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4. Human health, physical rehabilitation and physical recreation.
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Musical training of coaches in aesthetic-oriented sports

Irina ***Belenkaya***

Kharkov state academy of physical culture,
Kharkov, Ukraine

Purpose: *to justify theoretically the need for musical training of coaches in aesthetic-oriented sports.*

Material & Methods: *theoretical analysis and generalization of scientific and methodological literature, pedagogical supervision.*

Results: *the main directions of musical training of coaches in aesthetic-orientated sports were reviewed. It was discovered that in these types of sports coaches must have specific musical and rhythmic motor skills involving the use of musical accompaniment as a methodological technique for training sessions. The means of music and rhythmic education, which facilitate effective musical training of coaches in aesthetic-oriented sports, were determined.*

Conclusions: *the necessity of improving the teaching methods of the subject "music and rhythmic education" as part of the musical training of coaches in aesthetic-orientated sports, was theoretically justified.*

Keywords: *musical training, aesthetic-oriented sports, music and rhythmic education, music psychotherapy*.

Introduction

Traditionally sports preparation includes 4 types: physical, technical, tactical and psychological. But there are also obligatory, also important, as well as above-mentioned, types of additional preparation in each sport. Musical and choreographic preparations take the important place in sports of the aesthetic orientation.

Rhythmic, aesthetic and artistic gymnastics, dancing sports, sports aerobics, pair and group acrobatics, figure skating, synchronized swimming, fitness belong to sports of the aesthetic orientation. According to specialists (G. P. Artemyeva, O. Ye. Aftimichuk, L. A. Karpenko, A. N. Mishin, etc.), one of the most important professional abilities of specialists in these sports is ability to perform competently composite preparation of the special knowledge not peculiar to other sports which are engaged on the basis of system, but without which it is impossible to provide adequately at competitions of any rank of the talented and well trained athletes [1; 2; 8; 13].
Music plays the large role in estimation of performances at competitions. The choice and configuration of music – are one of the most important, difficult and responsible sections in composite training of athletes. Music is usually estimated in a complex with perception and display by athletes of nature of music therefore it shall be ideal on quality of record, conform to requirements of sport. But the main thing – music shall correspond to specific features of athletes: to their image, age, technical training and emotional opportunities. It is important to achieve such compliance that music allowed revealing and developing identity of athletes, i.e. those features which do them unlike others, original and memorable.

It is necessary to refer ability to use music as methodical acceptance for carrying out educational-training classes to the requirements determining qualification of a specialist in sports of the aesthetic orientation: to carry out exercises according to music, in time to send commands of the beginning/end of exercises; to carry out calculation according to the subway-rhythmic features of music; to constitute exercises, combinations, dancing sheaves according to structure, content, form, rhythm, dynamic shades of piece of music; to constitute soundtracks for various sets of exercises and competitive programs; to apply music as means of psycho-regulation in the educational-training process [2; 3; 8; 10].

Despite the relevance of a problem, it is paid the insufficient attention to the musical-rhythmic education of coaches in sports of the aesthetic orientation that is caused the need of enhancement of a technique of musical training of coaches, which will be applied by them in the professional activity.

The purpose of the research

To prove theoretically the need of musical training of coaches in kinds of sport of the aesthetic orientation.

Material and Methods of the research

The analysis of scientific and methodical literature in which theoretical and practical aspects of musical training of coaches in sports of the aesthetic orientation are stated, and also pedagogical supervision in the course of teaching discipline "Musical-rhythmic education" acts as the research methods in consideration of the delivered problem.

Results of the research and their discussion

Many authors in their scientific works specify that musical-rhythmic education in sports of the aesthetic orientation is necessary as a basic component of successful technical training that in turn prepares the soil for the highest sporting achievements [1; 2; 8]. Expressiveness of execution in many respects determines the level of sports skill and directly de-

pends on nature of the piece of music, its content. A capability to express thought, feeling, and mood is understood as expressiveness. Sometimes expressiveness of movement is determined as accomplishment of exercise with emotional reflection of a plan and features of movements. The understanding of the essence of expressiveness requires identification of its structure, the nature of the elements forming it, disclosure of communications between these elements. The following components of expressiveness of execution in sports of the aesthetic orientation are allocated: compliance of movements to nature of music, logical truthfulness of poses, and emotional saturation of exercise. The main prerequisites of ensuring emotional expressiveness in these sports are music and its subjective emotional experience by a performer. The last is connected with the motive interpretation of music, nuances of movements (solemnly, vigorously, smoothly, cheerfully, etc.) reached by the corresponding regulation of movements and a dosage of efforts [10; 12].

The music role in a question of manifestation of expressiveness in sports of the aesthetic orientation is ambiguous: first, music – is the expressiveness source, depends on it composition of exercises; secondly, music dictates and gives substantial feasibility to manifestation of emotions; thirdly, itself it is means of expressiveness; fourthly, music serves as an effective remedy of education of expressiveness. So, the first theorist of choreographic art Jean-Georges Noverre in «Letters on dance» wrote: «It is necessary that movements, actions, even silence were considerable, convincing and conformable to music» [8].

Influence of music is stronger, than more intensively performers plunge into music, can perceive it. It depends on ability of athletes to listen and hear music, to understand and realize it in movements. Understanding of music, its analysis and interpretation are performed by each person individually and depend on accumulating of necessary musical experience.

Music is an organic component of that composition which athletes and coaches take out on court of the audience and arbitrators. Creation, nature, temperament of the sports program are concluded in music and are determined by it. From as far as music is figurative and expressive, the level and contents of the program in many respects depends.

According to the data O. G. Rumba [12], it is necessary ability to competently group the piece of music or parts of various works in case of creation of a high-quality soundtrack. Importance of this work is caused by features of competitive activities where the program of performance in these sports is strictly regulated by rules of competitions. At the same time availability of different in speed, rhythm, dynamics (loudness), and nature of parts of composition is required. It is impracticably to find the piece of music conforming to all above-named requirements. The unique way – is coping of initial musical material. It is very important that the scheme, commonly accepted for works of art, was observed in a final soundtrack: introduction, beginning, main part (development), culmination, and outcome, final. In case of creation of musical compositions in which different pieces of music are used it is necessary to reduce to a common denominator frequency, i.e. timbre, characteristic of sounding of all parts of a soundtrack for the creation of a complete musical image [1; 7; 12; 13].

The musical programs which are made of one or different works, must to in itself have the finished form and be perceived as separate pieces of music, but not as annexes to sports programs [13].

The tough time regulations of the sports program demand the creation of the new, extremely squeezed musical forms, a pronounced subject and picturesque instrumentation. It is accepted to call composition as a musical form, i.e. features of creation of the piece of music. In results this or that type of composition occurs. The musical form of each work is individual. But historically there were some general types of forms. They allow embodying musical ideas, both simple, and difficult on figurative contents. Musical compositions which sections aren't divided into independent parts – single-part, two-part and three-part belong to simple forms. Irregular shapes are – variations, rondo, sonata form, cyclic and others [2; 3].

