreography funds is expanding choreographic vocabulary athletes and improved their artistic skills. Research orientation present in our methodology. In class jazz – modern dance and contemporary dance gymnasts lined connection between the dance form and its internal feelings.

The dance was performed Contemporary girl isolated movement different parts of the body. Athletes trained isolated movement – only one part of the mobility of the body, while the entire body remain stationary or moving in the opposite direction. Isolated traffic stressed rhythm of the music, creating the impression of music passing through the body of a gymnast. Classes contemporary dance gymnast learn to improvise, to exercise the utmost expressiveness, emotion and emancipation, thus improving the level of coordination abilities and artistry gymnasts.

Technique Jazz Nouveau is currently popular in the preparation of highly skilled gymnasts [6]. In this style of choreography developed plastic girls, flexibility, the ability to reflect movements using pulsing music. movements fusion was achieved in regular training to strengthen all muscle groups. Classes develop musicality, sense of rhythm, proper breathing, coordination and the ability to control the body. Broken body movements, spectacular dance moves dance totally dependent on the imagination of girls, unity of his inner world with the world of space and music. In class athletes have learned to distinguish between complex rhythmic patterns, coordinate movement with the rhythm of the music syncopated music between strong stakes.

In training with the use of modern forms of choreography studied diverse mix of footwork, arms, torso, head. This development was not of a mechanical character. By appropriate

adjustment of each movement raised its expressive, artistic performances. To improve the skills and maintain a creative interest as learning new exercises become more complex systems. While working on the nature of its motion-ha music was the main methodological procedures providing the most vivid and profound awareness of the task and correct its implementation [2]. Activities on the development of athletes have the ability to perceive the content of the music and its individual members have contributed more vivid sense of movement and provide the necessary emotional expressiveness. To develop the creative abilities of the athletes to respect the basic principle that the work on the nature of the motion in relation to music is to realize its tasks and independent decision. In this case, the teacher did not explain and did not show movement, athletes, listening to music, independently found ways to set training.

In the next phase of the study was conducted retest level of coordination abilities of gymnasts, which showed improvement in average performance in the group for all the studied parameters (table 2).

E number of errors when performing exercise asymmetrical errors decreased from 24 at baseline to 20 at the end of the experimental errors. Positive changes have also occurred in the tests on the orientation in space (from 9.9 s to 2 s and from 58° to 24°). The average value of the number of errors in the performance tests for improved rhythm ($\bar{X}$ – 4 errors – $\bar{X}$ – 2 errors), the deviation in the test for differentiation of muscle effort decreased from 24% to 20%. Thus, it is determined that a class modern types of choreography positive impact on the medium performance group coordination abilities gymnasts. The greatest improvement occurred in the coordination abilities of the gymnasts in which the primary testing results were at a low level.

Conclusions

1. Priorities in the artistic and aesthetic needs of the gymnasts were distributed in the following order: introduction to choreography classes (81%); the need to communicate with a serious music (71%); theaters (69%); reading (67%); interest in painting (54%); fellowship with the works of art (47%); introduction to creative work (46%). Most gymnasts are competent in the classical choreography. From contemporary trends are a priority for athletes Contemporary technology and modern jazz.

Table 1

The test results of coordination abilities of female athletes

Tests	Results									
	1	2	3	4	5	6	7	8	$\bar{X}$	σ
1.Asymmetric hands and feet movement, the quantity of errors	5	4	4	3	5	5	3	3	4,0	0,9
2. Right-circles, the left-vertical line, the quantity of errors	9	7	5	4	4	4	9	6	6,0	2,1
3. Left – circles, right – triangle, the quantity of errors	7	5	7	8	5	5	11	11	7,4	2,5
4. Right – circles, the left – the horizontal line, the quantity of errors	7	7	6	5	5	8	9	8	6,9	1,6
5.Passing 12 m. Of the same heading.	6,1	6,7	6,3	6,8	6,1	5,6	6,8	5,8	6,3	0,5
6.Runningbacks12 m	3	3,8	3,7	3,9	3,3	3,7	3,7	4	3,6	0,3
7. Pivoting after 5 spins around itself without visual control, degrees	15	30	15	20	40	30	25	15	23,8	9,2
8. Deviation walking without visual control, degrees	25	35	40	25	35	30	40	45	34,4	7,3
9. Two hands clap, step 1, the quantity of errors	0	2	0	0	2	1	0	0	0,6	0,9
10. Two steps, 1 clap hands, the quantity of errors	0	1	1	0	1	2	0	0	0,6	0,7
11. The rhythmic pattern, the quantity of errors	3	4	2	0	2	4	2	1	2,3	1,4
12.Dynamometryright, kg	16	21	18	24	18	17	15	16	18	3,0
13.Dynamometry 50% deviation (%)	6,3	11	5,6	8,3	38	8,8	3,3	25	13	12,0
14. Dynamometry 25% deviation (%)	6,3	6	8,3	16	36	10	1,7	6,3	11	10,8

Table 2

Tests	Results								At the beginning of the experiment		At the end of the experiment	
	1	2	3	4	5	6	7	8	$\bar{X}$	V	$\bar{X}$	V
1. Asymmetric exercise, the quantity of errors	24	20	18	18	15	18	26	19	24	19	20	18
2. The orientation in space	1,1	1,5	1,5	1,5	1,4	1,3	1,5	2,6	9,9	7	2,0	29
3. Orientation in space without visual control, degrees	10	25	20	15	30	30	30	30	58	33	24	19
3. The feeling of rhythm, the quantity of errors	2	5	2	0,5	3	5	1	0,5	4	77	2	75
4. Differentiation of muscular effort, deviation%	10	15	10	24	45	18	3	31	25	87	20	69

2. Gymnasts revealed problems in the performance of isolated movements and co-ordination of simultaneous movements in different parts of the body. In tests on orientation space without visual control deviation amounted to: ($\bar{X}$ – 24°; $\bar{X}$ – 34°); in the differentiation of muscle sensation tests: ($\bar{X}$ – 13%; $\bar{X}$ – 11%). Gymnasts showed lower result in the reproduction of musical rhythmic pattern.

3. The method of application of means of modern choreography in the preparation of highly skilled gymnasts based on the use of technology Contempo Dance (sontemporary dance) and jazz-modernist. Athletes performing isolated and asymmetric movements of different body parts, learn to distinguish between a complex rhythmic pattern, to improvise, to express their emotions and feelings. Under the influence of the modern choreography gymnasts improved expression skills, musicality, coordination of movements of different parts of the body, contributing to the improvement of artistry athletes.

4. The number of errors when performing asymmetrical exercises decreased from 24 to 20 errors. Decreased while the job in tests for spatial orientation with visual control (from 9.9 s to 2 s), the deviation in the tests fell outside the visual field (58° to 24°). When the differentiation of muscle effort deviation decreased from 25% to 20%. Greatly improved performance is musical-rhythmic training of athletes.

Prospects for further research. In future compilation of competitive programs of gymnasts with the inclusion of elements of Contempo and jazz-modern.

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Alla Mullagildina: *PhD (Pedagogy); Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0002-9232-6387
E-mail: gimnastika.sokol@mail.ru

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Improvement of the efficiency of procedure of expert estimation in oriental single combats

Vyacheslav Romanenko
Svitlana Pyatisotska

Kharkov State Academy of Physical Culture, Kharkov, Ukraine

Purpose: *to develop the program addition that allows increasing the efficiency of procedure of expert estimation in oriental single combats.*

Material & Methods: *theoretical analysis and generalization of scientific and methodical literature, method of computer programming.*

Results: *the computer program addition is developed that allows increasing the efficiency of procedure of expert estimation in oriental single combats, the previous approbation of the program is carried out.*

Conclusions: *the received results during the approbation demonstrate the improvement of quality of estimation, the optimization of process of exposure and fixing of estimates by experts. The developed computer program can be recommended for practical use.*

Keywords: *expert, expert assessment, program computer addition, tablet personal computer, single combats.*

Introduction

It is very often necessary for a coach to estimate the technique of performance by a sportsman of any element, method or action in sports practice, in different types of sport for the purpose of the determination of level of technical preparedness, the identification of execution errors and the search of ways of their elimination.

It is absolutely indisputable that it is necessary to rely on experience, knowledge and intuition of experts for the adoption of reasonable decisions.

Methods of expert assessments are the part of the extensive area of the theory of decision-making, and expert estimating – the procedure of receiving assessment of problem on the basis of opinion of experts for the purpose of the subsequent decision-making [6; 8].

The most significant criteria (characteristics, parameters) which range of change breaks into separate intervals to which certain estimates (points) are appropriated for receiving the objective assessment of technique of any method or action usually mark out [9].

The correct use of expert assessments allows obtaining the quite solid data where other ways of its receiving are excessively labor-consuming, expensive or even completely inapplicable. Thus, use of the method of expert assessments by a sports coach is a powerful mean of the solution of the applied tasks [11].

The use of computer technologies, namely mobile devices (laptop, netbook, tablet personal computer, smartphone), gains the increasing popularity in the training process every day. The computer and the special software allow a coach to obtain the urgent information on the studied object on the basis of which opportunity is given to analyze and to correct quickly the process of training of a sportsman [1; 4].

The development of the special software product which will allow simplifying the process of obtaining information on the studied object is urgent for the experts working in the sphere of physical culture and sport [2].

The purpose of the research:

to develop the software application allowing increasing the efficiency of the procedure of expert estimation in oriental single combats.

Research problems:

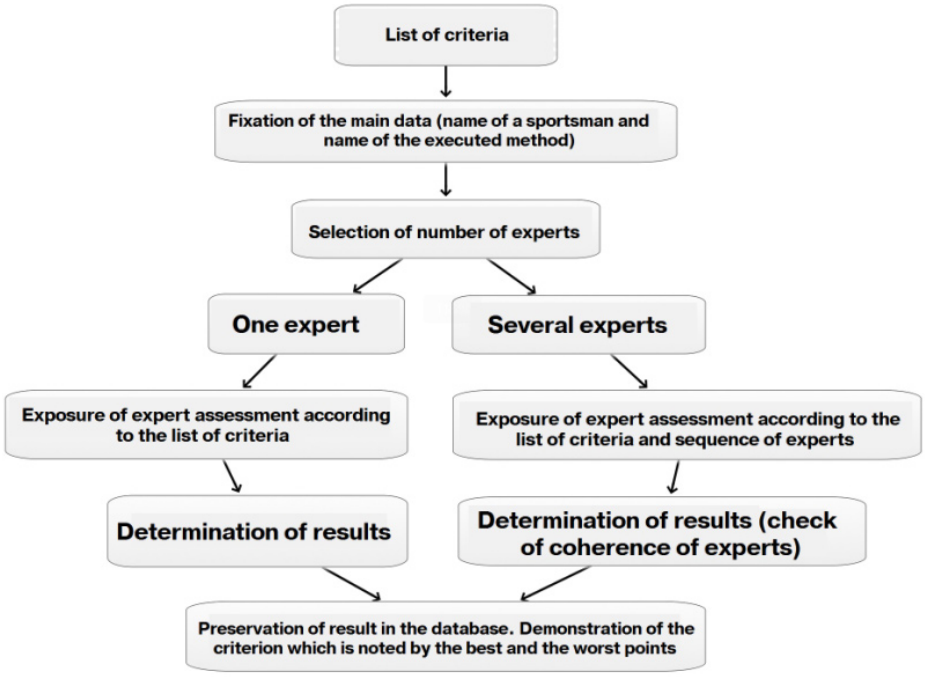
1. To define the main criteria for technique assessment in single combats.
2. To develop the algorithm of the procedure of expert estimation with the use of the computer equipment.
3. To develop and approve the software application for expert estimation in oriental single combats.

Material and Methods of the research

The following methods are used for the solution of the stated tasks: theoretical analysis and generalization of scientific and methodical literature, method of computer programming.

Results of the research and their discussion

The following provisions of rather expert estimation with the use of the computer equipment are selected on the basis of studying of the special literature, which is devoted to the perspective of control of technical preparedness in single combats [5; 9],:



Pic. 1. Algorithm of the procedure of expert assessment

– the most important criteria, such as accuracy, trajectory, speed, balance, the provision of the shock, blocking segment, breath etc. are marked out at the assessment of technique of performance of methods or actions [5; 7];
– the list and amount of the estimated criteria is defined by experts. The increase in amount of criteria, especially when it is necessary to estimate rather large number of sportsmen, complicates the procedure of expert assessment and increases probability of exposure of wrong estimates [4; 6];
– the mobile computer devices possess the certain technical characteristics which it is necessary to consider when using them in the training process. First of all they have to have reliability, speed, and usability, to be non-volatile [1; 2].

Considering the whole aforesaid, the algorithm of the procedure of expert estimation about the use of computer technologies is defined (pic. 1).

The program application "Expert's assessment" was developed on the basis of the offered algorithm of the procedure of expert estimation. The application is calculated on the use on tablet personal computers under the management of the operating system iOS.

The application supports "Ukrainian", "Russian" and "English". It is offered to formulate the name of criterion for the assessment of technique and to add it to the list in the main application window (pic. 2). It is possible to add up to 10 criteria, but as it was told above, the increase in amount of criteria leads to the unjustified complication of the procedure of expert estimation.

It is offered to enter specification after the creation of the list of criteria, which are necessary for assessment: name of a sportsman and name of method or action.

The application gives opportunity of the selection of number of experts from 1 till 3.

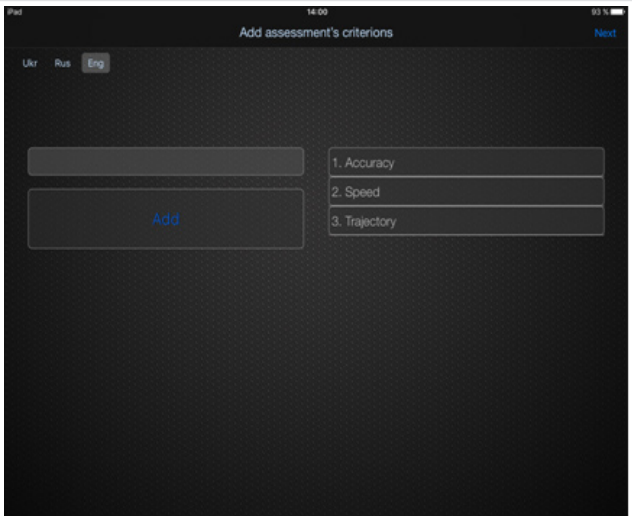
If the mode of assessment of technique or action is selected by several experts, it is offered to estimate each criterion in turn: 1st expert, then the 2nd and 3rd.

The estimated field of the application has borders: the upper bound assumes an excellent execution of technique or action, the lower – an unsatisfactory execution that is respectively equated to estimates of "5" and "2" (pic. 3). As the estimated field has no internal divisions, it is possible to give any mark in the whole range from 2 till 5 points within the 100-th that allows to achieve certain flexibility at the assessment of this or that criterion, and opportunity to use Swype (to carry out without tearing off, to slide) gives the chance to select the assessment corresponding to the opinion of the expert.