Music by drawing up composition and creation of an artistic image is the primary source. It is primary in relation to the movements. Work on any composition, as a rule, begins with selection of the piece of music. Music has to not just accompany the movement, and organize and define its character [3; 13]. In the course of studying of discipline «Musical-rhythmic education» coaches get acquainted with a technique of drawing up soundtracks for competitive compositions and demonstration performances.

The program of discipline «Musical-rhythmic education» of Kharkov state academy of physical culture included the sections «Music history» and «Dance music». The circle of the musical genres, which are used in sports of an esthetic orientation, is very big and every year extends. It is music of various styles and the directions: classical, national and characteristic, dancing, jazz, pop, music from movies and performances, any compositions of electronic music, pop and rock music; for demonstration performances use also vocal music. The knowledge of history of creation of the chosen piece of music, specifics of a genre, the identity of a composer, and also listening of music of different styles and moods helps a coach with the choice of the necessary musical material and achievement of the maximum result directed by the competitive composition [3].

Musical or musical-rhythmic training of athletes is the obligatory component of technical training in sports of the aesthetic orientation where there is music. Musical-rhythmic education is the main type of musical activity which retells the matter of music and its character by means of movements. A basis is music, and various physical exercises, dances, subject and figurative movements are used as means of its deeper perception and understanding.

Emile Jaques-Dalcroze (1865–1950), the Swiss teacher and the composer, has developed the system of musical-rhythmic education. His method is based on transfer of the figurative contents of music by the plastic movement.
The system of E. Jaques-Dalcroze is allocated with the detailed development and accurate structure against various plastic schools and doctrines of the beginning of the 20th century. The concept of a rhythm as the universal beginning creating and organizing life in all its manifestations and forms is its basis. The person, according to Dalcroze's opinion, is capable to penetrate a rhythmic impulse of the life and the body, joins the deepest secrets of the universe and gets unprecedented power. The rhythm influences the person in

general, similarly bringing up and forming his body, soul and spirit [3; 14]. The purpose of his system of «the spiritualized corporal exercises» – to lead the person to self-knowledge, to fair ideas of the forces and creative opportunities, to help to get rid of physical and psychological complexes and clips, to find pleasure of life, and everything this is thanks to education of own rhythmic reason, will and self-control. «A basis of any individual improvement is the discipline of sensory perception and training of impulses», – E. Jacques-Dalcroze said [7].

The method of Jacques-Dalcroze was called rhythmic gymnastics, and later – eurhythmics. Rhythmic gymnastics (eurhythmics) is a combination of music, plasticity of a body and gestures, «transfusion of sounds in human movements». Each movement is made in a certain rhythm. The feeling of a rhythm in the basis has the motor, active nature, is always followed by motor reactions. Movement, merging with music, connects motive reactions to laws of a musical rhythm, the motor centers are brought up through music, activities of the neuromuscular centers, hearing and perception unite, and coordination of movements is developed. Unlike other types of exercises to the sound of music in which only its metric pulsation is involved in Dalcroze's system a body learns to react to all aspects of the subway – the rhythmic organization, accents, pauses, sound altitude, modulation processes, speed and dynamics, features of an intoning and phrasing. Jacques-Dalcroze gave the popular definition to distinction of meter and rhythm: «A measure (a measure and meter are identical concept) is a certain similarity into which a rich variety can be put, and a rhythm and is that variety which is put into similarity» [14].
A coach needs to have certain knowledge, skills for competent application of music in the educational - training process in sports of the aesthetic orientation.

The main means of musical-rhythmic education are:

– bases of the theory of music including concept about means of musical expressiveness;

– exercises on coordination of movements with music which promote the development of feeling of a rhythm, ear for music allow to understand more deeply a musical and motive image, create skills of perception of the piece of music;

– choreographic exercises include line items of hands, legs and elementary movements on line items, development of starting positions are the preparatory exercises necessary for mastering school of movements, from which various exercises will be carried out for forming of a correct posture;

– elements of national and modern dances are constructed on music which determines features of dancing movements of different times and the people. This group of means acquaints engaged with folk art, promotes development of coordination, emotionality, culture of movements;

– musical games apply to fixing of the received skills in compliance of movements with music.

– walking and run will organize, make active pupils, and adjust for the forthcoming work. Pieces of music of various content determines features of accomplishment of walking and run that helps to seize movements, various on nature;

– exercises without subject are spring and wavy movements, waves, balance, turns, jumps;

– rhythmic gymnastics – one of kinds of improving types of gymnastics, is fine means of aesthetic education, its feature is the continuity of movements to the sound of music at various rates. Exercises of rhythmic gymnastics influence the musculoskeletal device, cardiovascular and respiratory systems, promote development of physical qualities, forming of a correct posture, beautiful gait, culture of movements [2; 3; 9].

Influencing the emotional sphere of the personality, music influences a psycho-emotional condition, strong-willed regulation of behavior and motive memory (mechanisms of storing and reminiscence) of athletes [6]. Perception of music is very individually. Besides it changes depending on a surrounding situation, our mood, a general psychological and physical state.

There is a number of acceptances of regulation and self-control of a mental condition of the athlete which or lower mental tension, or raise it in case of need in sports practice. One of acceptances of psycho-regulation is the musical psychotherapy. Accomplishment of creative tasks in the system of musical psychotherapy, according to V. I. Petrushin, R. Blavo, O. A. Blinova, Zh. Port, etc., is one of the most effective acceptances of optimization of a mental condition of a person. Hearing of music, movement and dance remove psychological stress [5; 11].

The musical psychotherapist V. I. Petrushin considers that the problem of musical psychotherapy consists in the help to the athlete in eradication of his negative experiences, filling by their positive emotions, removal of a stress, designing of his cognitive sphere. The emotional state exerts direct impact on efficiency of the athlete [11].

Musical preparation and knowledge of a technique of application of functional music allows coaches to use various musical materials as means of psycho-regulation in the educational – training process [4; 6].

It is necessary to pay attention to a possibility of application of nonconventional forms of the organization of classes in musical rhythmic education (in particular, «musical theater», «graphic dance», «live music», etc.) which experience of use was stated in the researches of the author of article and is introduced in the educational process on disciplines «Musical-rhythmic education» and «The theory and the technique of the chosen sport» in Kharkov state academy of physical culture [4].

Conclusions

The need of improvement of a technique of teaching discipline «Musical-rhythmic education» as the making musical training of coaches in sports of the aesthetic orientation is theoretically proved on the basis of the analysis of scientific and methodical literature.

Means of musical-rhythmic education which include both traditional and nonconventional are defined. Traditional means are: bases of the theory of music, musical-rhythmic, choreographic and dancing exercises, musical games, rhythmic gymnastics to which it is necessary to add the section «Music

history». The knowledge of history of creation of the chosen piece of music, specifics of a genre, the identity of the composer, and also listening of music of different styles and moods will help the coach with the choice of the necessary piece of music and achievement of the maximum result directed by the competitive composition. Nonconventional – «musical theater», «graphic dance», «live music» make the psychoregulating impact on athletes, form a positive emotional spirit, correct adverse mental states, intensify restoration processes, instill self-confidence, develop a creative initiative.

Prospects of the further research

The development of new forms of the organization of high-quality musical training of coaches in sports of the aesthetic orientation is planned.

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References

1. Artemyeva, G. P. & Nechitaylo, M. V., 2014, "The development of coordination abilities of children 9–11 years, the fitness dance with elements of Indian dance", *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 3, pp. 13-18. (in Ukr.)
2. Aftimichuk, O. Ye. 2011, *"Musical-rhythmic education", improving aerobics. Theory and Methods* [Ozdorovitelnaya aerobika. Teoriya i metodika], Kishinev: Valinex SRL, 134 p. (in Russ.)
3. Bilenka, I. G. 2012, *"Theory and methods of musical and rhythmic education"* [Teoriya ta metodika muzichno-ritmichnogo vikhovannya], Kharkiv: KhDAFK, 122 p. (in Ukr.)
4. Belenkaya, I. G. 2004, "Music therapy in the training process", *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 7, pp. 283–287. (in Russ.)
5. Blavo, R. 2003, *Healing music* [Istseleniye muzykoy], Spb.: Piter, 192 p. (in Russ.)
6. Deyneko, A. Kh. & Belenkaya, I. G. 2011, [Role and functions of the musical accompaniment to the training sessions], *Slobozans`kij naukovo-sportivnij visnik* [Slobozhanskyi science and sport bulletin], Kharkiv: KSAPC, No 1, pp. 17-20. (in Russ.)
7. Zhak-Dalkroz, E. 2006, *Ritm* [Rhythm], Moscow, 248 p. (in Russ.)
8. Karpenko, L. A. & Rumba, O. G. 2001, [About expressiveness, artistry, emotion in the gym] *Materialy nauch.-prakt. konf., posvyashch. 100-letiyu so d. r. L. P. Orlova* [Materials scientific-practical conference., is dedicated. 100th anniversary L. P. Orlov]. SPb., pp. 74-77. (in Russ.)
9. Kulikov, A. I. & Kurako, A. A. 2003, *Muzykalno-ritmicheskoye vospitaniye s metodikoy prepodavaniya* [Musical-rhythmic education with teaching methodology], Gomel: UO «GGU im. F.Skoriny», 88 p. (in Russ.)
10. Mullagildina, A. Ya., Belenkaya, I. G. & Deyneko, A. Kh. 2012, [The development of musical and compositional abilities of gymnasts of 15–16 years] *Nauka i osvita. Naukovo-praktichniy zhurnal Pivdennogo naukovogo tsentru NAPN Ukraini* [Science and education. Scientific journal of the Southern Research Center NAPS Ukraine], No 2, Odesa, pp. 65-71. (in Russ.)
11. Petrushin, V. I. 2000, *Muzykalnaya psikhoterapiya* [Music therapy], Moscow: Gumanitarnoye izdatelstvo, 226 p. (in Russ.)
12. Rumba, O. G. 2006, *People characteristic choreography in the training of specialists in gymnastics and dance on the dance floor : PhD thesis: Author's abstract* [Narodno-kharakternaya khoreografiya v sisteme podgotovki spetsialistov po gimnastike i tantsam na parkete: avtoref. dis. kand. ped. nauk], Peterb. gos. un-t fiz. kultury im. P. F. Lesgafta, SPb., 24 p. (in Russ.)
13. Mishina, A. N. 1985, [Tactics build short and arbitrary programs], *Figurnoye kataniye na konkakh* [Figure skating], Moscow: Fizkultura i sport, 271 p. (in Russ.)
14. Tyutyunnikova, T. E. 2003, *Videt muzyku i tantsevat stikhi... Tvorcheskoye muzitsirovaniye, improvizatsiya i zakony bytiya* [See the music and dancing poetry ... Creative music-making, improvisation and laws of existence], Moscow, 264 p. (in Russ.)

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Irina Belenkaya: *Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0002-8336-3100
E-mail: belenkaya.irina@gmail.com

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Research of functional status of handball player is in a training process

Vladimir Bogush
Aleksandr Yatsunsky
Olga Sokol
Irina Smirnova
Oksana Reznichenko
Olga Kuvaldina

Admiral Makarov National University of Shipbuilding, Nikolayev, Ukraine

Purpose: *to learn functional changes in the organism of sportsman in the conditions of training process for optimization of sporting preparation of handball player.*

Material & Methods: *the handball player of different age groups and sporting qualification inspected: 13–15 years without a sporting digit, 16–18 years is the second digit, 19–23 years is the first digit and candidates in masters of sport, in all 45 persons. Sensomotorni reactions, exactness of dosage of muscular efforts, limit of the line of sight, frequency of cardiac reductions, maximal consumption of oxygen, general and special capacity, were studied.*

Results: *showed that an increase in the level of training significantly improved response sensorimotor systems (visual, auditory, motor), increased limits the field of vision that promotes a special game quality – the ability to see the field increased general and special performance, the optimum duration of intensive work is the heart rate and oxygen consumption, when a specific task training is a definite change in physiological systems.*

Conclusions: *objective assessment and analysis of changes in the studied parameters of the functional state of an athlete revealed their relationship, which can be used in the training process.*

Keywords: *handball, sensorimotor reactions, frequency of cardiac reductions, maximal consumption of oxygen, general and special capacity.*

Introduction

Sports games belong to a group of situational sports for which non-standard movements, lack of stereotype and repetitions of invariable, standard provisions, and also inconstancy of conditions of their performance are peculiar. Kind of work of a sportsman is decided, first of all, by interaction on the rival or members of the team, isn't regulated in advance and changes according to their actions, which can be at some point to a certain extent stereotypic (run, walking, etc.), acyclic, high-speed and power (throws, jumps, blows, falling). It predetermines considerable probability of use of repetitions of certain situations, game moments and techniques. At the same time the variety of forms of manifestations of actions of a sportsman is constantly connected with the solution of numerous game combinations which depend to a large extent on sports experience of players [3; 10].

The maximum repetition of special and auxiliary exercises leads to a change of certain physiological functions of an organism of a sportsman, promotes the best development of physical qualities, the increase of functionality and, therefore, sports preparedness [6].