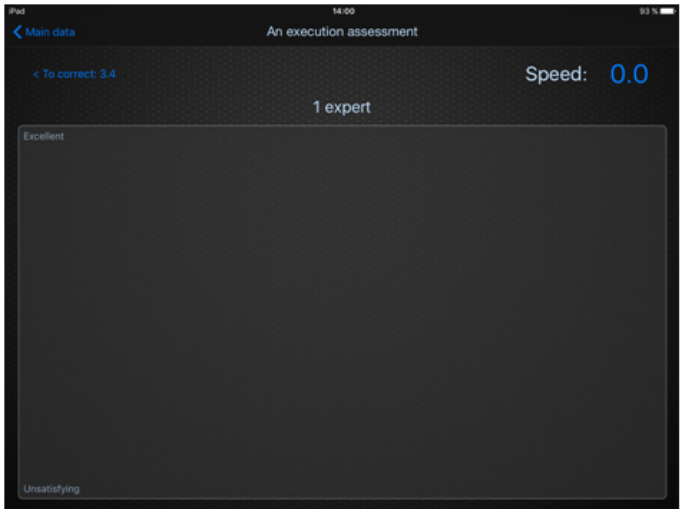
The program represents result on the completion of the procedure of expert estimation which includes:

– estimates of experts in each of the criteria;
– average grades;
– the coefficient of concordance of Kendall, confirming or disproving the coherence of opinions of experts;
– the highest and the lowest points with the criteria, corresponding to them;
– the number of the experts who are taking part in the examination (pic. 4).

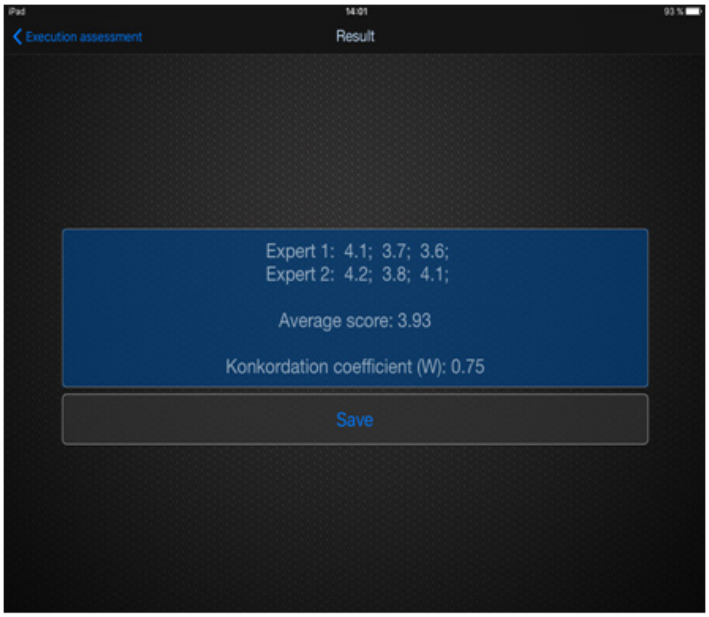
The program passes to the screen for input of specification after the preservation of result where it will be necessary to enter only the name of the following sportsman and it is possible to continue the procedure of expert estimation.
This program application was approved in children's and youth sports schools and sports clubs of Kharkov at the assessment of the level of development of techniques by sportsmen-wrestlers. The results, which were received by means of the application "Expert's assessment", are also presented in the qualification works of students of the chair of single combats of KhSAPC.



Pic. 2. The main window of the program "Expert's assessment"



Pic. 3. Application window "Essessment of execution"



Pic. 4. Application window "Result"

The version of this program for smartphones, working under the operating system iOS was created in the fact-finding purposes, which distinctive feature was the fact that criteria for evaluation of equipment (accuracy, speed, trajectory, balance, the provision of the shock, blocking segment) and their qualitative characteristic were already registered in it. So, for example: it was offered to be determined at the assessment of such criterion as "Accuracy", how precisely the method is executed – "Precisely" (5 points), "With insignificant deviation" (4 points), "Level is not kept" (3 points), "Deviation through the attack" (2 points).

The use of this application version in the training process showed its efficiency when holding the procedure of expert estimation of the level of technique of sportsmen of the low qualification where the coach can act directly as the expert.

Conclusions

1. The analysis of special literature showed that the objectivity of expert assessment in many respects depends on the qualification of experts, right selection of the estimated parameters and their optimum quantity.

2. The algorithm of the procedure of expert estimation with the use of the tablet personal computer is developed.

3. The software application for expert estimation in oriental single combats is developed and approved.

Prospects of further researches. The further research will be directed to the improvement of software application from the point of view of its use in other sports, in which there is a need of receiving expert assessment.

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Vyacheslav Romanenko: *PhD (Physical Education and Sport); Kharkov State Academy of Physical Culture: Klochkovska Street 99, Kharkov, 61058, Ukraine.*
ORCID.ORG/0000-0002-3878-0861
E-mail: slavaromash@gmail.com

Svitlana Pyatisotska: *PhD (Physical Education and Sport); Kharkov State Academy of Physical Culture: Klochkovska Street 99, Kharkov, 61058, Ukraine.*
ORCID.ORG/0000-0002-2246-1444
E-mail: skharchenko@rambler.ru

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Assessment of index of quality of life of students

Larysa Ruban
Stanislav Stavitskiy

Kharkov State Academy of Physical Culture, Kharkov, Ukraine

Purpose: *to carry out the assessment of index of quality of life of students of the specialty "Health of the person".*

Material & Methods: *students of the 2nd course of the specialty "Health of the person" took part in the research; methods were used: analysis of scientifically-methodical literature, screening questioning by "The scale of the assessment of quality of life".*

Results: *the results of questioning, which are received by means of the index "Quality of Life", students of the specialty "Health of the person" of Kharkov state academy of physical culture, are considered.*

Conclusions: *it is established that 10% had the high point of the index "Quality of Life" among youth-students, and 35% of respondents gained the high point among girls, and from them only in 14% of students – the lower limit of the high index of life. The lower limit was traced in one at the analysis of the average point of index of life (90%) of students, and 55% of respondents were in the borderline case at the time of the poll among girls.*

Keywords: *index of quality of life, students, screening questioning.*

Introduction

The necessary condition of learning of students in higher education institution – full-fledged health – is the most important need of the person, which provides the harmonious development of the personality. The way of living, lifestyle, vital motivations of a student define his health and social wellbeing eventually during the whole life. High intellectual, exercise and psycho-emotional stresses, violations of the mode of work, rest and food, change of moral values, uncertainty in the future demand from students of the mobilization of forces for adaptation to new condition of accommodation and training, formation of the interpersonal relations out of family and overcoming difficult life situations. In this regard studying of quality of life of student's youth, which will define the condition of intellectual level of our country, its competitiveness, is represented relevant [2; 3; 6].

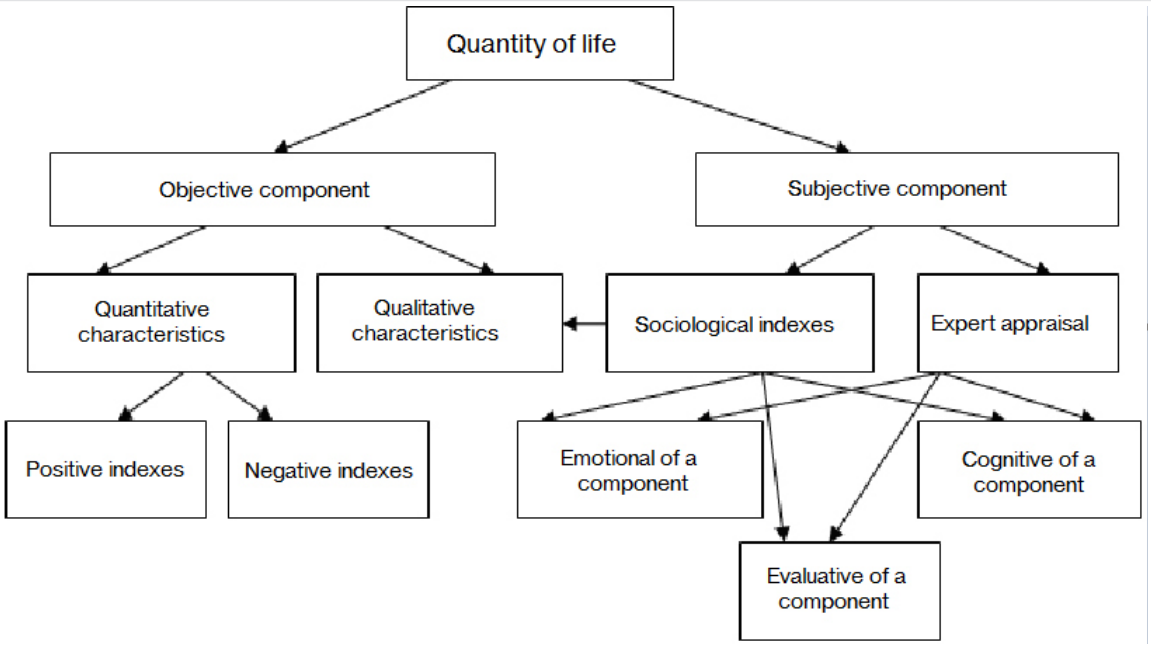
Quality of life of a student is important and informative characteristic of health of youth. The indicator of index of quality of life of students cannot be characterized as optimum, but its monitoring will give the chance of influence on it for the purpose of the further improvement. Timely diagnostics and assessment of the level of health allows revealing weak links in organism for purposeful influence, to make the individual program of improving trainings and to estimate efficiency, to predict risk of developing of life-endangering diseases, to define biological age of the person [1; 7; 9].
The concept "quality of life" appeared in use less than 40 years ago and at once began to be used in practice of sociological, and then and medical, statistical, demographic and other researches, characterizing the condition of activity and level of the person [2; 8].

The World Health Organization, which defines quality of life as "perception by an individual of his situation in life in the context of culture and system of values in which an individual lives, and in connection with the purposes, expectations, standards and interests of this individual", made the big in the development of scientific studying of quality of life contribution. WHO elaborated the fundamental criteria of quality of life:

1. Physical (force, energy, fatigue, pain, discomfort, dream, rest).
2. Psychological (positive emotions, thinking, studying, concentration, self-assessment, appearance, experiences).
3. Independence level (daily activity, working capacity, dependence on drugs and treatment).
4. Public life (personal relations, social value of the subject, sexual activity).
5. Environment (life, wellbeing, safety, availability and quality of the medical and social care, security, ecology, possibility of training, availability of information).
6. Spirituality (religion, personal beliefs) [2; 8; 10].

The greatest value belongs to a person, in whom objective and subjective factors are reflected and correspond, when studying quality of life (pic. 1) [2].

The analysis of references showed that the known ways of assessment of quality of life at people with various deviations use in medical practice (in particular, the Questionnaire of quality of life (the version of WHO)), but the scientific research of feature of formation of quality of life of student's youth exists a little more. The modern political situation, reforms, happening in the country, become objective reality and convince of need to influence quality of life of student's youth as our future state. The period of students is the period of considerable physical and mental reorganization of organism, which is connected with the transition of students to qualitatively new standard of living. The integrated subjective characteristic of quality of life of student's youth is formed before on the basis of characteristics of the personality, and also the general emotional condition of a young man – these aspects defined



Pic. 1. Factors of quality of life

the relevance of our research [5; 8].

Communication of researches with scientific programs, plans, subjects. The work is performed according to the priority thematic plan of the RW of Kharkov state academy of physical culture 76.35 "Medico-biological foundation of holding recovery actions and purpose of means of physical rehabilitation to persons of young age of different level of fitness". Number of the state registration – is 0116U004081.

The purpose of the researches: to carry out the assessment of index of quality of life of students of the specialty "Health of the person" on the basis of the screening-questioning.

Research problems:

1. To analyze the modern scientific and methodical literature and to get acquainted with definition questionnaires of "Quality of Life".

2. To carry out the screening-questioning among students on the "Scale the assessment of quality of life".

3. To characterize the assessment of index of quality of life of students of the specialty "Health of the person".

Material and Methods of the research

Students of the 2nd course of the specialty "Health of the person" participated in the research; methods were used: analysis of scientific and methodical literature, screening-questioning on the "Scale of the assessment of QL".

Results of the research and their discussion

The analysis of references showed that the main method of assessment of quality of life is application of the standardized questionnaires, there are about 400, but all of them were generally developed by foreign authors and they have to be Ukrainian-speaking and are modified under different categories of the population of our country for the further use in our country.

The integrated subjective characteristic of quality of life of student's youth, first of all, is formed on the basis of characteristics of the personality, and also the general emotional condition of a boy – these aspects defined the relevance of our research.

We used the "Scale of the assessment of QL", consisting of 36 questions, by means of which the assessment of spheres of quality of life is carried out for the assessment of quality of life of students: physical, psychological functions, independence level, social relations, and also perception by the respondent of health and quality of life in general [4; 9].

The expressed optimism and activity of living position are characteristic of the people, who have the high IQL, and the low level of index often meets at the persons, who endure burning out syndrome. The assessment of index of quality of life by the results of questioning of students of the specialty "Health of the person" of KhSAPC is provided in tab. 1.

Table 1

The assessment of index of quality of life of students of the specialty "Health of the person"

Index of quantity of life, points							
Very low (depressive)		Low		Average		High	
4–10		11–20		21–29		30–40	
M	W	M	W	M	W	M	W
0	0	0	0	90%	65%	10%	35%

10% had the high point among the male part of students, and the high point was gained by 35% of respondents among girls, and from them only 14% of students had – the lower bound of high index of life.

The lower bound was traced at one in the analysis of GPA of IQL (90% gained) students, and 55% of respondents were among girls in the borderline case at the time of the poll.