The most important feature of sports games is their emotional saturation, high degree of unpredictability of actions of the rival that causes the physiological changes in an organism proceeding as stressful reactions. A sportsman has to assess quickly arisen situation, make the effective decision, choose the expedient game technique, execute it in the rational way taking into account the time, a space, a dosage of muscular efforts, to be ready to performance of the following motive task [5].

The efficiency of the training process considerably depends on correctness of selection and distribution of means and methods in which every period certain problems are solved. The productivity of their performance depends on a combination of various loadings and their alternation to rest that is a prophylactic of exhaustion, overfatigue and overtraining. At the same time it is necessary to set a task of development and fixing of the certain motive qualities on each training classes, providing a performance of difficult coordination movements in sports games [11].

Handball is characterized by high intensity of movement, a constant differentiation of three-dimensional motions, locations of a partner, the rival, throws, and passes, techniques of a ball with a different speed and force that makes active the level of perception of various analyzers [2].

In the conditions of trainings afferent influences form a certain level of activity of touch systems and promotes emergence of mood between them that probably is specific and characteristic of certain sports. High degree of interrelation of analyzers when performing exercises with a ball is noted in sports

games, when moving partners and the opponent on the platform. The change of functional activity of one analyzer (visual, kinaesthetic) leads to similar changes in another. The level of sensitivity of touch systems in a concrete sport is formed by the specifics of muscular activity causing a background of interaction of analyzers [13].

Sportsmen have to have the high level of physical and technical-tactical preparedness with manifestation of standard and coordination abilities in the existential accuracy of physical actions and their biomechanical rationality [9].

The impact on physical and functional preparedness is applied in improvement of the system of training of handball players, that will provide co-ordination, speed, variability of technical-tactical opportunities promoting effectively and rationally to perform physical actions in a game at influence of various forcing-down factors [7; 12].

Components in the structure of sports preparedness are interconnected and are based on activity of functional complex of motive coordination: technique and processing of information, accumulation and realization of a play experience, mechanisms of correction, executive components. However the interrelation of separate elements in physical and technical-tactical preparedness in general isn't essential, that it is explained by a large amount of individual distinctions. The correlation interrelations during the different age periods are ambiguous on the level between indicators of physical and functional preparedness [1; 8; 14].

Construction, planning, management of training of handball players of the system has to be evidence-based, consider tasks, working conditions, continuity, new achievements and innovative prospects [4].

The purpose of the research

Studying of functional changes in the sportsman's organism for the optimization of his physiological state in the conditions of the training process which is brought closer on intensity and loading to extreme conditions of competitions.

Material and Methods of the research

The examination of handball players of various age groups and sports qualification was conducted: 13–15 years old – beginners (without sports category), 21 persons; 16–18 years old – the second category, 15 people; 19–23 years old – the first category and candidates for the master of sports, 9 people. Indicators were studied: general and special working capacity, borders of fields of vision, sensomotor reactions (visual, acoustical, motive), accuracy of a dosage of muscular efforts, heart rate, maximum consumption of oxygen.

Results of the research and their discussion

Indicators of sensomotor reactions of handball players on the general and specific irritants are presented in table 1. Reaction to light in the age group of 13–15 years old equaled 0,237 s, on a sound – 0,218 s, in 16–18 years old respectively 0,225 s and 0,195 s, in 19–23 years old – 0,211 s and 0,188 s. Therefore, with the increase of sports preparation the time of reaction to a light irritant decreased in the group of sportsmen of the second category in comparison with the beginners by 5,1% and for a sound irritant for 10,5%, at more qualified sportsmen respectively for 10,9% and 20,6%. The improvement of the time of reaction when carrying out game techniques in the studied groups respectively for 6,3% and 23,3%, on an assessment of a game situation was noted at a throw for 12,2% and 24,4%, by passes for 2,6% and 5,1%, at an inking for 6,3% and 12,6%. The time of reaction of the choice of techniques in the set game situations was various in the observed age groups. In training exercises: 1x1 at the age of 13–15 years old equaled 0,649 s, 15–16 years old –0,586 s, 19–23 years old – 0,524 s; i.e. it decreased respectively by 9,7% and 19,2%; 2x1 according to the age groups equaled 0,651 s, 0,599 s, 0,547 s and decreased by 8% and 15,9%; 2x2 on the studied age was – 0,603 s, 0,548 s, 0,494 s, it was noted the reduction of indicators by 9,1% and 18%. At the increase of professional skill the time of reaction decreased, that is the reaction of the choice of techniques in game situations improved. Sports games are an effective remedy of improvement of a functional condition of touch systems, namely visual, acoustical and motive analyzers.

Hard or long work changes the functions of physiological systems of an organism, showing by exhaustion, which signs are deterioration in accuracy of physical actions, increase in quantity of technical mistakes, temporary decrease in working capacity, etc. The noticeable discoordination of vegetative functions and subjective feeling of fatigue appear later. The indicators of special and general efficiency of sportsmen are distinguished, first of all, in game sports from the limiting factors of working capacity, which are presented in table 2.

Methods were applied at the research of special working capacity: run with the maximum speed at 30 m, dribbling at the same distance, jumps – threefold from the place and according to Abalakov. Results of testing were the lowest at sportsmen at the age of 13–15 years old, in groups of 16–18 years old and 19–23 years old increased respectively in run with acceleration by 2,12% and 7,36%, dribbling – 1% and 4,25%, a triple jump – 2,45% and 1,5%, a jump according to Abalakov – 2% and 5,4%. The general working capacity was determined by results of intensive run on 30 m, 5 times with an interval of rest of 20 s. The best result was in the first attempt at the age of 19–23 years old – 3,96 s, i.e. for 5% speed was more, than in the younger age group. The average value on five attempts had the same tendency, i.e. the time of execution of the test decreased respectively by 0,5% and 3,8% at sportsmen of higher qualification in comparison with the beginners.

The development of coordination abilities is closely connected with the improvement of specialized perceptions – space sense, time, accuracy of a dosage of muscular efforts as ability of handball players effectively depends on these properties to operate the movements. The data of the accuracy of differentiations of the set effort (mistake) by handball players of various level of preparation are given in tab. 3.

The researches were conducted before and after training at the maximum effort of 20 kg, then a half and the fourth part. The smallest mistake was noted in the senior age group, and the accuracy of differentiation of the maximum effort worsened almost twice at all sportsmen after training, and smaller dosages of muscular loading under the same conditions are characterized by the increase of accuracy of physical actions.

Table 1

Indicators of sensomotor reactions of handball players to the general and specific irritants (s)

Age	Light	Sound	Game techniques (throws, passes, outplay)	Game situations			Reaction of the choice of techniques in game situations		
				throw	pass	outplay	1x1	2x1	2x2
13–15	0,237	0,218	0,304	0,720	0,648	0,663	0,649	0,586	0,524
16–18	0,225	0,195	0,285	0,632	0,631	0,621	0,651	0,599	0,547
19–23	0,211	0,188	0,233	0,544	0,615	0,579	0,603	0,548	0,494

Table 2

Indicators of special and general efficiency of handball players

Special working capacity						General working capacity					
Age	Acceleration 30 m, s	Dribbling 30 m, s	Triple jump from the place, m	Jump according to Abalakov, sm	Accuracy of throws, quantity	Acceleration 5x30 m with an interval of rest 20 s					
						1-st	2-nd	3-rd	4-th	5-th	$M_{av.}$
13–15	4,23	4,24	7,94	76,0	7	4,15	4,23	4,20	4,28	4,25	4,22
16–18	4,14	4,20	8,14	77,5	6	4,16	4,19	4,23	4,23	4,23	4,20
19–23	3,94	4,06	8,06	80,1	7	3,96	4,09	4,09	4,10	4,08	4,06

Table 3

Indicators of differentiation of the set effort (mistake) at handball players, kg

Age, years	Dosage of muscular efforts (20 kg)					
	Before training			After training		
	Max	S from max	jfrom max	Max	S from max	j from max
13–15	3,7	3,8	3,6	7,1	2,9	2,6
16–18	0,9	4,1	3,9	1,7	3,6	2,8
19–23	0,3	2,98	2,5	0,6	1,6	2,4

The increase of coordination complexity of training impacts influences the size of response of an organism more than their duration, and in some cases and intensity. This regularity is result of features of a functional condition of nervous system of a sportsman in game sports which allows him in specific conditions more effectively to conduct processing of the obtained information in comparison with sportsmen of other specializations. Unexpectedly arising and quickly changing game episodes demand from players of high degree of perception of separate situations and ability correctly them to solve.

One of the factors limiting effective use by sportsmen of information on game actions of the partners and team of the rival about movements of a ball, is functional restriction of fields of vision as result of insufficient special preparedness and lack of a necessary play experience. Special quality – ability to see the field is distinguished in sports game.

The comparative assessment of border of fields of vision in various directions testifies to higher rates at handball players, namely it is more than to outside on 2°, inside on 15°, up on 7°, on 13° from the top till the bottom, than at the persons who aren't playing sports.

Borders of fields of vision of both eyes (tab. 4) with the increase of sports qualification increase: external border on 6°, lower – on 6°, internal – 3–4°, top – 4°, i.e. the lowest indicator at the age of 13–15 years old and the highest in the group of 19–23 years old sportsmen.

Table 4

Borders of fields of vision of handball players (degrees)

Indicator	Age (years)		
	13–15	16–18	19–23
External border			
Left eye	71	73	77
Right eye	69	72	75
Low border			
Left eye	47	51	53
Right eye	45	48	51
Internal border			
Left eye	48	50	52
Right eye	50	51	53
Top border			
Left eye	32	33	36
Right eye	33	31	37

The acceleration of rate of a game, the increasing mental and physical tension raise approximate activity at handball players which is a compound component of tactical preparation and to a great extent causes the general scheme of behavior of a sportsman in difficult game situations, is inseparably linked with tactics of a game in attack, in defense and in transition just seeing the game activity to another. The structure of sports activity of handball players is made: speed of perception and an assessment of game situations, decision-making on implementation of a concrete game technique; speed and accuracy of carrying out the corresponding combinations, control over the implementation of a motive task.

Character, structure, content of a game demands from a handball player of manifestation not of separate components of motive activity, and all its complex which is provided with interaction of the main functional systems of an organism: central nervous system, neuromuscular, cardiovascular and respiratory. Optimum ratios between the physiological systems providing the most rational solutions of motive tasks by transition from one functional state to another are established in an organism.

The criterion for the determination of optimum duration of a hard work and intervals of rest between series of exercises in trainings of athletes is the heart rate that is the cardiovascular system which is most reacting and functionally significant in the development of volume of a training load. It is confirmed by the indicators of heart rate at handball players of various age groups and sports qualification at training and competitive loads are presented in table 5.

Movements of a sportsman have a various character in the direction of movement, intensity, performance of numerous accelerations therefore in power ensuring his activity aerobic and anaerobic processes are of great importance in sports games.

Impact of systematic trainings on an organism of handball players places great demands on systems of power supply that is caused by the volume of the performed work and its intensity.

During the game activity which is taking place in conditions of a high emotional pressure, intensity of power processes reaches very considerable sizes. One of factors of high performance of sportsmen in sports games is the aerobic productivity which is defined by the size of the maximum consumption of oxygen – the leading factor of efficiency of a sportsman. Therefore, intensity of physical activities is characterized by indicators of the cardiovascular system on HR and consumption of oxygen.

Handball players hold rather high position among sportsmen of various specializations in the aerobic opportunities. The maximum consumption of oxygen made: at the age of 13–15 years old an absolute value of 3,1±0,127 l·min^{-1}, relative – 49,2 ml·min^{-1} on 1 kg of body weight; in 15–16 years old respectively 4,6±0,66 l·min^{-1} and 52,7 ml·min^{-1}, increase for 48,3% and 7,1%; in 19–23 years old an absolute value – 5,5 l·min^{-1}, relative – 59,4 ml·min^{-1}, increase respectively by 77,4% and 20,7%. Changes of an absolute value it is caused first of all by anthropometrical and constitufeatures, and relative – it is generally connected with the professional standard. The working capacity in sports games depends on the efficiency of information processing and its use for implementation of special motive activity, and also on power opportunities of an organism of a sportsman. More qualified sportsmen more likely foresee nature of action of the rival and find necessary tactical and technical techniques for counteraction.

Various factors work at the same time in the numerous combinations, which are determined at present by a concrete game situation in sports practice. The reaction of an organism in a training task is always the total answer on physical, emotional and other influences (household, climatic, educational, and stressful). The optimization of sports preparation is connected with the increase of efficiency of planning and the accounting of training and competitive loads.

Conclusions

The obtained data give the chance to estimate objectively changes in components of motive activity, feature of indicators of physiological and functional condition of organism of sportsmen of the various age groups and the level of sports preparation and qualification which can be used in the training process, that is manifestation of the principle of expediency realized in the changing conditions of trainings or competitions.

The results of the research confirms essential reserves of a

Table 5

Heart rate at handball players in the conditions of training and competitions

Type of activity	HR on 30 s								
	Walking in warming-up	Runs in warming-up	Runs in the main part of trainings (competitions)	Run without a ball (spurt)	Run with a pass of a ball to a partner	Dribbling in the main part of trainings (ccompetitions)	Pass of a ball in pairs at place (with various quantity of touches)	Pass a ball moving	Pass a ball moving with throws at the gate
Training	40–70	60–75	75–80	60–75	75–85	75–85	60–70	70–80	60–70
Unofficial games	50–90	60–65	80–85	75–85	75–85	75–90	70–75	75–80	65–75
Calendar games	60–75	65–80	80–90	80–95	80–90	80–95	70–80	70–80	70–85

functional state that provides the improvement of motive abilities and technical preparedness of handball players and need of introduction of means of joint impact on the development of coordination abilities and the formation of methods of a game for the increase of level of physical and technical-tactical preparedness of handball players.