Table 2

Results of the screening-questioning of students of the specialty "Health of the person" on the "Scale of the assessment of quality of life"

№	Criteria of quantity of life	M, point	W, point
	BLOCK 1. Physical criteria (force, energy, fatigue, pain, discomfort, dream, rest)		
1.	Health	7,5	**8,5**
2.	Physical state	7,2	8,6
3.	Dream	**5,4**	7,1
4.	Physical shape	8,0	7,6
5.	Fear and alarm (discomfort)	7,4	7,4
6.	Internal (personal) resources	**6,2**	**6,9**
	BLOCK 2. Psychological criteria (positive emotions, thinking, studying, concentration, self-assessment, appearance, negative experiences)		
1.	Ability to organize the time (deficiency of time)	**5,8**	**5,9**
2.	Self-checking and self-control	7	7,2
3.	Sense of guilt and shame	7,5	6,5
4.	Anger	7	6
5.	Self-esteem	7,2	**5,9**
6.	Feeling of emotional "elation" and cheerfulness	**5**	**5,6**
7.	Offense or anger on others (seldom test)	3,1	4,6
8.	Mood	7,7	7,7
	BLOCK 3. Level of independence (daily activity, working capacity, dependence on drugs and treatment)		
1	Work (study)	**6,4**	**8,0**
2	Financial state	**5,2**	**6,1**
3	Physical activity	7,2	8,5
4	Vital values and principles	7,8	6,8
5	Changing circumstances	7,1	7,0
	BLOCK 4. Social life (personal relations, social value of the subject, sexual activity)		
1.	Personal aspirations and achievements	7,3	7,5
2.	Relations with children (or others)	7,1	7,7
3.	Relations at work (with colleagues, the administration, etc.)	7,5	7,7
4.	Relations with friends	**9,5**	**8,3**
5.	At change of situation or plans	7,4	6,8
6.	Intimate and sexual life	**5,5**	**5,7**
	BLOCK 5. Environment (life, wellbeing, safety, availability and quality of the medical and social care, security, ecology, possibility of training, availability of information)		
1.	Good mood, as a rule, depends on the external environment	8,3	7,6
2.	Environment	7,1	7,2
3.	Quantity and dramatic nature of vital crises in the last two years	**6,1**	**5,8**
4.	Business (professional) career	7	8,6
5.	Understanding and respect in the business (professional) environment	**7,3**	**6,8**
6.	Professional (business) support	**5,1**	**6,7**
	BLOCK 6. Spirituality (personal beliefs, religion)		
1.	Spiritual or religious support	6,0	7,3
2.	Decision-making	6,0	6,7
3.	Obligation	**6,4**	**6,3**
4.	Moral and emotional support of close people	7,7	8,0
5.	I have feeling of being lost in difficult life situations	**9,1**	**9,5**

Because the most part of our respondents have average IQL, and the borderline case was observed at 14% of girls and 10% of boys, the analysis of answers to questions was carried out.

We divided 36 questions into 6 blocks, consisting of the fundamental criteria of quality of life; the answers are estimated on the 10th ball scale (tab. 2).

The analysis of results of questioning showed that approximately the identical figures among boys and girls are traced concerning the first block, but, girl estimate their health as good more, and boys noted a bad dream at themselves more often.

Nobody estimated their physical criteria on 10 points and the indicator of internal reserves is also estimate rather low.
The most part of respondents of both sexes noted the deficiency of time that can speak about inability of concentration of the attention on something certain. The self-esteem is noted at the low level by girls that can speak about the underestimated self-assessment. Both boys and girls have seldom feeling of emotional "elation" and cheerfulness.

We can see from the answers of the Block 3 that the financial state didn't satisfied both boys, and girls, but everything more dissatisfaction is present among male. Boys show discontent more (6,4 points at boys to 8,0 points at girls) as for the choice of the direction of the activity.

The analysis of the Block 4 showed that students of both sexes estimate «Relations with friends» at the high level and the intimate and sexual life at rather low levels.
Answers to the questions of the 5th block showed that our students rather often endured vital crises in the last two years, and it belongs to such concepts as safety. They have no understanding and respect up to standard, and also support in the professional environment both girls, and boys.

Judging by answers, the spiritual aspect at our students is at the good level, but respondents defined such criterion as "obligation" on average on 6 points. The answer was more often – "I do only that I can, I am never overstrained", than "I undertake too much personal and others' obligations" or "I often undertake what others have to do".

The answers to the 5th question of the Block 6 (9,1 to 9,5 points) about feeling of being lost in difficult life situations can demonstrate that our students most often "never lose hope for safe permission of difficult life situations".

Conclusions

As a result of the conducted research, the high point had only 10% of boys, and the high point gained 35% of students among girls, and from them only at 14% of students – the lower bound of high index of life among students of the 2nd course of the specialty «Health of the person». The positive indicators of the objective component of quality of life were observed more among girls that speak about the expressed optimism and activity of their living position.

Prospects of the further research are connected with the development of the computer version "Scales of assessment of quality of life" for conducting the testing of students of all courses and specialties of our academy.

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Larysa Ruban: *PhD (Physical Education and Sport); Kharkov State Academy of Physical Culture: Klochkovska Street 99, Kharkov, 61058,*

Ukraine.
ORCID.ORG/0000-0002-7192-0694
E-mail: lara.ruban@mail.ru

Stanislav Stavitskiy: *Kharkov State Academy of Physical Culture: Klochkovska Street 99, Kharkov, 61058, Ukraine.*
ORCID.ORG/0000-0003-0651-331X
E-mail: ua-fan@mail.ru

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Formation of tactics of actions of cadets taking into account their cerebration during training in higher education institution

Yuri Sergienko
Alexander Lavrentiev
Sergey Antonenko

University of the State Fiscal Service of Ukraine, Irpin, Ukraine

Purpose: *the formation of tactical actions of cadets taking into account their cerebration on classes in the subject matters, which is connected with modeling of situations on office activity.*

Material & Methods: *the analysis of law-enforcement practice when carrying out various operational investigative actions, which are connected with the detention of offenders and their prosecution. The computer tests of assessment of psychophysiological abilities of sportsmen, which are developed by V. S. Ashanin were used, for carrying out the research. The experiment (n=25) is made during four years.*

Results: *the main psychophysiological processes of cerebration at cadets-law enforcement authorities on special physical preparation classes, tactical-special preparation and tactics of behavior of the employee of fiscal service with organic firearms in unusual situations are established.*

Conclusions: *the structure and the model of preparation are experimentally proved and specified, the role of interrelations of physical and psychophysiological qualities is opened.*

Keywords: *tactical and special preparation, law-enforcement practice, cerebration, cadet, law enforcement officer, professional activity.*

Introduction

Future professional activity of cadets, which will be connected with law-enforcement practice, is predetermined mostly by unusual situations, where act as major factors: specifics of the mode of the working day and non-normalized day, the nature of motive activity, and it, in turn, significantly influence the state of health and efficiency of workers. The change of situation presents during the operational actions constantly which, as a rule, passes in conditions of the limited space, insufficient information, uncertainty and impossibility to predict the whole development of the situation, which amplifies surprise and unpredictability of the end result.

The work in law enforcement agencies needs from a worker the big personal courage, ingenuity, figurative memory, the high level of organization, persistence and emotional firmness, ability, to make the decision quickly and coolly. They have to be able: to think logically and organize the activity; to carry out the urgent actions, which are provided by special tactics of operational and investigative subsections; to work with people effectively, to come into psychological contact; to resist to negative impact from participants of the process of inquiry; to be guided quickly in conditions which change; to apply different approaches to the assessment of the situation which has arisen, without templates and stereotypes of thinking [1; 5; 6; 10; 13].

The whole complex of special objects of the professional direction gives all the best in higher educational institutions of law enforcement agencies. Professionally-applied training of employees of law enforcement agencies is one of such complexes. This complex consists of subject matters which provide ontogeny of the general and special qualities. The attention is paid concerning mastering actions of physical influence by methods of hand-to-hand fighting and ability to own organic firearms for the formation of specialized skills on classes of physical, special physical training, fire preparation, tactics of special preparation and tactics of behavior of an employee of the fiscal service with organic firearms in unusual situations.

Proceeding from the above, the professional activity of an employee of law enforcement agencies on the structure influences functional systems of organism in the course of ensuring result and can be classified on: physical, psychomotor and intellectual [4; 8; 9; 11; 12]. The cerebration is one of the psychophysiological mechanisms of the professional activity of a worker.

The specific feature of activity of law enforcement agencies is the existence of conflict situations in which an employee is resisted by persons of different degree of social safety, at the same time working conditions change quickly from the quiet state (sedentary form of work) to the maximum manifestation of exercise and psychological stresses where the following qualities have to be shown: quick and logical thinking, professional memory, attentiveness, observation, processing and decision-making.

A lot of scientists researched the level of the progress of achievement of the purposes in different types of the pro-

fessional activity of law enforcement officers, namely: the achievement of positive results in the professional activity (Yu. O. Prikhodko, I. V. Bandurka, B. V. Konovalova); the successful performance of methods of self-defense (S. A. Antonenko, O. A. Yareshchenko, O. M. Ivlyev, V. V. Bondarenko); the forecasting of the attacking actions of the opponent as the factor of increase in effectiveness of collisions (I. G. Znakovanu, V. D. Mironov).

The motivation of behavior of an offender is connected with features of collision with an employee. Attack, generally happens unexpectedly, mainly at the approach of workers for the verification of documents and so forth. Actions of attack depend on quantitative ratio of workers and offenders. If the number of workers prevails in number, then attack happens not at once, at first offenders try to disappear if it is not possible – to attack.

The feature of tactical actions is the individual character of a worker. As their physical, technical, tactical, fighting and psychological preparation is different, behavior in everyone is special. Therefore skills are necessary for employees how to work at deficiency of time, space, quickly and variable to change the position, to predict actions of the opponent and to make the decision. All these qualities need to be considered at carried out individual trainings and on practical training [3; 7; 9; 14].

Communication of the research with scientific programs, plans, subjects

The scientific research is carried out according to the research subject of the chair of special disciplines and the organization of vocational training of faculty of preparation, retraining and professional development of employees of tax police of University of the State Fiscal Service of Ukraine, for 2014–2019 on the subject “Formation of special professional qualities of employees of law enforcement agencies”, the state registration number is 0114U001841.

The purpose of the research:

to investigate the dynamics of psychophysiological mechanisms of cerebration at cadets during the study in HEl with the definition of factorial models.

Research tasks:

1. To analyze data of references on the counteraction of the worker to the armed offender.

2. To define components which influence the formation of tactics of actions of cadets taking into account their cerebration at threat of use of firearms (gun).

Material and Methods of the research

Methods of the analysis and generalization of scientific, educational and methodical and special literature are used in work.

The experiment within four years with cadets of the faculty of tax police was made for the solution of the purpose. 25 cadets who studied during the period from September, 2012 till June, 2015 participated in the experiment.

The computer tests of assessment of psychophysiological abilities of sportsmen, which are developed by V. S. Ashanin, were used for carrying out the research, namely: simple visual-motor reaction to a light irritant, difficult visual-motor reaction to a light irritant, simple audio-motor reaction to a sound signal, the assessment of level of switching and the distribution of attention were carried out by means of the technique of Gorbov “The red-black table”, the assessment of level of mental firmness, overall performance, degrees of ability to work were carried out according to the technique “Shulte Table” and short-term visual member [2].

Dynamics of psychophysiological indicators of cadets during study

Name of indicator	n	Year of study (M±m)			
		2012	2013	2014	2015
			Sensomotor reactions		
Simple visual (s)	25	0,4±0,01	0,36±0,01	0,32±0,01	0,31±0,01*
Difficult visual (s)	25	0,52±0,03	0,41±0,02	0,39±0,01	0,35±0,01*
Simple acoustic (s)	25	0,46±0,02	0,38±0,02	0,33±0,01	0,3±0,01*
			«Red-black table»		
Switching of attention (s)	25	150,08±7,74	135,56±6,91	132,0±5,33	129,16±5,3*
			«Shulte Table»		
Overall performance (s)	25	46,93±0,68	44,52±0,25	44,37±0,45	43,5±0,3*
Degree of ability to work (s)	25	61,03±0,68	59,83±0,84	56,61±0,61	54,09±0,96*
Mental firmness (s)	25	59,42±0,42	57,12±0,8	56,4±0,96	54,02±0,82*
			Short memory		
Short-term visual memory (quantity)	25	6,12±0,18	7,04±0,10	7,6±0,15	9,0±0,28*
			Cooper test		
Endurance (meters)	25	2615,16±30,97	2670,84±27,33	2715,56±25,3	2810,3±33,15*

Note. ** P<0,05.*

Results of the research and their discussion

We developed the experimental technique, which was based on application of special game exercises of professional orientation and modeling of situations, which can happen during the performance of official duties.

Physical exercises were aimed at the development of coordination abilities, endurance; power exercises of dynamic and static orientation were applied. Game exercises according to the contents demanded from cadets of quick switching from one kind of activity to another, decision-making on the basis of the gained knowledge, ability to quickly concentrate attention on necessary objects, and also their tactical behavior was studied.

Modeling of situations provided ability to keep in mind situation quickly into which the cadet had got in case of threat emergence, at the same time without exceeding limits of necessary self-defense, and the analysis of actions with the specified mistakes which were made during the solution of situation to which the cadet has got was carried out after that.

At the first stage we defined the dynamics of changes of indicators of sensomotor reactions, cognitive abilities and the general endurance of cadets, during the entire period of study which found display in the table.

The results of the conducted research demonstrate authentically positive dynamics of indicators on the whole psychophysiological parameters during the whole experiment.

We tracked changes which happen in processes of cerebration of cadets during the experiment by means of the factorial analysis at the second stage of our research.

It is revealed that the factorial structure of cerebration of cadets includes three factors at the first year. Three indicators entered *the first factor*: overall performance (0,855); degree of ability to work (0,896); mental firmness (0,894), which percent of the general dispersion equals 35,2%.

Two indicators entered *the second factor*: simple and difficult visual sensomotor reaction (0,606), (0,898), percent of the general dispersion of which equals 16,9%.

Indicators of endurance (0,778), and short-term visual memory (0,679) which percent of the general dispersion equals 13,9% entered *the third factor.*

The structure changed on the second year:

three indicators entered *the first factor*: overall performance (0,819); difficult visual sensomotor reaction (0,745); simple acoustical sensomotor reaction (0,705), percent of the general dispersion equals 24,5%;

indicators entered *the second factor*: idle times of visual sensomotor reaction (0,627) and switching of attention (0,896), percent of the general dispersion equal 19,2%;

indicators entered *the third factor*: mental firmness (0,702) and indicator of short-term memory (0,782) with percent of the general dispersion 16,1%.

Such major factors were defined on the *third year*:

the simple acoustical sensomotor reaction (-0,634), endurance (0,875) and short-term visual memory (0,608) entered *the first factor* (22,7% of the general dispersion);

indicators: difficult visual sensomotor reaction (0,782), switching of attention (0,758), the percent of the general dispersion equals 21,05% entered *the second factor;*

indicator of ability to work (0,830) entered *the third factor*, the percent of the general dispersion equals 13,8%.

Such factors were defined on the fourth finishing year:

indicators entered *the first factor*: difficult visual sensomotor reaction (0,769); switching of attention (0,722); short-term visual memory (0,649) with the percent of the general dispersion of 20,7%;

simple acoustical sensomotor reaction (0,853); mental firmness (0,733) which percent of the general dispersion, equal 17,6% entered *the second factor*;

simple visual sensomotor reaction (0,769); endurance (656); overall performance (0,612) entered *the third factor* (16,2% of the general dispersion).

The formation of special skills in the conditions of cerebration happens with the participation of sensomotor reactions, and from the point of view of structure of the organization of processing of information, psychomotor activity of the person is the integrated result of interaction motor (muscular) and central nervous (mental) systems [6; 11].

The made experiment demonstrates that cadets have changes in the studied factorial structure during the study. So, the components of indicators constantly change at cadets of the first three courses that confirm the acquisition of certain movement skills and the minimum motive experience from application of methods of hand-to-hand fighting. At the same time the perception of information, its processing are at first, and the decision is made only then at cadets of the fourth year at getting to the simulated situation.

Conclusions

It is necessary to form not only single knowledge and abilities of separate disciplines, and also to create conditions at the final stage of study, which will provide the importance and understanding of their application in the professional activity as the only complete experience, when forming professionally-applied skills at cadets.

Prospects of the subsequent researches in this direction

We see the subsequent research in the studied ways of the increase in efficiency of interaction in the connected subject matters of tactical and special preparation and special physical training for the organization of lawful application of physical influence for future employees of law enforcement agencies in the course of modeling of office activity in non-standard conditions and from use of weapon.

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Yuri Sergienko: *University of the State Fiscal Service of Ukraine, Garden str., 90, Irpin, Kyiv region, 08201.*
ORCID.ORG/0000-0002-0103-9615
E-mail: sergienkofpm@mail.ru

Alexander Lavrentiev: *University of the State Fiscal Service of Ukraine, Garden str., 90, Irpin, Kyiv region, 08201.*
ORCID.ORG/0000-0003-2785-2994
E-mail: alex.lavrentev.72@mail.ru

Sergey Antonenko: *University of the State Fiscal Service of Ukraine, Garden str., 90, Irpin, Kyiv region, 08201.*
ORCID.ORG/0000-0001-8127-4625
E-mail: antondocent@mail.ru

UDK 613:796.015.6-057.875

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Influence of technology of formation of skills of healthy lifestyle on changes of physical activity of students

Lydia ***Shchur***[1]
Iryna ***Hribovska***[2]
Victoria ***Ivanochko***[2]

[1]*Lviv National Academy of Arts, Lviv, Ukraine.*
[2]*Lviv State University of Physical Culture, Lviv, Ukraine*

Purpose: *to define influence of technology of formation of skills of healthy lifestyle on physical activity of students.*

Material & Methods: *90 students of the III course of the specialty "Fine and decorative and applied arts" of Lviv national academy of arts took part in the research. The following methods were used: theoretical analysis and synthesis of data of scientific and methodical literature, sociological methods (questioning), and methods of mathematic-statistical data processing.*

Results: *it is revealed that the optimization of process of formation of skills of healthy lifestyle is possible on condition of logical combination in the program of physical education of theoretical, methodical and practical components; it is found out that the content of the discipline "Physical education" in higher educational institutions of the art direction has to promote the formation of the corresponding skills which will promote the correct physical self-improvement of students. It is defined that students of the experimental group had positive shifts according to all characteristics which were studied.*

Conclusions: *it is proved that the created technology of healthcare education is more effective, than traditional for students of the specialty "Fine and decorative and applied arts".*

Keywords: *healthy lifestyle, physical activity, students, technology.*

Introduction

As native and international experience testifies, physical education and sport in the higher school is the integral component of formation of the general and professional culture of the personality according to requirements of time and has to provide the increase in level of working capacity, preservation and promotion of health, to promote the continuation of active longevity of the person [3].

Sports education is the complete complex of knowledge, skills, psychological features (qualities), and beliefs in need of maintaining healthy lifestyle [5]. The process of physical education, first of all, is directed to the improvement of physical preparedness, and already then to the formation at students of knowledge, skills that in the future will give them opportunity to carry out recreational activity fully in non-core higher educational institutions.

Undoubtedly, the high level of formation of healthy lifestyle at students depends more on quality of the organization of work on physical education, pedagogical conditions of management of physical activity [6; 7; 8]. However, the researches which characterize the technique of formation of skills of healthy lifestyle of students of higher educational institutions of the different professional direction including people of creative professions, is insufficiently for today.

The change of priorities in the system of physical education of students-artists concerning the improvement for the sake of optimization of the process of formation of skills of healthy lifestyle at them comes down to change of the target orientation of contents and organizational aspects, namely – to the transition from some kind of categorical requirements concerning the performance by students of tasks to studying of their interests and the needs for the sphere of corporal and spiritual self-improvement. Especially, in our opinion, it concerns students of creative professions.

We consider that the process of formation of skills of healthy lifestyle belongs to spheres of both study, and education of students-artists as in the conditions of management of behavior, that is study, it is necessary to cultivate the culture of health at students. The researches of M. Amosov [1], V. Baronenko [2], N. Brayko [4], T. Krutsevich [5] and many others, also convince that physical longevity is the integrated result of many circumstances of life, forms of education and types of professional activity of the person.

Communication of the research with scientific programs, plans, subjects

The work is performed according to the Built plan of the research work in the sphere of physical culture and sport of the Ministry of Ukraine of family, youth and sport on the subject 3.9 "Improvement of the scientific principles of sport for everybody, fitness and recreation", for 2011–2015 (number of the state registration is 0111U001735).

The purpose of the research:

to define influence of technology of formation of skills of healthy lifestyle in physical education on physical activity of students.

Research tasks:

1. To define the ways of optimization of the process of formation at students of art specialties of skills of healthy lifestyle.

2. To find out the degree of formation of skills of healthy lifestyle of students of the specialty "Fine and decorative and applied arts".

Material and Methods of the research

90 students of the III course of the specialty "Fine and decorative and applied arts" of Lviv national academy of arts participated in the research. All students were distributed on two groups: control (CG) – 45 persons and experimental (EG) – 45 persons. Students of the control group studied according to the traditional training program of physical education, and the process of study of students of the experimental group was followed by the introduction of healthcare technology of education.

The following methods of research were used for the solution of the put tasks: theoretical analysis and syntheses of data of scientific and methodical literature, sociological methods (questioning); methods of mathematic-statistical data processing.

Results of the research and their discussion

The technology of healthcare was developed at the previous investigation phase that generalizes in certain the system of not only the use of means of physical culture, but also the process of improvement of personal qualities, physical development, state of health, psychophysiological potential, through the formation of beliefs in need of continuous physical self-improvement. The generalized technology of healthcare displays and considers specifics of the professional activity of students-artists, their specific features and a lot of other factors. The created healthcare technology of education has cross-disciplinary, integrative, complex, fundamental structure and contents. The attention was concentrated on studying by students exclusively detailed, specially allocated, by the fact that will define in the future their lifestyle in sections of the program of the created by us integrative training course "Basis of healthy lifestyle" [9; 10].

The questioning, which was carried out before carrying out the pedagogical experiment and after its end, was carried out for the identification of influences of use of the new-created technology of formation of skills of healthy lifestyle on changes of physical activity of students; the definition of effectiveness of influences of maintenance of cross-disciplinary course and the corresponding specially prepared educational and methodical complex towards the formation of healthcare knowledge, skills.

It is well-known that few hours on assimilation by students of theoretical knowledge, generally this discipline is presented by practical training, is taken away in non-core higher educational institutions in the content of the discipline "Physical education". At the same time, the total amount of information, techniques and technologies, in the sphere of healthcare increases the same rates now, as well as the whole set of scientific information. In our opinion, impossibility of representation throughout physical education classes even of the part of such information obvious, and it negatively influences the formation at students of requirement of use of means of physical culture for strengthening of own health. The presented data in table 1 are the confirmation to it.

Table 1

The analysis of answers of rather positive influence of classes by physical exercises on the state of health (in %)

Group	Answers	Before the PE	After the PE
EG	I didn't think	42,4	6,8
	I don't believe	2,9	0
	I believe	54,7	93,2
CG	I didn't think	40,7	22,5
	I don't believe	3,2	2,8
	I believe	56,1	74,7

Only 56,1% of respondents of the control group and 54,7% – the experimental group are confident in positive influence of classes by physical exercises on the state of health at the beginning of our experiment. Also it turned out that some students of both control, and experimental groups don't believe in usefulness of physical exercises at all (respectively 3,2% and 2,9%).

The number of students who believed in usefulness of physical exercises, grew by 38,5%; those who did not think of this question, remained to only 6,8% of persons; also there is no student left who would not believe in usefulness of physical exercises in the experimental group. Insignificant shifts took place in the control group: the number of students who believed in usefulness of physical exercises grew by only 18,6%; almost the fourth part (22,5%) remained such who did not think of this question and in 2,8% of students, the belief in usefulness of physical exercises didn't appear.

Also we found out the opinion of students concerning influences of the motive mode on reduction of quantity of diseases. At the beginning of the experiment, and it actually after two years of study, such students as in the control group (16,8%), and in the experimental group (15,9%) are not many. However the number of such students who recognized physical activity as the factor of reduction of risk of developing of diseases grew to 71,2% after the experiment the in experimental group, and in the control – to only 22,4% of persons.

We also studied student's likings concerning the choice of forms of physical activity and implementation by them to introspection concerning positive (negative) feelings that it was necessary to worry from exercise stresses. The number of those who do not like exercise stresses at all from 24,7% only to 19,6% of persons throughout the experiment in the control group reduced, and in the experimental group – 26,7% to 7,4% of students.

Generalizing, it should be noted that the number of students of the experimental group, who did not like exercise stresses at all in comparison with the number of such students of the control group, was almost three times smaller after the completion of approbation of the developed by us technology of formation of skills of healthy lifestyle.

The positive result, in our opinion, can be considered the fact that 87,5% of the interviewed students of the experimental group after the completion of the experiment specified that most often they use as exercise stresses jogging (at the beginning of the experiment their quantity made 23,4%). It is well-known that despite of availability of jogging, the youth seldom calls this kind favorite.

We consider that such result managed to be received thanks to change of technology of training with students of this group and introduction of cross-disciplinary integrative course of study in the system of physical education. It is obvious that the understanding by students of the experimental group of usefulness of jogging, their conscientious attitude, to need of use of means of physical culture for the improvement of own health, led to the increase in number of participants of this type of classes.

And here the number of students who like such type of recreational classes from 25,8% to 3,1% of students reduced in the control group, despite of the fact that jogging is the most available type of recreational classes.

Besides we found out whether the formation of skills of healthy lifestyle is promoted by the content of the discipline "Physical education". The negative answer was provided by 87,6% of students of the experimental group before the experiment, and after its end, that is the academic year organized with use of the new-created pedagogical technology of formation of skills of healthy lifestyle in the system of physical education, the number of such respondents lowered to 6,4%. 93,6% of this group gave the affirmed answer (tab. 2).

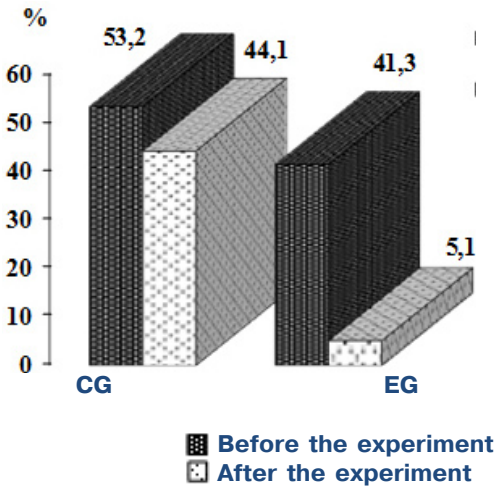
Table 2

Result of self-assessment by students of the content of the discipline "Physical education" concerning the formation of skills of healthy lifestyle (in %)

Group	Answers	Before the PE	After the PE
EG	No	87,6	6,4
	Yes	12,4	93,6
CG	No	84,8	82,6
	Yes	15,2	17,4

Also it should be noted that students, both of the control, and the experimental groups at the beginning of the experiment complained: on misunderstanding of psychophysiological processes which happen at them under the influence of exercise stresses; on ignorance of technique of selection of physical exercises of the different direction; on inability to organize the day, food and to create for itself safe working conditions and rest. If these questions and remained unclear after the experiment for students of the control group, then students of the experimental group pointed to usefulness of listened by them theoretic-methodical classes which were included into the program of the inter-disciplinary training course "Basis of healthy lifestyle"; there was no student who would point to the lack of information in questions which concern healthy lifestyle.

Studying of the reasons of admissions of classes in the discipline "Physical education" and unwillingness them is the following aspect that we found out throughout questioning of students-artists to attend recreational actions. The greatest was the number of students of the control group (53,2% of persons) and the experimental group (41,3% of persons) who specified that they are indifferent to classes by physical exercises,, and visit them only for receiving offset on the discipline "Physical education" as the content of classes does not meet their requirements at the beginning of the experiment. The number of such respondents of the control group almost didn't change (44,1% of persons) after the experiment and only 5,1% of such students were in the experimental group (pic. 1).



Pic. 1. Dynamics of changes of the number of respondents, who consider that the content of the discipline "Physical education", does not meet their requirements (in %)

It should be also noted that the number of students who visited sections health-improving clubs and were engaged in physical self-improvement after hours, made 19,1% in the experimental group and 18,3%, – in the control group at the beginning of the experiment. 69,5% of students of the experimental group began to visit various sections and health-improving clubs, in the control group – the number of students who in addition began to be engaged in physical self-improvement made only 18,7% upon the termination of the experiment.

Besides, the redistribution of motives which indicates the existence of beliefs in need of physical activity took place at students of the experimental group. The awareness of usefulness of physical exercises by them for improvement of the state of health became motive after the experiment in the experimental group for most of students (67,3% of persons).

Considering the stated above, it becomes clear that the optimization of process of formation at students of art specialties of skills of healthy way is possible only on condition of logical combination in the content of physical education of theoretical, methodical and practical components. In particular, students of both groups, both at the beginning and at the end of experiment recognized that the main task of the discipline "Physical education" is knowledge acquisition and abilities, what will be necessary for them in future activity, and here improvement of sports results is not for them priority. And, the number of such students of the experimental group after the fact that they took inter-disciplinary training course of formation of skills of healthy lifestyle according to the specially created program, grew to 70,1% of persons.

The following question of the questionnaire concerned self-assessment students of abilities to organize active recreation on the weekend. The number of students of the experimental group who recognized the abilities, which are created at them to organize recreational actions during week-end, grew to 87,4% of persons.

We received positive displacements, having carried out the analysis of answers to the question which concerned self-assessment students of knowledge, skills, concerning the organization of remedial gymnastics and rehabilitation actions in case of such need. The number of those who are able to make sets of exercises of remedial gymnastics, and carry out rehabilitation actions at requirement after the completion of the experiment made 82,7% of persons in the experimental group, whereas in the control – only 23,4% of respondents. These data were almost identical in both groups at the beginning of the experiment and made 24,3% and 22,8% of persons, respectively.

The comparative and factorial analysis of the obtained data at the forming stage of the pedagogical experiment demonstrates that at students of the experimental group, in comparison with students of the control group, positive shifts according to all characteristics took place that were studied by us, and it allows to establish the fact of positive influence of the new-created technology of education for formation at students-artists of the corresponding knowledge, skills, concerning maintaining healthy lifestyle.