One of the main methods of improvement of the training process in sports games is the directed physical activity, which is connected with manifestation of force, speed, endurance (aerobic and anaerobic) which exert specific impact on working capacity and exchange processes.

Prospects of further researches. Complex researches of functional changes of organism of sportsmen of various age groups and levels of preparedness at physical activity will be conducted for the creation of a technique of determination of prospects of a sportsman in the chosen sport.

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References

1. Ashanin, V. S., Druz, V. A., Kantsedal, A. A. & Petrenko, Yu. I. 2011, [Main regularities of locomotion in sport and work], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 3, pp. 116-119. (in Russ.)
2. Aleshin, I. N. & Dubinin, K. S. 2014, [Perfection of a technique of special endurance trained handball players in the preparatory period], *Vestnik Chelyabinskogo gosudarstvennogo universiteta* [Herald of Chelyabinsk State University], No 4, pp. 17-21. (in Russ.)
3. Borsuk, N. A. 2013, *Faktory i usloviya vliyayushchiye, na effektivnost ispolzovaniya izometricheskikh uprazhneniy v obshchey fizicheskoy podgotovke vysokokvalifitsirovannykh gandbolistov dlya profilaktiki travmatizma* [Factors and conditions affecting, the efficiency of the use of isometric exercises in the general physical preparation of highly qualified handball players for injury prevention], Pinsk: PolesGU, pp. 151-153. (in Russ.)
4. Gusev, Yu. A. 2003, *Metodika formirovaniya koordinatsionnykh sposobnostey u yunykh gandbolistov na osnove modelirovaniya usloviy sorevnovatelnoy deyatelnosti*: dis. kand. ped. nauk [Technique of formation of coordination abilities in young handball players, based on the simulation conditions of competitive activity : PhD diss.], Volgograd, 156 p. (in Russ.)
5. Ignatyeva, V. Ya. 2008, *Analiz sorevnovatelnoy deyatelnosti muzhskikh komand vysokoy kvalifikatsii v gandbole* [Analysis of competitive activity of highly qualified men's teams in handball], Moscow: FiS, 34 p. (in Russ.)
6. Kamayev O. I. & Proskurov Ye. M. 2012, [Features of the development of power-speed abilities with different anthropometric indices in boys 10-11 years], *Fizicheskoye vospitaniye studentov* [Physical education students], No 4, pp. 68-72. (in Russ.)
7. Lyakh, V. I. 1988, [The most important for various sports coordination abilities and their significance in technical and technical and tactical improvement], *Teoriya i praktika fizicheskoy kultury* [Theory and Practice of Physical Culture], No 2, pp. 57-59. (in Russ.)
8. Manolaki, V. G. 1990, *Pedagogicheskiy kontrol za urovnem podgotovlennosti kvalifitsirovannykh dzyudoistov na etape sportivnogo sovershenstvovaniya*: avtoref. dis. ... kand. ped. nauk [Pedagogical control over the level of readiness of the qualified wrestlers on the stage of sports perfection :PhD thesis], Moskva, 24 p. (in Russ.)
9. Palagin, A. A. 2014, [The structure of the physical and technical-tactical readiness handball 10-11 years], *Pedagogika, psikhologiya ta mediko-biologichni problemi fizichnogo vikhovannya i sportu* [Pedagogy, psychology and medical-biological problems of physical education and sport], No 10, pp. 35-41. (in Russ.)
10. Portnov, Yu. M. 2009, *Osnovy upravleniya trenirovochnym i sorevnovatelnym protsessom v sportivnykh igrakh* [Fundamentals of management training and competitive process in sports], Moscow: Fizkultura, obrazovaniye i nauka, 300 p. (in Russ.)
11. Ratnikov, A. A. 2006, *Differentsirovannyy podkhod k skorostno-silovoy podgotovke gandbolistok 14–16 let*: avtoref. dis. ... kand. ped. nauk [Differentiated approach to speed-strength training handball players of 14-16 years :PhD thesis], Moscow, 22 p. (in Russ.)
12. Ratov, I. p. 1994, *Dvigatelnyye vozmozhnosti cheloveka* [Motor abilities of the person], Minsk, 121 p. (in Russ.)
13. Rovnyy, A. S. 2015, [Features of the functional activity of the kinesthetic and visual sensory systems in athletes of various specializations], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 1, pp. 104–108. (in Russ.)
14. Sadovskiy, Ye. 2003, *Osnovy trenirovki koordinatsionnykh sposobnostey v vostochnykh yedinoborstvakh* [Fundamentals training coordination abilities in martial arts]. Belaya Podlyaska, 384 p. (in Russ.)

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Volodymyr Bogush: *PhD (Medicine); Admiral Makarov National University of Shipbuilding: Geroev Stalingrada str. 9, Mykolayiv, 54025, Ukraine.*
ORCID.ORG/0000-0002-7178-6165
E-mail: toops@ukr.net

Oleksandr Yatsunskiy: *Admiral Makarov National University of Shipbuilding: Geroev Stalingrada str. 9, Mykolayiv, 54025, Ukraine.*
ORCID.ORG/0000-0002-7580-4308
E-mail: yatsunskiyal@ukr.net

Olga Sokol: *Admiral Makarov National University of Shipbuilding: Geroev Stalingrada str. 9, Mykolayiv, 54025, Ukraine.*
ORCID.ORG/0000-0003-1693-8418
E-mail: toops@ukr.net

Irina Smirnova: *Admiral Makarov National University of Shipbuilding: Ushakov str. 44, Mykolayiv, 73022, Ukraine.*
ORCID.ORG/0000-0002-6967-7103
E-mail: smirinik@ukr.net

Oksana Reznichenko: *Admiral Makarov National University of Shipbuilding: Geroev Stalingrada str. 9, Mykolayiv, 54025, Ukraine.*
ORCID.ORG/0000-0003-4388-2982
E-mail: toops@ukr.net

Olga Kuvaldina: *Admiral Makarov National University of Shipbuilding: Geroev Stalingrada str. 9, Mykolayiv, 54025, Ukraine.*
ORCID.ORG/0000-0002-3402-2369
E-mail: toops@ukr.net

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The existing state of material support of football clubs

Denis Demenkov

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

Purpose*: to investigate the current state of material support of football clubs at schools of the Sumy region.*

Material & Methods: *we used a complex of complementary methods for the achievement of the purpose of the research among which: analysis and generalization of scientific and methodical literature; analysis of normative documents, official sites of Internet; analysis of documentary materials; questioning.*

Results: *the question of the current state of material support of football clubs at schools of the Sumy region is considered. Questions of fullness of material support of football clubs are revealed.*

Conclusions*: the state of material support of football clubs at schools of the Sumy region is determined on the basis of the analysis of biographical particulars. The problematic issues regarding the process of preservation and development of material support of football club classes are defined for the purpose of the improvement of quality of football club classes.*

Keywords: *material support, football club classes.*

Introduction

The negative tendency, which is characterized by the deterioration in physical development and health of children and youth, progresses in recent years. Practice confirms that more than half of pupils of general comprehensive educational institutions have unsatisfactory or low physical preparedness.