Thus, we proved that the new-created technology of healthcare education is more effective, than traditional for students of the specialty "Fine and decorative and applied arts". The organization of physical education for this technology caused statistically the reliable improvement of physical activity of students; the level of knowledge, skills and reduction of admissions of classes, through respiratory diseases.

Conclusions

1. It is proved that the use of the new-created pedagogical technology in the system of physical education promoted the formation of skills of healthy lifestyle. So, 87,6% of students of the experimental group claimed that the content of the discipline «Physical education» does not promote the formation of skills of healthy lifestyle before the beginning of the experiment whereas after its end, the number of such respondents made 6,4% of persons.

2. It is certain that the redistribution of motives to classes by physical activity took place at students of the experimental group. The awareness of usefulness of physical exercises by them for the improvement of state of health became motive for most of students (67,3% of persons) after the experiment in the experimental group.

3. It is established that 87,5% of students of the experimental group after the completion of the experiment noted that they apply jogging (the number of such students made 23,4% of persons at the beginning of the experiment). The number of students who like such type of recreational classes unfortunately reduced from 25,8% to 3,1% of students in the control group.

4. It is found out that positive shifts concerning self-assessment them knowledge, skills, from drawing up sets of exercises of remedial gymnastics and application of rehabilitation actions took place at students of the experimental group. So, the number of such students made 82,7% after the completion of the experiment, whereas in the control – only 23,4%. These data were almost identical and made 24,3% and 22,8% of persons, respectively, at the beginning of the experiment in both groups.

Prospect of the subsequent researches is the creation of programs for carrying out observations of own health by students, changes in state of health; developing and use in the system of physical education of health-improving systems, models, programs which will induce students of higher educational institutions of the art direction to the use of modern health-improving technologies in daily activity.

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Lydia Shchur: *PhD (Physical Education and Sport); Lviv National Academy of Arts: street Kubiiovych 38, Lviv, 79000, Ukraine.*
ORCID.ORG/0000-0002-3736-9085
E-mail: ivv200868@gmail.com

Iryna Hribovska: *PhD (Physical Education and Sport); Lviv State University of Physical Culture Street. Kosciuszko, 11, Lviv, 79000, Ukraine.*
ORCID.ORG/0000-0002-0317-2153
E-mail: irunagrub1@gmail.com

Victoria Ivanochko: *PhD (Physical Education and Sport); Lviv State University of Physical Culture Street. Kosciuszko, 11, Lviv, 79000, Ukraine.*
ORCID.ORG/0000-0002-4519-4414
E-mail: ivv200868@gmail.com

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Use of computer technologies in physical education of women of the first mature age

Julia Tomilina

National University of Physical Education and Sport of Ukraine, Kyiv, Ukraine

Purpose: *the improvement of process of physical education of women of the first mature age by means of Pilates with use of information technologies.*

Material & Methods: *the experience of development and deployment of computer technologies in the process of physical education of women of mature age was systematized by means of the analysis of scientific and methodical and special literature and the best pedagogical and coach's practices, which is presented in mass media. The ways of application of computer programs were revealed, and the computer program ''Pilates'' was developed by means of programming in the system Visual Basic.*

Results: *the computer program ''Pilates'', which consists of directory, settlement and recreational blocks, is offered for the purpose of improvement of the process of physical education of women of the first mature age by means of Pilates and increase in their motivation to classes by physical exercises.*

Conclusions: *it is revealed that application of the computer programs has the positive effect in practice of physical education of women of the first mature age. The computer program ''Pilates'' is submitted.*

Keywords: *women, mature age, Pilates, computer program, introduction, physical education.*

Introduction

Life of modern women of the first mature age, which covers the aged period from 21 till 35 years old, is often very saturated. Women usually establish family, give birth to children, receive profession and move on career steps during this period. All changes in the social status are followed by the achievement of peak of manifestation of physical capacities of their organism and gradual decrease in indicators of physical preparedness. And only the concern about own health, respect for the principles of healthy lifestyle and the optimum motive mode allows to slow down start of involution processes of organism of women. Health-improving fitness is represented adequate means of preservation and strengthening physical health of women of the first mature age.

Modern specialists of physical education try to resolve the issue of involvement of women to classes by health-improving fitness by the development and the deployment of innovative types of physical activity, perspective programs and means of training, technologies and techniques, which are directed to their stimulation to active lifestyle.

The analysis of the last researches and publications leads up interest of experts problems of computerization of the sphere of physical education of different groups of the population [13] and development of computer fitness-programs for women [5; 9]. According to authors, the creation of an automated fitness-instructor will allow each woman to adhere to the principles of healthy lifestyle without additional material expenses [2].

Systematizing operating time of predecessors, V. G. Arefyev allocates the following types of computer programs of health-improving appointment: the training programs are aimed at training of specialists on health-improving physical culture; technical that provide the computer equipment of trainers or fitness centers; diagnostic which represent the automated systems of diagnostics of physical state; programs of management and control of physical condition or development of motive qualities of those who are engaged; programming of classes of health-improving orientation and improving which tasks is the creation of personal fitness-programs [1, p. 34].

D. Yu. Lutsenko, in turn, recommended to use the personal information system "Fitness for women", which is developed on the basis of technology of databases, in the course of the organization of work of fitness-club for the purpose of tracking of dynamics of changes of indicators of physical preparedness of women [8].

As a result of the conducted research, O. S. Gubareva developed the computer program "Fitness Centre" which application allows to model classes taking into account interests and the level of preparedness of participants of classes [3, p. 13].

It is offered N. V. Zinchenko the program of fitness class, which gives the chance to define somatotype of women and according to it to gather additionally rational parameters of exercise stresses for classes of classical aerobics and step-aerobics, founding the expediency of use of computer technologies for differentiation and individualization of programs, which are used in the system of health-improving fitness. The efficiency of the computer program is provided by the following blocks of the menu of the main interface: "Office of fitness testing", "Hall of trainings", "Library" and "Diary of self-checking" by the beliefs of the author [4].

O. Yu. Lyadska submitted the computer program "Fitball training" which includes such sections as "Personal data", "Level

of physical preparedness", "Physical development", "Level of health", "Results", and allows to find the dynamics of level of health, physical development and physical preparedness of women, on completion of the research work, which is directed to the increase in efficiency of the training process at classes by fitball with women of the first mature age [9, p. 10].

There are certificates on expansion of opportunities of realization of modern health-improving technologies in the training process of women of the first mature age, its representation in the form of the closed control system thanks to the automated control system for the training process in health-improving fitness on the basis of the software product «PERFECTBODY» [6, p. 35].

We also paid attention to the research of Zh. Sotnyk at the review of scientifically-methodical materials, in which it is proved that it is necessary to carry out monitoring of their physical condition, to establish efficiency of training programs by operating control by separate indicators of physical preparedness at classes by shaping with women of the first mature age, and also to apply the system of shaping which includes at itself the complex of computer and video technologies, such as "shaping-classic", "shaping-pro", "shaping-youth". The author focuses the attention that complexes of three levels of complexity are shown to the monitor at the same time when using these technologies on the screen [10, p. 289].

During studying of Internet resources, we found information on the chargeable addition "Fitness for women: training and exercises from Sport.com" what combines three main units: ready programs of trainings for users with different levels of training, creation of the individual program on the basis of the purposes and the output data and the automated selection of exercises with the number of approaches set by the user. At the same time each exercise is provided with the video, the description and the audio-instruction, and the tempo of execution of exercises can be regulated independently depending on health.

The position of E. A. Zeitler was given interesting to us at the synthesis of data of the literature, according to which the youth in which structure of free time considerable part is occupied by entertainments with the use of computer technologies needs to be stimulated to classes by physical exercises also due to use of IT. As a result of the conducted research, the author offered the automated fitness instructor, who represents multipurpose web addition, which allows users to receive the program of trainings, made on the basis of individual indicators of health of the person [14]. We are convinced that this approach concerns also women of the first mature age who are also inclined to passive leisure by computer entertainments.

Besides, it is necessary to prefer as the sparing mode of loadings and actions directed to injury prevention, considering aggravation of symptoms of health of women of the reproductive age [11], planning the process of physical education of women of this category. Such approach provides classes according to the technique of Pilates.
However, we didn't find such, which are directed to classes by Pilates with women of the mature age, from between the presented computer technologies, which are developed for health-improving fitness classes with women of the first mature age. Thus, we incline to think of need of the development and the deployment of the computer program Pilates which application will provide optimization of the motive regime of women of the first mature age and will increase their motivation to health-improving fitness classes.

Communication of the research with scientific programs, plans, subjects

The work is performed on the subject of the research work of the chair of health, fitness and recreation of NUPESU, "Theoretic-methodical principles of formation of the system of health-improving fitness"; state registration number is 0106U010787.

The purpose of the research:

the improvement of process of physical education of women of the first mature age by means of Pilates with the use of information technologies.

We put the following *tasks* during the research: to finish the relevance of introduction of computer programs in the process of physical education of women of the first mature age and to develop the computer program "Pilates".

Material and Methods of the research

Studying, analysis and generalization, scientifically-methodical and special literature and the best pedagogical practices concerning computerization of the process of physical education, in particular, of women of the first mature age were applied during the research. The programming method by means of objectively focused programming languages in the system Visual Basic 6.0 was applied for the development of the computer program "Pilates". As the independent choice by the woman of complex of physical exercises by means of the computer program provided the accounting of her physical condition and compliance of body weight of the woman to length of her body, we have applied the method of assessment of level of physical condition on the basis of the index of physical condition and the method of assessment of physical development of women on the basis of the index of Quetelet.

Results of the research and their discussion

Investigating the ways of improvement of the process of physical education by means of Pilates, we considered interest of women of the first mature age in computer technologies and their distribution in life.

Besides, we took into account that computer programs for independent occupations improving fitness which allow operating the process of study and training are of special interest, to take part in drawing up complexes of the corresponding exercises and their modification [8].

When developing the computer program, we paid attention to the experts according to which when developing complexes of physical exercises, first of all, it should be taken into account the level of physical condition of women of the first mature age.

Besides, developing the computer fitness-program, we assumed that women, attending class three times for week, in other time, 1–2 times for week, will be independently engaged

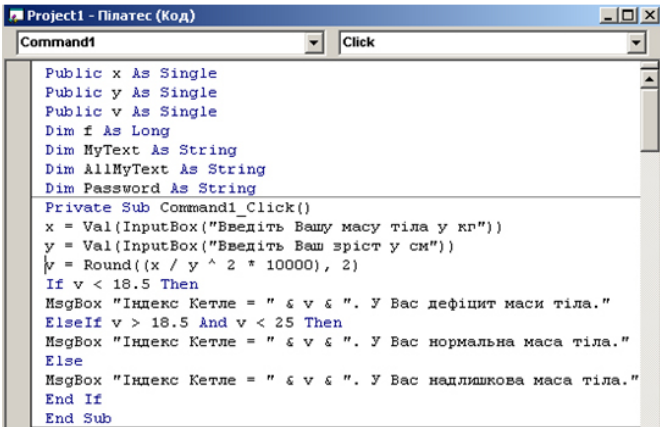
in house conditions. But, if the woman did not owe opportunity to visit trainings, she can also make up for lost time and execute set of exercises considering its LPC and likings.

Therefore, we developed the computer program "Pilates" as a result of the conducted research, by means of the objectively focused the programming languages Microsoft Visual Basic 6.0. The purpose of the computer program was interest of women by Pilates and expansion of destiny of independence of women in the course of training. It is necessary to distinguish the involvement of women of the first mature age to health-improving classes, their expansion from the main tasks, basic concerning improving training, optimization of physical activity, and, in turn, increase in level, their physical condition.

Information, settlement, sports and program blocks, and activates work of the program of 10 managing directors of buttons is contained in the structure of the computer program.

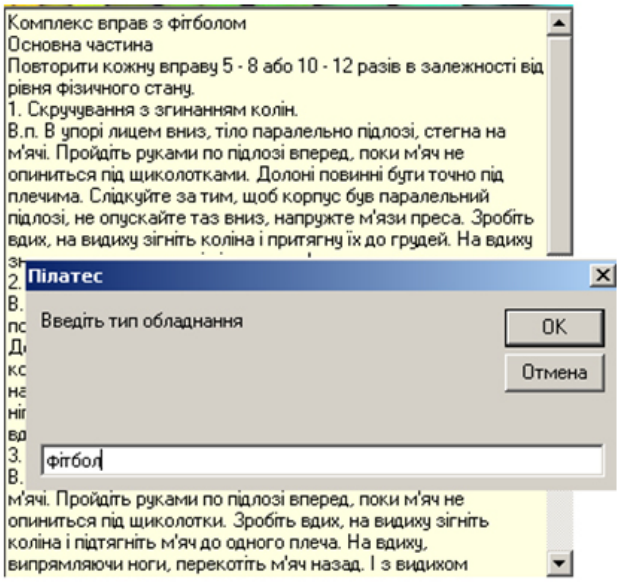
The expansion of theoretical base of women concerning influence according to Pilates on physical condition of women of the reproductive age, the illumination of questions about the popularity reasons of Pilates in physical education of women of the first mature age, the message for women of information on versions of Pilates and features of their application, and also the presentation of certificates about the principles of Pilates are the tasks of ***the information block***. Besides, the information block contains information on the author of the program and the instruction to its practical use.

It should be noted possibility of assessment by women of the level of their physical condition and physical development thanks to calculation of indexes of Quetelet and indexes of physical condition on the basis of entrance data among the main tasks of ***the settlement block***. Really, the existence of knowledge of the woman of excess body weight or low level of physical condition can become releaser for the revaluation of values of the woman towards the domination of category "Health" in the system of its basic values. Let's note that the calculation of indexes provides the program code in which the settlement formulas executed by the standard technique and their interpretation are registered (pic. 1).

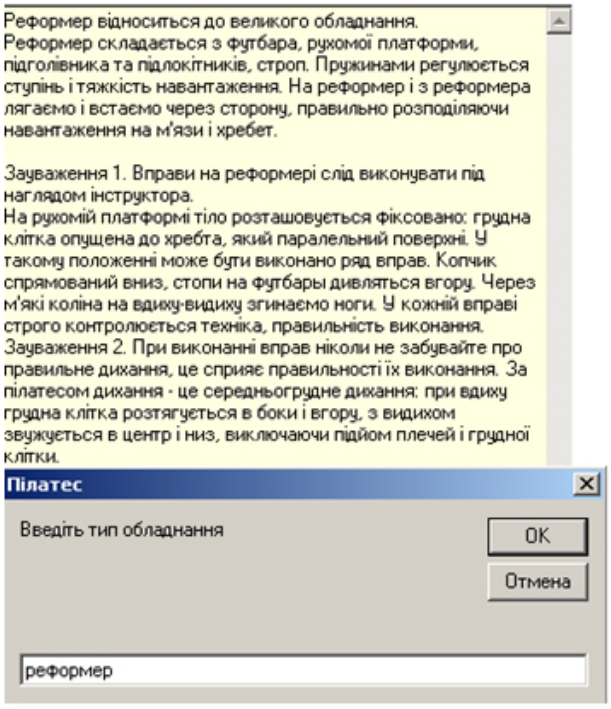


Pic. 1. Calculation of index of Quetelet and its interpretation (the part of the program code of the program "Pilates")

The tasks of the development of the classes complex are untied, considering the output data and tastes of the woman in the course of realization of ***the sports-program block***, considering theoretical bases of the organization of improving and recreational physical activity and dispensing of loadings [12]. Each complex, which enters this block, contains preparatory, main and final parts. But, the main part of classes begins with the aerobic component lasting 7–10 minutes, then the transition to 15–20-minutes to the block of power exercises, in which big groups of muscles are involved, and then – to stretching lasting 10–15 minutes, occurs. The final part of classes traditionally provides the performance of exercises on renewal and relaxation. It is necessary to notice that depending on mood of the woman and her wishes, by means of the computer program, she can select the complex with equipment or without it (pic. 2).



Pic. 2. The selection of the training program of fitball in the program "Pilates"



Pic. 3. The selection of the training program with Reformer in the program "Pilates"

The data on type of this equipment, its structure and methodical recommendations to classes and the remark that sets of exercises need to be carried out strictly under the supervision of the instructor will appear in the information window at the performance by the woman of request for obtaining the program of classes with the big equipment (pic. 3).

Should be noted that the window "Complex in condition of the development" comes up at the introduction of the name of the equipment with which complexes are not provided for the development or are not ready yet, and also at the incorrect introduction of the name.

Conclusions

The development of computer programs of health-improving appointment promotes the improvement of physical education of women of the first mature age.

The is offered by us computer program "Pilates" is aimed at the increase in motivation of women of the reproductive age to classes by Pilates and creations of opportunities for their independent classes near classes under the leadership of the fitness- instructor.

The woman owes opportunity to expand theoretical knowledge of the system of Pilates, to find out the level of the physical development and physical condition, to receive the complex of physical exercises taking into account physical condition and wishes concerning the equipment by means of the computer program "Pilates".

We consider that the use of innovative means of physical education has the positive influence on the motivational sphere of women of the reproductive age, and, in the long term, on their physical condition.

Prospects of the subsequent researches consist in the establishment of efficiency of use of technology of health-improving training of women of the first mature age according to the technique of Pilates with the use of the computer program "Pilates".

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Julia Tomilina: *National University of Physical Education and Sport of Ukraine: Phyzkul'tury str. 1, Kyiv, 03680, Ukraine.*
ORCID.ORG/0000-0003-1127-2987
E-mail: ulech-ka@yandex.ua

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Structure and content of training of the qualified runners on middle distances in annual cycle of preparation

Tu Yanhao[1]
Lydmyla Shesterova[2]

[1]*Chengdu Institute of Physical Education, Chengdu, People's Republic of China*[1]
[2]*Kharkiv State Academy of Physical Culture Kharkiv, Ukraine*[2]

Purpose: *to develop and to confirm experimentally the efficiency of the program of one-cycle creation of the training process of the qualified runners on middle distances in annual cycle of preparation.*

Materials & Methods: *40 qualified runners on middle distances took part in the research, 20 of which mainly lived in mountain conditions and 20 – mainly on the plain. The following methods were used during the research: analysis and synthesis of references, analysis of documentary materials, pedagogical observation.*

Results: *the structure of annual macrocycle of training of runners on middle distances with the use of trainings in mountain conditions is presented. Content of mesocycles of preparation, volumes and orientation of training loads at them are directed.*

Conclusions: *the correct and rational connection of means of training of runners on middle distances in mountain conditions and on the plain influences positively the level of preparedness and promotes the professional development of sportsmen.*

Keywords: *runners on middle distances, structure of macrocycle, means of training.*

Introduction

The modern level of the development of track and field athletics sport is characterized by the tendency to the steady growth of sporting achievements that involves the improvement of the theory and technique of sports training, the structure and the system of construction and the management of the training process, the search of new means, methods, forms and conditions allowing to open more stoutly potential opportunities of sportsmen.

One of the perspective directions, which are capable to make an active impact on the increase in functional reserves of organism of sportsmen and the growth of special working capacity, is trainings in the conditions of the mountain area [4].

Training in mountain conditions promotes the development of complex of the adaptive reactions providing the growth of special preparedness and creating conditions for the successful performance of sportsmen at competitions in the conditions of the plain [4].

The sports result in track and field athletics directly depends on the high-quality management of preparetion of sportsmen and includes the rational structure and contents macro - meso - microcycles, ratio and distribution of training means in structural educations, the effective organization and holding the centralized educational training camps, the balanced power supply system and restoration, regular control of various parties of preparedness of sportsmen [3].

One of the effective methods of restoration of functional condition of sportsmen, the increase in their aerobic opportunities, physical efficiency and endurance, according to L. D. Lukyanova with coauthors (2008), is hypoxemic training.

Various methods of modeling of hypoxia – options of hypoxemic trainings are offered in a number of scientific works: long hours-long exposition of hypoxia (the model “train low, sleep high”); interval 2–6-hour exposition daily within 12–28 days; hypoxemic expositions in combination with exercise stresses [2; 8]. However most of experts consider that the most effective training is under natural conditions.

At the same time, it should be noted that we didn't almost reveal the works, reflecting the content of the educational-training process in year macrocycle of preparedness of the qualified runners on middle distances, being the closest reserve of the national team of the country. The single questions devoted to this problem were considered in the works of Wang Dai (2013), L. Ye. Shesterova, Tu Yanhao (2014, 2015), however they created only the general idea about the content of the training process.

The purpose of the research:

to develop and to confirm experimentally the efficiency of the program of one-cyclic creation of the training process of the qualified runners on middle distances in annual cycle of preparation.

Material and Methods of the research

The researches were conducted in People's Republic of China. 40 qualified runners on middle distances participated in the research, 20 of whom mainly lived in mountain conditions and 20 – mainly on the plain. Sportsmen trained according to the offered by us program, uniform for everybody.

The following methods were used during the research: analy-

sis and synthesis of references, analysis of documentary materials, pedagogical observation.

Results of the research and their discussion

The analysis of scientific and methodical materials, own experience, features of the competition calendar and results of the factorial analysis allowed to develop the basic provisions of the program of the annual preparation of runners on middle distances with the use of trainings in mountain conditions. The annual macrocycle of training of the qualified runners on middle distances was under the construction on one-cyclic structure that assumed the existence of one, rather long, preparatory period, the competitive period, lasting 5 months, and the transition period. Considering the competition calendar and possibilities of sportsmen and training bases, preparation of sportsmen assumed the existence of 3 training sessions in midlands and highlands and one training session in the conditions of lowlands at the height of 800 m (tab.).

The content of mesocycles of training on the plain and in mountain conditions was developed taking into account the structure of the factorial analysis about the contribution of separate components to sports result. It should be noted that the training program of the sportsmen whoare lived in various climatic conditions was identical. It is connected with the fact that the formation of the national team of China does not provide the division of sportsmen into groups now, depending on accommodation conditions.

At the same time, the analysis of records of China in types of endurance showed that only one third from them (3 of 9) belongs to the sportsmen, who live in the mountain area. And, it is records in run on 10000 m, marathon and sports walking on 50 km [7].

The all-preparatory stage of the preparatory period consisted of 2 mesocycles – involving and basic. Trainings in these mesocycles took place in conditions of the plain and were directed to the increase in functionality of organism and power of aerobic processes, the development of force of all muscular groups, strengthening of ligaments and sinews.

The involving mesocycle. Run volume in the aerobic mode made 280 km and was carried out with small and average intensity, generally it is uniform run under natural conditions. Run on pieces uphill of the small steepness, turning into run on the plain, was applied to the improvement of take-off and preparation of the musculoskeletal system for trainings in mountains. Length of pieces did not exceed 200 m.

Sportsmen performed the large volume of special running exercises: tripping run, run with high lifting of a hip, run with lash of shins, run by jumps with emphasis on speed of take-off, run with high lifting of hip and lash of shins "wheel", run on straight line with statement of feet to one line, run through objects or of marking for improvement of rhythm and length of steps. Kinds of run were carried out on pieces of 50–60 m, coming to the end with obligatory acceleration 30–40 m long.

The overall physical condition included exercises on the development of the physical qualities defining result of the competitive activity of sportsmen. Hopping exercises included: run by jumps with emphasis on flight phase, jumps from leg on leg with emphasis on performance speed, jumps on one leg with pulling up of take-off foot under buttock, jumps on two legs with their pulling up to breast, vaults, jumps through apparatuses and natural obstacles, jumps through jump rope on one and two legs, outleap from deep squat, threefold, quintuple, tenfold standing jump, etc. The exercises,which are aimed at the development of muscular strength of back, prelum abdominale, back and forward surface of hip, were carried out in couples, on apparatuses, trainers, with stuffed balls, expanders, bar etc. by the method of circuit training. The exercises, which are aimed at the flexibility development: elastic bendings, leg swings with big range, extension in couples, stretching. The total volume of the work, which is directed to the increase in overall physical condition made 20 hours.

Run volume in the aerobic mode made 330 km and was carried out with small and average intensity in the basic mesocycle of the all-preparatory period; generally it is uniform run under natural conditions.

The intensification of the training process was reached due to the increase in speed of run. Variable on pieces of 0,5–1,5 km and tempo – 3–5 km added to cross run on 20–25 km with speed up to 4.20 by 1 km. Run uphill and about mountains, jumps on soft soil joined. Hopping work uphill on pieces to 300–400 m with the subsequent running-off from the mountain practiced. All accelerations and rhythm jogs were carried out with speed, the corresponding speed of run at distance of 1500 m (for runners on 800 m) and 3000 m (for runners on 1500 m).

The structure of annual cycle of preparation of runners on middle distances

X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX
Preparatory period						Competitive period					Transition period
AP stage		SP stage				Stage DPMC		Stage of the maon competitions			
Plain	Plain	Mountains (21 days)	Plain	Mountains (28 days)	Plain (7 days)	Lowlands (14 days)	Plain	Mountains (14 days)	Plain		Plain

High-intensity trainings on the improvement of power abilities of sportsmen with the use of circular method were carried out three times a week. A lot of work for the development of fast force – to 30% of total amount of time, which is allowed for power preparation, was performed in this mesocycle.

The exercises,which are aimed at the flexibility development, presented in the involving mesocycle, were supplemented with exercises of "barrier school".

In general OPC volume, as well as in the previous mesocycle, made 20 hours.

Specially preparatory stage of the preparatory period solved problems of the improvement of special aerobic opportunities in combination with anaerobic glycolytic; increases in ability to motive switchings.

The basic mesocycle of this stage of training passed in mountain conditions. The total amount of run made 430 km, of them in mountain conditions – 300 km. The duration of stay in mountains – is 21 days.

The main assets of training: cross run, which is aimed at the development and maintenance of the level of the general endurance; pace running on pieces of 3–4 km with speed of 3.10–3.25 by 1 km; variable run (fartlek), at the speed which is not exceeding 3.45 by 1 km.

Means of high-speed and power preparation, jumps, many-gallops, jumps uphill, run from the mountain and uphill, were carefully planned and not applied in large volume at once. It is connected, first of all, with conditions of holding trainings and possibility of functional overload of muscles of legs. The majority of trainings came to the end with accelerations and rhythm jogs at the speeds corresponding to run on 800 and 1500 m.

The volume of OPC decreased a little and made 15 hours.

The second basic mesocycle of the special-preparatory period was carried out on the plain. Problems of maintenance of the reached level of aerobic opportunities, increases in the level of high-speed preparedness were solved in it. The total amount of run made 500 km. Run volume in the blend mode, at the expense of pace and interval running on long pieces increased considerably. The number of the interval trainings held at the speeds corresponding to run on 1500 m and 3000 m increased (for runners by 800 and 1500 m respectively).

Practically all trainings came to the end with accelerations and rhythm jogs at the speeds corresponding to run on 800 and 1500 m. The volume of special running and hopping exercises remained the same.

OPC volume, remaining the same according to contents, decreased a little in comparison with the first basic mesocycle of the special-preparatory stage of the preparatory period.

The third basic mesocycle of the special-preparatory stage was carried out in mountain conditions. Sportsmen executed 380 km of aerobic running work for 28 days (4 weeks) of stay in conditions of midlands and highlands. It should be noted the substantial increase of volume of work in the blend mode at the expense of pace and interval running on long pieces. And, not only the volume of work, but also its intensity increased. Run on pieces in the anaerobic mode was carried out in the conditions of highlands. Thus, ability to make the finishing acceleration in the conditions of the come hypoxia was fulfilled. The volume of special running and hopping exercises increased a little.

The volume of means of OPC decreased till 10 o'clock.

The control-preparatory mesocycle of the stage of direct preparation for the main competitions was carried out for the purpose of check of the level of preparedness of sportsmen to conditions of the competitive activity. Sportsmen participated in two competitions of All-China scale. Their preparedness for display of result for 2–3 day and in 21 days after descent from mountains was checked.

14 days of this mesocycle sportsmen trained at the height of 800 m above the sea level. The volume of the performed work in the aerobic mode made 240 km. Much attention was paid to the increase in high-speed abilities both due to run in the anaerobic mode, and due to the exercises of the all-preparatory character. Hopping work uphill on pieces to 600–800 m with the subsequent running down from the mountain was performed every week.

Sportsmen participated in competitions which had a control character after descent to the plain. The amendments, which allowed optimizing training of sportsmen for the main competitions of season, were introduced in the training process on the basis of results of the competitive activity.

Run volume in the aerobic mode on the plain made 500 km. Against the background of large volume of aerobic work runners performed 35 km of run in the mixed zone (interval run on long pieces) and 15 km of run in anaerobic zone (repeated run on short pieces). At the same time strengthening of the musculoskeletal system due to hopping and power exercises continued, the technique of run by application of special running exercises and exercises of "barrier school" was improved.

Trainings came to the end with accelerations and rhythm jogs at speeds higher than the speeds of run on 800 and 1500 m.

Sportsmen participated in competitions, but special preparation for them was not carried out in 21 days after descent from mountains.

Problems of the improvement of aerobic and anaerobic opportunities, increases in the level of the development of special endurance, the improvement of techniqueof run and tactical skill were solved in the precompetitive mesocycle. The mesocycle was subdivided into two parts – 14 days of training were spent in mountain conditions and as much in the conditions of the plain. Trainings took place in mountain conditions at heights corresponding to midlands and highlands. Run volume in mountain conditions in the aerobic mode made 230 km. Trainings, generally anaerobic character were held on highlands. The training process joined the work of the repeated character modeling run conditions on 800 and 1500 m. Accelerations on 30–80 m with the subsequent free running to complete recovery were carried out in cross-countries.
Sportsmen participated in competitions of All-China scale after the descent from mountains.