One of the prime tasks in the matter of the improvement of the noted situation is need of renewal of all forms of after-hour and out-of-school work, the creation of the corresponding material resources, for classes on physical culture and sport which in turn will give the chance to provide the all-round development of motive qualities of pupils during their study in educational institution, will promote the preservation and strengthening of mental and physical health of children of all age groups [6].

Financial and logistical support is the important condition of functioning of the system of physical education at school. At the same time mass physical culture needs special conditions. Planning their creation, teacher of physical education has to be guided not only and not just by lesson how many on need to involve in performance of exercises of all pupils, considering their age and level of preparedness. It is important to provide pupils with stock at lesson and in after-hour classes. Only then it is possible to give to pupils a necessary loading, to approach to everyone differentiated, to maintain his interest during the whole classes [9].

Realization of all provided recreational actions in comprehensive educational institutions is possible under conditions of creation of the corresponding the financial and logistical support of school on the basis of modern requirements to the organization and carrying out classes which will provide implementation of requirements of the program.

Creation of the financial and logistical support demands from a teacher of big efforts, initiative and creativity. A teacher has to leave from those increased requirements to physical education of people whose realization is impossible without continuous improvement of educational-material resources [4].

Problems of financial and logistical support of physical education classes, open classrooms and clubs, are identical. Since 2003 the Ministry of education and science of Ukraine, Committee on physical education and sport of MES of Ukraine, developed the number of normative documents "About the general secondary education", "About physical culture and sport", "The provision on gym hall of comprehensive educational institution", "The provision on educational offices of comprehensive educational institutions" "The list of the typical equipment and sports stock for sports and gyms for CEI and PTEI, sports constructions of mass use" in which the indicative list of stock and equipment, which is necessary for carrying out physical education classes, open classrooms and clubs, is regulated accurately.

The list of stock and equipment for carrying out physical education classes with elements of football, football clubs is displayed in the appropriate programs, approved by the Ministry of Education and Science of Ukraine [2; 5].

Authors [3; 4; 9] demonstrate that the number of the contingent of children and teenagers attracted to regular trainings in different forms of physical education was reduced more than by 300 thousand persons since the end of the 90th years of the XX century. Unfortunately, interests of modern pupils changed not in the best side. The low level of financial and logistical support is one of the reasons of decrease in efficiency of teaching-educational and recreational work in educational institutions of Ukraine.

The experience of teachers of physical culture gives the

chance to claim that the development of physical culture and sport at school is impossible without regular updating and improvement of educational -ports base today. The most part of practical modules, classes of circles including on football, cannot be fully acquired by pupils without the existence and the optimum quantity of the special sports equipment, stock and technical means of study [8].

In recent years the values of club work as means of additional physical activity, sports education and preservation of health of pupils, does not raise doubts [3; 4]. Carrying out club classes of football at comprehensive school – is one of the most important conditions of realization of the education system for children and young people football in Ukraine, which will be able to attract in the only effective structure the different directions of the educational-training process in children and young people football.

K. L. Vikhrov, E. V. Stolitenko (2001, 2013), O. V. Kuzmichev (2000), B. M. Shiyan (2002), N. M. Kovalchuk (2005), T. M. Chizhenok (2009), V. I. Goncharenko, D. V. Demenkov (2014) et al. researched the analysis of the last researches and publications showed that monitoring of condition of financial and logistical support of teaching-educational and recreational work. However studying of condition of material support of football facultative classes remains to topical issues because it gives the chance of the improvement of organizationally methodical providing, teaching-educational, recreational process of open classrooms, football clubs in comprehensive educational institutions.

Communication of the research with scientific programs, plans, subjects

The research is conducted according to the plan of the research work of Sumy State Pedagogical University name is A. S. Makarenko, the Built plan for 2016–2020 by the subject "Increases of level of health and physical preparedness of different groups of the population means of physical culture" (the state registration number is 0111U005736).

Purpose of the research

To investigate current state of financial and logistical support of football clubs at schools of the Sumy region.

Material and Methods of the research

We used the complex of complementary methods for the achievement of the purposes of the research, among which: analysis and generalization of scientifically-methodical literature; analysis of normative documents, official sites of network, Internet; analysis of documentary materials; questioning.

Results of the research and their discussion

Studying of security of open classrooms and football clubs was carried out by means of questioning of teachers of physical culture who work in comprehensive educational institutions of the Sumy region and conduct football clubs classes.

Having analyzed scientifically-methodical, special literature, normative documents, materials of the official sites of Internet [1; 2; 7], we have defined the list of stock and equipment for carrying out open classrooms and football clubs. footballs, counters, football vests (shirtfronts), football goals, nets for football goals, pump for inflation of balls, needles nipple, roulette, stop watch, whistle, the computer, projector, screen for projector, model of football field, platform for football game or platform with artificial covering entered to this list.

It is necessary to notice that the analysis of the existing training program for football club classes of comprehensive educational institutions in 1–11 found the lack of the list approximate stock and equipment, necessary, for carrying out classes of football clubs.

It was offered to respondents to compare the determined by us list of stock and equipment with available in their educational institutions, which is used for carrying out facultative and classes of football clubs.

Also it was offered to respondents to define stock and equipment which was included into the list and can improve, in their opinion, the quality of carrying out classes of football clubs.

In total teachers of 38 comprehensive educational institutions of the Sumy region, who will see off facultative and classes of football clubs, took part in the questioning.

The analysis was carried out by comparison of biographical particulars of respondents with the existing requirements of rather indicative list of stock and equipment which is necessary for carrying out open classrooms, football clubs, approved by the Ministry of Education and Science of Ukraine, Committee on physical education and sport of MES of Ukraine.

Studying of security of educational institutions of the Sumy region with stock and equipment for carrying out open classrooms and football clubs according to the indicative list of MES of Ukraine gave the chance to find out that the financial and logistical support have the sufficient level of security and gives opportunity for high-quality carrying out the noted above classes.