The second half of mesocycle passed in plain conditions. Run volume in the aerobic mode decreased to 170 km. Run volume in the mixed and anaerobic modes increased considerably on this background. Much attention was paid to the improvement of technique of run and strengthening of the musculoskeletal system in combination with exercises in couples on extension of muscles and ligaments. The share of means of OPC decreased by 60% in comparison with the beginning of the preparatory period.

The stage of the main competitions lasting 4 months pursued the aim – to provide high functional and psychological preparedness of the sportsman for the competitive activity. The main assets of training: repeated and interval run, control starts and competitions. The stage was characterized by the gradual decrease in total amount of training loads and occurred against the background of increase in the high-speed modes of run. The share of means of OPC remained at the level of 60% of maximum.

The transition period assumed active recreation and recovery of sportsmen after the long competitive period. The loadings, serving to active restoration of physical efficiency and mental working capacity, were used te contrast in relation to competitive ones. In classes were used: long slow run, exercises with burdenings, swimming and diving with long breath holding, sports, different types of throwings of track and field athletics apparatuses.

Testing of the level of physical preparedness and functional condition of systems of organism of the sportsmen, who were participated in the research, was regularly held in the course of preparation.

The increase in sports results of runners, the establishment by one of participants of the research of record of China in run on 800 m and the performance of standards of the world class master of sports by two sportsmen became the result of introduction of the program.

Conclusions

1. The analysis of scientific and methodical literature showed that questions of the structure and the content of preparation of the qualified runners on middle distances are considered not rather deeply.

2. The application in preparation of the qualified runners on annual distances of trainings in the conditions of midlands and highlands influences preparedness of sportsmen positively.

3. The correct and the rational combination of means of preparation of runners on middle distances in mountain conditions and on the plain influences the level of r preparedness positively and promotes the professional development of sportsmen.

Prospects of further researches: the further researches are supposed to be devoted to studying of changes of physiological indicators at the runners on middle distances, who live in various climatic conditions under the influence of trainings in midlands and highlands.

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Tu Yanhao: *Lecturer, Department of Athletics; Chengdu Institute of Physical Education: Chengdu, People's Republic of China.*
ORCID.ORG/0000-0002-9553-7323
E-mail: 200879469@qq/com

Lydmyla Shesterova: *PhD (Physical Education and Sport); Assosiate Professor, Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0001-8777-6386
E-mail: shesterova1@mail.ru

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Biologic-pharmacological providing of trainings, competitions and renewal of triathletes

Vladimir Vodlozerov

Kharkov State Academy of Physical Culture, Kharkov, Ukraine

Purpose: *to analyze the main means of biologic-pharmacological providing of triathletes during different periods of sports activity.*

Material & Methods: *studying and generalization of special literature on problem of ensuring efficiency of training, competitive and renewal processes in continuous triathlon, analysis of features of application of sports food, medicamentous means and methods of passive renewal in kinds of sport on endurance.*

Results: *features of biologic-pharmacological providing of sportsmen are considered before, during and after triathlon competitions, and also expediency of application of methods of passive renewal therapy is shown.*

Conclusions: *sports food is balanced by products of the increased biological value, adequate drinking mode and medicamentous providing play the major role by preparation, successful overcoming of the combined distance and the subsequent full renewal with simultaneous use of methods of passive therapy.*

Keywords: *triathlete, sports food, products of the increased biological value, drinking mode, pharmacological providing, passive renewal therapy.*

Introduction

Training and renewal in cyclic kinds of sport represent a single whole of the training process. Restoration of functions of organism of a sportsman after the muscular work is meant as not only their return to the pre-working level, but also the transition of life support systems to the higher level of power and physical capacities [1; 5; 6; 8].
The creation of the training process in continuous triathlon includes also the correct organization of meal of a sportsman before, in time, after trainings and competitions. The daily diet of a sportsman has to be full as in quantitative, and in a qualitative sense. Non-compliance with this rule will have an adverse effect on operability of a triathlete.

The main requirement to sports food as to power supply source when performing endurance exercises is the existence in it of optimum ratio of carbohydrates, fats, proteins, vitamins, mineral substances and water (carbohydrates play the leading role). At the same time the carbohydrates processed in organism which are in blood-flow in the form of glucose are the most readily available energy source for muscles. Besides, they can stock up in muscle cells and liver in the form of glycogen. Excess carbohydrates will be transformed to free fatty acids and laid in the form of fatty tissue [6; 14].

Unfortunately, the organism of a sportsman can reserve only limited quantity of glycogen. About 2 thousand kcal in the form of glucose and glycogen can contain a well trained triathlete (weight of 70 kg). This amount of energy is enough approximately for 2–3 hours (depending on intensity) of the continuous muscular work [17]. Physical condition of a sportsman begins to worsen sharply (the feeling of strong fatigue, dizziness, muscular pains, violation of haemo-dynamic indicators of HR, AD, etc. appears) at the exhaustion of all glucose-glycogenous stocks. Speed of passing of the combined distance considerably decreases because power needs of organism begin to be satisfied only due to the transformation of fatty stocks that is the extremely inefficient way of power supply [1; 6].

The exit from this situation seems in the increase in maintenance of glycogen in muscles and a sportsman's liver to the greatest possible level even prior to physical activity, maintenance of reserves of carbohydrates during the performance of exercises and completion of the exhausted power supply sources after aerobic loading – and all this at the expense of the high-carbohydrate balanced sports food.

Possibilities of expansion of so-called "bottlenecks" of metabolic processes lie at the heart of application of the pharmacological means increasing the physical efficiency and accelerating the process of renewal of sportsmen who specialize in sports on endurance [6].

However, the questions concerning the biologic-pharmacological providing of a triathlete during the precompetitive period, during the competitions, during the post-competitive period, and also applications of passive methods for renewal of their sports working capacity are far not completely studied.

The purpose of the research:

to analyze the main assets of biologic-pharmacological providing of a triathlete during the different periods of sports activity.

Research problems:

1. To reveal features of food and drinking mode of a triathlete during the precompetitive period.

2. To show the value of use by the sportsman of adequately picked up sports food during the continuous triathlon competitions.

3. To consider specifics of the process of renewal of a triathlete during the post-competitive period.

4. To show the value of application of pharmacological means for the increase in working capacity and acceleration of the process of renewal of the sportsmen who specialize in sports on endurance.

5. To consider the role of methods of passive therapy as means for the acceleration of renewal of sports operability of a triathlete.

Material and Methods of the research

1) studying and synthesis of the data of literary and Internet sources for the assessment of the degree of study of problem and allocation of the key provisions which are the cornerstone of ensuring efficiency of training, competitive and renewal processes in triathlon;

2) analysis of features of application of sports food, medicamentous means and methods of passive renewal in sports on endurance.

Results of the research and their discussion

Correctly organized trainings of the triathlete in combination with balanced diet products of the increased biological value create prerequisites to accumulation of large number of glycogen in muscle cells and liver. However it should be noted that the increase in possibility of organism to increase glycogenous stocks due to its adaptation to the growing requirements – rather long process.

Balanced, adequate to training load and timely sports food is also one of the powerful means of renewal of muscular working capacity and physiological functions of organism of the sportsman after hard and long physical activity [10, 14].

Food and drinking mode during the precompetitive period

At this stage sports food has to provide the sportsman's organism to all necessary for successful overcoming of the combined distance of continuous triathlon.

It is necessary to increase the content of carbohydrates in food till 80% of total of the consumed calories and to provide the sufficient saturation of organism with liquid (as also 3–4 grams of water stock up with each gram of glycogen) in 10 days prior to participation in triathlon when planning diet (taking into account the type of the program and length of distance) [1; 6].

It is necessary to enter into daily food allowance surely juice and energy drinks a day before the participation in competitions, and it is recommended to include the small amount of vegetable food fibers in lunch reception of high-carbohydrate food – whole-grain bread, fresh fruit and vegetables (for simplification of cleaning of intestines in day of competitions).

It is desirable to reduce the use of firm foodstuff, having replaced them with the high-carbohydrate easily acquired food and energy drinks before 2–3 hours prior to start.

It is necessary to drink in addition up to 200 ml of the drink filling liquid for hour prior to the competitions.

It should be noted that it is necessary to test them during the intensive trainings before to eat any food or liquid before competitions [10].

Food and drinking mode during the competitions

Because the kind of sport triathlon includes the different in extent combined competitive distances, time of their overcoming differs significantly [2].

Passing of distances of *short* triathlon is in two-hour time frames for professional sportsmen (three-hour – for fans and veterans), i.e. the power stocks which are saved up in organism before start are quite enough for performance of the necessary muscular work [3; 7; 17].

It is desirable for a triathlete to use the liquid nutritious mixes consisting of digestible carbohydrates, enriched with complex of vitamins and mineral salts (single dose of reception of 100-200 ml at food temperature +15-20°C) for the replenishment of the energy spent during swimming at the cycle stage «Olympic sweatshirts». The special drinks containing glucose and small amount of the sodium, which is necessary for normal absorption of liquid, can effectively be used for the purpose of compensation of losses of liquid.

When overcoming **long** distances of triathlon of amount of glucose in blood and glycogen reserved in muscle cells and the sportsman's liver it is not enough for power supply of his organism throughout the whole race (a sportsman spends about 10 000 kcal on "classics") therefore the prevention of glycogenous exhaustion requires the additional food during the competition (for example, one of options of composition of nutritious mix: porridge broth (20 g of grain on 200 g of water), sugar – 50 g, cranberry jam – 50 g, glucose – 25 g, sodium phosphate – 3 g, ascorbic and lemon acids – 0,3 and 0,5 g properly).

Considering that professional triathletes should spend for conquest of classical distance about 8–9 hours, the closest attention, on an equal basis with technical, tactical and his physical training has to be paid to questions of food and compensation of losses of liquid of a sportsman on the track of race [2; 4; 5].

As in continuous triathlon competitions rules have forbidden any help to a sportsman, he takes with himself liquid individual food in special cycle flask which fastens in flask-holder on the frame of the bicycle or is placed in the cycle undershirt pocket [15; 16]. On conducted – and running segments of the track Nutritious points, where a triathlete also settle down, can leave his sports foods and drinks [13], which is prepared for themselves in advance.

Hard to digest products, and also causing dehydrations of organism and condition of discomfort (for example, congestion of gases in intestines), it is not necessary to include in diet during the competitions (vinaigrettes, salads, greasy and

spiced food).

As when passing super-marathon, a sportsman loses more than 5 liters of water, drinks, which are intended for its compensation, have to contain no more than 5–10% of glucose. If concentration exceeds 10%, the organism perceives them as energy source, but not as liquid (that fully does not provide adequate replenishment of water stocks).

As a rule, opportunities for the use of drinks are more, than during run at the cycle stage of. It is necessary to drink 100–200 ml of drink small drinks every 20 minutes of muscular work.

It is necessary to consider that the need of organism for liquid is influenced by also weather conditions because it is spent much more in hot, damp, windy weather [1; 6; 17].

Food and drinking mode during the post-competitive period have to promote active the return to norm of muscles and physiological functions of a triathlete which were broken during the intensive long loading, and also to full recovery of the spent power stocks of organism and renewal of its water balance [10; 14].

Sports food, which is used by a sportsman after the competitions, has to be, in principle, the same, as well as prior to them and consist of the products of the increased biological value including: carbohydrates – glucose, sucrose; separate amino acids – glutamic acid, methionine; mineral salts; products of intermediate exchange – lemon, amber, apple acids. For example, proteinaceous-glucose vitaminized chocolate, which is containing to 20% of milk proteins + 60% of glucose + vitamin E. The recommended single dose of reception is 25–100 g (depending on the done muscular work).

However sports nutritionists have certain recommendations concerning the beginning of meal during this period.

The maximum strengthening of activity of enzyme glycogen-synthetase (which increases ability of muscle cells to reserve glycogen) is observed within 2–4 hours directly after the finish, and then for days it comes back to the normal precompetitive level [6].

It is important to use this property of organism in an expedited manner to transform carbohydrates to glycogen at renewal after exercise stress. It is recommended to take “Sports drink” (300 ml) consisting of glucose, sugar, ascorbic, glutamic and lemon acids, sour phosphate of sodium, berry extract, fruit juice and water for this purpose after completion of overcoming the combined distance of continuous triathlon.

A triathlete should accept the special food including not less than 65% of difficult (glycogen, cellulose, pectines) and simple (glucose, fructose, lactose) carbohydrates in one hour after the end of competitions. To repeat the similar meal in two hours (an athlete has to use up to 400 g of carbohydrates for two receptions).

It is necessary to restore water balance of organism also completely except the replenishment of power stocks. It is necessary to drink water, such drinks as fruit juice, skim milk, herbal teas in small portions, but regularly throughout the day for this purpose [10; 14]. You should not wait when having felt thirsty because to observe the drinking mode correctly is problematic at emergence of thirst. The indicator of dehydration of organism is muddy or yellowish urine (its color has to be always light).

It is not recommended to take drinks with caffeine during renewal (coffee, black tea, Coca-Cola, Pepsi Cola, etc.) and alcohol (beer, longer, etc.) as all this is diuretics and forces organism not to fill up, and to lose water.

A triathlete needs several days for complete recovery of stocks of glycogen after overcoming long distance of triathlon and to compensate losses of liquid in organism, it will be required to it till 24 o’clock.

Triathlete chooses products of the increased biological value in sports food for himself taking into account their caloric content (carbohydrates – 4, kcal·g^{-1}, proteins – 4,3 kcal·g^{-1}, fats – 9,3 kcal·g^{-1}), on the basis of personal experience and recommendations of the sports nutritionist [14].

The best sources of proteins and carbohydrates of vegetable origin for food of sportsmen, who do sports on endurance, are the following products:

– bean (>20% of protein) – black, red and white beans, soy, lentil, dry whole and split peas;
– grain (>70% of carbohydrates) – barley, buckwheat, wheat, corn, rye grain, rice, oat flakes (the flattened grits);
– fruit and vegetables (≥90% of carbohydrates) – apples, bananas, baked potatoes.

Among the components of animal origin which are part of sports diets, low-fat dairy products (milk, yogurts, cottage cheese), and proteins – bird (chicken breasts), fish (cod, tuna) and white of egg are considered as the main sources of carbohydrates.

The intensive metabolism in organism of triathletes demands the increase in norm of reception of vitamins.

Correctly made food allowance after the trainings and competitions provides a sportsman’s organism with enough carbohydrates (for the replenishment of energy sources), proteins (for cellular structures), liquids (for all functions of organism), the balanced ratio of vitamins and mineral substances (for optimum work of cages) and serves as additional effective remedy of both renewal, and increase in the level of power opportunities of a sportsman [10; 14].

Pharmacological means for the increase in working capacity and acceleration of the process of renewal

Training loads of triathletes are rather high therefore except rational diet products of the increased biological value for the purpose of better preparation for competitions, they use also the following medicamentous means:

1) inosine, potassium orotate– for ensuring strengthening of synthesis of protein;
2) carnitine, Pananginum, glutamic acid, calcium glycerolphosphate, Aminalonum – medicines of power action;
3) Eleutherococcus, Saparalum, pollitabs – adoptogenny medicines;
4) different types of salts of iron – blood formation stimulators.

When carrying out the training process in the conditions of the mountain area it is in addition possible to accept vitamin E (on 50–100 mg a day) and vitamin B15 (on 1 tablet 3 times a day).

With the increase in intensity of loadings after the basic stage of preparation in need of regulation of physiological functions of organism of a sportsman can be used:

1) vitamin B5 (0,1 g a day) along with lipoic acid (25 mg a day) and niacinamide (5 mg a day);
2) thiamine (5 mg a day);
3) ascorbic acid (on 0,5 g 2–4 times a day) [1; 6].

Passive methods of renewal. Distance of a triathlete is the complex "test" on endurance, consisting of three tests heavy physically.

The major factor reducing the efficiency of sportsmen is insufficient renewal after long loadings during the training cycle that is promoted by the accumulation in organism of by-products of metabolism [11, 12].

The increased content of lactic acid in muscular tissue (muscular acidosis) leads to emergence in a sportsman of feeling of fatigue.

Methods of passive recovery therapy are used for acceleration of removal of lactate from muscles. The greatest distribution in sports practice was gained by the weakening bathtubs and massage, and also fresh bath and sauna (it is not recommended to accept right after the competitions, it is more expedient – next day since morning).

At moderate use the weakening bathtubs – one of the most pleasant ways of removal of muscular tension. Use of vortex bathtubs and Jacuzzi with water temperature +36°C promotes the improvement of blood circulation and acceleration of removal of lactic acid from organism.

Sports massage is also widely applied to renewal of triathletes after the trainings. Thanks to it, inflow of blood to muscles increases, removal of lactate accelerates and intake of nutrients to muscular tissue improves.

Fresh bath and sauna in combination with alternating douche are important for renewal of sports efficiency of a sportsman between morning and evening trainings. Action of high temperature and relative humidity of air increases the efficiency of recovery process (optimum indicators for fresh bath – air temperature +60–70°C at humidity of 20–70%; for dry-air (sauna) +100–140°C, at 10% respectively) [1; 6; 9].

Conclusions

On the basis of the conducted research it is possible to draw the following conclusions:

1. About 80% of carbohydrates of total of the calories consumed by it at full saturation of organism liquid have to be contained sports food of a triathlete within ten days before the start.

2. The use of individually picked up sports food as power supply source when passing of the combined track of race has to prevent the exhaustion of glucosic-glycogenous stocks of organism of a sportsman.

3. The main feature of renewal after long aerobic exercise stress is the use of ability of organism in an expedited manner (within 2–4 hours after the muscular work) to transform carbohydrates to glycogen what a triathlete needs the use of the special high-carbohydrate food including products of the increased biological value for.

4. Application of medicamentous means for the better preparation for competitions in continuous triathlon and the process of renewal after them promote the increase in opportunities of expansion of so-called "bottlenecks" of metabolic processes and regulations of physiological functions of organism.

5. The use of passive methods of renewal after exercise stresses in the types of sports activity, entering triathlon, increases inflow of blood to muscles, accelerates removal of lactate and improves intake of nutrients to muscular tissue.

Prospects of further researches. The subsequent researches will be directed to studying of questions of optimization of the specialized food of sportsmen at the organization of long-term training process in types of the program of triathlon.

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Vladimir Vodlozerov: *Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0002-4685-0436
E-mail: triathlon.ua@gmail.com

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Training of young football players with use of modern innovative approaches

Leonid ***Yarmolynskyi***

National University of Physical Education and Sport of Ukraine, Kyiv, Ukraine

Purpose: *to study the condition of posture of young football players and to develop the multimedia information and methodical system "TORSO" for the further use in the educational-training process.*

Material & Methods: *analysis of special scientific and methodical literature, pedagogical observation, videometry and biomechanical analysis of posture. The research was conducted on the basis of the department of kinesiology of National university of physical education and sport of Ukraine. Football players of 7 years old in number of 40 people participated in the research.*

Results: *it is established that such type of violation of biogeometrical profile of posture as rounded back – at 30%, scoliotic posture – at 22%, rounded – hollow – at 16%, flat – at 6% and flat – hollow – at 2% most often meets at football players of 7 years. The obtained data caused the development of the information and methodical system "TORSO" which is expedient for using both for the prevention, and for the increase in level of theoretical knowledge of young football players and coaches.*

Conclusions: *introduction of computer technologies to practice of preparation and organization of the educational-training process of young sportsmen will allow bringing the quality of training of sports reserve to the new methodical level.*

Keywords: *young sportsmen, information technologies, multimedia, posture.*

Introduction

The most innovative and progressive moments of the accumulated experience of long-term preparation of sports reserve in football in many countries, first of all Western Europe, deserve not only the close attention of the Ukrainian experts, but also the scientific foundation of the directions of their use, for the sake of high-quality transformation of the native system of training of young football players [1; 5; 7].

Modern general-theoretical knowledge and powerful practical experience of management of the educational-training process in the branch of sport allow estimating critically training of sportsmen in football, to trace positive sides, to define reserve opportunities and ways of the subsequent improvement of the educational-training process [2; 8; 12].
Today, the use of information technologies in the training process became the relevant problem of scientifically pedagogical activity with the development of technologies of sports preparation [4; 6; 9]. The constant growth of opportunities of information systems causes the need of the search of new directions of use of modern information technologies for sports science and practice, needs even closer attention to opportunities of the optimization of information processes in the pedagogical activity [3; 10].

Communication of the research with scientific programs, plans, subjects

The research was executed according to the plan of the research work of the chair of kinesiology of National University of physical education and sport of Ukraine and the Built plan of the research work in the sphere of physical culture and sport for 2011–2015 of the Ministry of Education and Science, youth and sport of Ukraine, on the subject 3.7 "Improvement of biomechanical technologies in physical education and rehabilitation taking into account specific features of motility of the person", number of the state registration is 0111U001734.

The purpose of the research:

to learn the state of posture of young football players and to develop the multimedia information-methodical system "TORSO" for its subsequent use in the educational-training process.

Research tasks:

1. To generalize the scientific data on the current state of posture at young football players in the course of physical education.

2. To define the most frequent types of violations of posture at young football players.

Material and Methods of the research

Such methods of the research were used for the performance of the put tasks: analysis of special scientifically-methodical literature, pedagogical observation, videometry and biomechanical analysis of posture. The research was conducted on the basis of the chair of kinesiology of National university of physical education and sport of Ukraine. Football players of 7 years old, in number of 40 people participated in the research.

Results of the research and their discussion

The data of the stating experiment allowed to find out that violations of the biogeometrical profile of posture meets most often at football players of 7 years old is rounded back – at 30%, scoliotic posture – at 22%, rounded – hollow – at 16%, flat – at 6% and flat – hollow – at 2%. The videogram of the biogeometrical profile of posture were processed with the use of the program "Torso", with the definition of 3 angular characteristics of the biogeometrical indicator of posture: α_1 – the angle of slope a head, which is formed by vertical and the line, that joins acantha of the seventh cervical vertebra of C_7 and the center of weight (CW) of a head; α_2 – the point of view, which is formed by horizontal and the line that joins the most acting point of the front bone and performance of a chin; α_3 – the angle of slope of a trunk which is formed by vertical and the line that joins acantha of the seventh cervical vertebra of C_7 – the backbone point which is most acting back on border of cervical and chest departments and acantha of the fifth lumbar vertebra (L_5) – the most scoliotic profound point of lumbar lordosis (center of the somatic system of coordinates).

It is established in the course of the researches that deviations of angles of the biogeometrical profile of posture break the high-differentiated general structure of axial skeleton of children and lead to violations in the field of passive and active stabilizing and supporting structures.

The fact attracts attention that the angle, which is formed by vertical and the line that joins acantha of vertebra of C_{VII} and CW of a head (a1) at football players of seven years old with normal posture averaged 32,14° (S=0,61°), with flat – hollow 44,3° (S=0,2°), with rounded back – 38,28° (S=1,4°), with scoliotic posture – 32,48° (S=1,87°), and with rounded – hollow and flat – 31,44° (S=1,54°) and 36,42° (S=0,5°) respectively (tab. 1).

It was revealed that this angle equals on average 84,59° (S=0,84°) at rounded-hollow and flat back this indicator decreases on average till 77,77° (S=0,74°) and till 79,58° (S=0,66°) respectively, and also till 78,22° (S=0,97°) at scoliotic posture whereas at flat-hollow back increases till 86,77° (S=0,13°) at football players who have no violations of the biogeometrical profile of posture in the analysis of indicators of the angle, which is formed by horizontal and the line that joins the most acting point of front bone and performance of a chin (α_2).

The significant role are played by the system of numerous small muscles at which the ease increase in the angle is observed in the correct statement of the angle α_2 which is formed by horizontal and the line that joins the most acting point of front bone and performance of a chin. Scalenus muscles at which overloads the change of the angle which is formed by horizontal and the line, that joins the most acting point of front bone and performance of a chin, promote through the cervical department of spine column for support of point of view.

We developed the multimedia information-methodical system "TORSO" which is expedient for using as for the prevention of functional violations of the musculoskeletal system (MSS) of football players at the initial stage of preparation, and for the increase in the level of theoretical knowledge of coaches and young football players on the basis of data of the experiment, and also the research, ranks of experts [3; 4; 11] which prove the need of use of information technologies for the system of sports preparation.

The menu of the program is a page element of management with tabs and hyperlinks. Having activated the mouse cursor the necessary tab, it is possible to get access to necessary functions of the program "TORSO".

Table 1

Characteristic of the angle, which is formed by vertical and the line, that joins acantha of the vertebra C_{VII} and CW of a head (α_1) at football players of 7 years old

Type of posture	Statistical indicator			
	X	S	m	p
normal posture (n=6)	32,14	0,61	0,25	
round back (n=12)	38,28	1,4	0,4	<0,01
scoliotic posture (n=10)	32,48	1,87	0,59	
rounded-hollow back (n=6)	31,44	1,54	0,63	
flat back (n=4)	36,42	0,5	0,25	<0,01
flat-hollow back (n=2)	44,3	0,2	0,14	<0,01

Table 2

Characteristic of the angle, which is formed by horizontal and the line, that joins the most acting point of front bone and performance of a chin (α_2) at football players of 7 years old

Type of posture	Statistical indicator			
	X	S	m	p
normal posture (n=6)	84,59	0,84	0,34	
round back (n=12)	75,76	0,86	0,25	<0,01
scoliotic posture (n=10)	78,22	0,97	0,31	<0,01
rounded-hollow back (n=6)	77,77	0,74	0,23	<0,01
flat back (n=4)	79,58	0,66	0,33	<0,01
flat-hollow back (n=2)	86,77	0,13	0,09	<0,01

Such tabs contain on the panel of working window.
The tab "SET UP" – use of this tab provides the control of basic elements of the program (sound level, video picture size, size of text fonts, and so forth).

The tab "**USEFUL TO KNOW**" contains several subsections focused on obtaining additional data on posture, types of its violations. All information is submitted as separate sections and subsections:

The first section –"CORRECT POSTURE" includes information on correct posture and its characteristics.

The second section – "RECOMMENDATION" contains information: what it is necessary to be known for formation of the correct posture, how to prevent emergence of violations of posture as it is correct to get static working pose as it is correct to accept the orthograde pose as it is correct to choose berth and as it is correct to lie in bed.

In the section "ABOUT VIOLATION OF THE POSTURE" information on violation of posture is provided in the frontal and sagital planes.

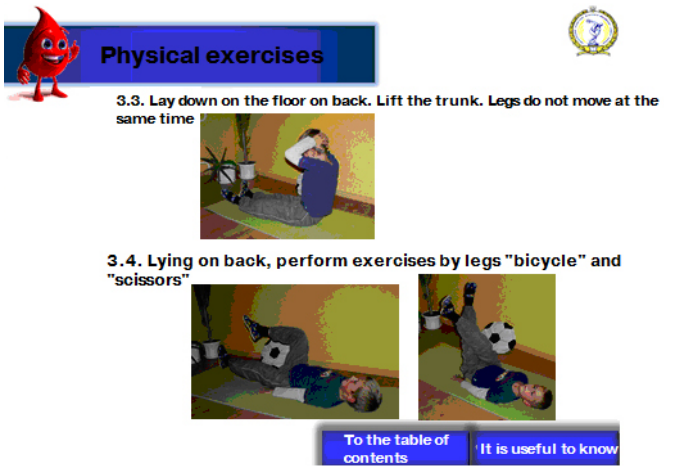
In the section "VIOLATIONS OF BASIC AND SPRING PROPERTIES OF A FOOT" – short information that such flat-footedness and methods of its definition.

The tab "Recommendations for coaches" contains information on opportunities of use of correctional-preventive actions in the educational-training process of young football players. This section gives opportunity to pass to the database of video lessons. This presentation – videos with complex of the physical exercises, which are developed for use in the course of the educational and training classes.

The tab "Recommendations for parents" informs on opportunities use of correctional physical exercises in house conditions.

The tab "Recommendations for children" submits information, which is directed to the increase in motivation at children for classes by physical exercises (pic. 1).

The available hyperlink is in each subsection by means of which it is possible to obtain more detailed information on this subject: everything that needs to be made, – only to activate the reference more in details in the bottom of the page.



Pic. 1. The window of the information-methodical system "TORSO" "Recommendations for children" (listing from the computer screen)

Conclusions

A lot of questions, which concern the correction of violations of posture of young sportsmen, are still far from the optimal solution.

It is established that such type of violation of the biogeometrical profile of posture meets most often at football players of 7 years old as rounded back – at 30%, scoliotic posture – at 22%, rounded-hollow – at 16%, flat – at 6% and flat- hollow – at 2%. The obtained data are planned to be considered further at the organization of the educational-training process of young football players in the annual cycle of preparation.

Recently the radical changes are noticeable in technique of sports preparation, which are connected with the increase in the competition at big competitions and promotion into the forefront of training programs, which implementation often exceeds adaptation opportunities of human body. This problem gains the special sharpness at the initial stages of long-term training of children and teenagers, when reserves of their organism are intensively spent for the natural growth and development, and also for power and plastic providing the set loadings. Such situation goes deep early specialization in sport, intensification of trainings and their negative impact on human body. Contradictions appear between the increased requirements to training of young sportsmen which are dictated by need of constant growth of results and limited functionality of their organism which develops.

Today, introduction of computer technologies, in practice of training of young sportsmen and search of ways of their effective use will allow bringing the quality of training of sports reserve to the highest methodical level in the conditions of the impetuous technification of activity of the coach.

Prospects of the subsequent researches will be connected with the introduction of the multimedia information-methodical system of the educational- training process of young football players.

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Leonid Yarmolynskyi: *National University of Physical Education and Sport of Ukraine: Phyzkul'tury str. 1, Kyiv, 03680, Ukraine.*
ORCID.ORG/0000-0002-5558-028X
E-mail: yarmolka@ukr.net