The analysis of biographical particulars of respondents testified that 100% of educational institutions, which took part in the experiment, have stock and equipment for carrying out open classrooms and football clubs in enough according to the indicative list, which is approved by the Ministry of Education and Science of Ukraine.

The completeness by footballs reaches 97,5%. Average quantity of balls on one school of 18,3 of 20 offered in the indicative list. The existence of enough balls in educational institutions gives opportunity to teachers of physical culture to perform different special exercises and to effectively study technical and tactical preparation of football game.

The high level of security with counters – 98% is watched. 18,9 units on average are the share of one educational institution.

The analysis of security with stock and equipment for carrying out open classrooms, clubs in comprehensive educational institutions testified that most of all educational institutions are completed with such equipment: vests football (shirtfronts) (98%), needles nipple (100%).

Security with the model of football field reaches (75,4%) that,

certainly, complicates mastering pupils of tactical actions in football.

Rather the low level, in our opinion, is developed with ensuring study with interactive means. So, 46% of teachers showed the existence of the computer, the projector and the screen. It should be noted that having conducted oral survey, 100% of respondents have confirmed the existence of these interactive means of study in educational institutions, availability of their use is actually possible.

Also the conducted research found the high level of security with football goals, average quantity which is the share of one school, makes 2,8 units (by the norm – 2 units), roulettes – 1,2 units (by the norm – 1 unit), stop watch – 1,1 units (by the norm – 1 unit) and whistle of 1,4 units (by the norm – 1 unit). The sufficient level of completeness by nets for them – 95% is observed near overtime the quantity of football goal. 1,8 units on average are the share of one educational institution.

It was offered to teachers of physical culture to define stock and equipment, which was included into the list and can improve, in their opinion, quality of carrying out classes of football clubs for the purpose of the accounting of pedagogical experience in the organization and carrying out facultative, occupations of circles after soccer. The additional stock was defined: video records with study of technical actions, mobile hockey gate, stands for running exercises, coordination track, the arbitrator's tags, stuffed balls. It certifies the uses of the above-mentioned stock and equipment in practice of carrying out facultative and classes of football clubs by the teachers, which were involved in questioning.

Conclusions

1. The analysis of scientifically-methodical and special literature found out that the effective implementation of the contents of the program, the planned practical material of open classrooms, football clubs depends not only on the teacher, but also on the quantitative existence of the sports equipment and stock which allows realizing the program of club.

2. The analysis of biographical particulars of respondents testified that 100% of educational institutions, which took part in the experiment, have stock and equipment for carrying out open classrooms and football clubs in enough according to the indicative list, which is approved by the Ministry of education and science of Ukraine namely:

– completeness by footballs– 97,5%;
– counters – 98%;
– football shirtfronts – 98%;
– needles nipple – 100%;
– security with the model of football field – 75,4%;
– multimedia (computer, projector, screen) – 46%;
– net for football goal – 95%.

Also the conducted research found the high level of security with such stock:

– football goal – 2,8 units (by the norm – 2 units);
– roulette – 1,2 units (by the norm – 1 unit);
– stop watch – 1,1 units (by the norm – 1 unit);
– whistle – 1,4 units (by the norm – 1 unit).

3. The analysis of financially-sports base for carrying out football clubs of the Sumy region testified that the condition of security according to the list of the approximate educational equipment, calculated on educational institution which has one set of classes, answers norm. It testifies to readiness of comprehensive educational institutions for effective realization of work of football club.

Prospects of the subsequent researches. The development of financial and logistical support of football will give the chance to improve the state regulation of the process of preservation and the subsequent development of material and technical basis and infrastructure of football on the basis of combination of efforts of the legal entities and individuals interested in its development. For this purpose, in our opinion, it is necessary to resolve such issues: creation of conditions for preservation and improvement of the available financial and logistical support, definitions of its strategy, the subsequent development; ensuring the state support of construction of stadiums, football fields in cities, regional and district centers; ensuring the state support of participation of Ukraine in the project of UEFA from construction of football places as bases for mass football classes and prospects of its development.

The subsequent researches concerning the improvement of organizationally- methodical ensuring classes of football clubs in comprehensive educational institutions are relevant.

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References

1. Vikhrov, K. L., Zubaliy, M. D. & Stolitenko, Ye. V. 2004, *Futbol u shkoli* [Football School], Kyiv: Kombi LTD, 256 p. (in Ukr.)
2. Goncharenko, V. I. & Demenkov, D. V. 2014, *Programa gurtka (fakultativu) "Futbol" dlya 5–9 klasiv zagalnoosvitnikh navchalnikh zakladiv* [Program group (elective) "Football" for 5–9 classes of secondary schools], Sumi: Vid-vo SumDPU imeni A. S. Makarenka, 28 p. (in Ukr.)
3. Tomenko, O. & Demenkov, D. 2015, [Value significance constituent organizational methods of classes in football circle with students], *Sportivniy visnik Pridniprov'ya: naukovo-praktichniy zhurnal* [Sports Bulletin Dnieper, scientific journal], Dnipropetrovsk: Innovatsiya, No 2, pp. 225–229. (in Ukr.)
4. Tomenko, O. & Demenkov, D. 2014, [The current state of organizational methods of classes circle of football with students], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, Vol. 41 No 3, pp. 101–105. (in Ukr.)
5. *Navchalna programa dlya gurtkiv z futbolu v 1–11 klasakh zagalnoosvitnikh navchalnikh zakladiv* [The curriculum for groups of football in 1–11 grades of secondary schools], Available at: http://ua.convdocs.org/docs/index-56797.html. (in Ukr.)
6. *Programa rozvitku fizichnoi kulturi i sportu v Sumskiy oblasti* [The program of physical culture and sports in the Sumy region]. Available at: http://sorada.gov.ua/dokumenty-oblrady/6-sklykannja/category/76-rishennja-16-sesiji.html?download=1703:pro-programu-rozvytku-

fizychnoji-kultury-i-sportu-v-sumskij-oblasti-na-2012-2016-roky. (in Ukr.)
7. Stolitenko, Ye. V. & Cherevko, T. P. 2013, *Fizichne vikhovannya uchniv 1–11 klasiv u protsesi zanyat futbolom* [Physical education students in the 1–11 grade classes in football], Kyiv, 304 p. (in Ukr.)
8. Chizhenok, T. M. 2009, [The state and security equipment of physical culture secondary schools Zaporizhzhya city], *Visnik Zaporizkogo natsionalnogo universitetu* [Journal of Zaporizhzhya National University], Zaporizhzhya: Zaporizkiy natsionalniy universitet, p. 167–173. (in Ukr.)
9. Shiyan, B. M. 2002, [Creating infrastructure and the fight against accidents at school], *Teoriya ta metodika fizichnogo vikhovannya shkolyariv* [Theory and methods of physical education students], Ternopil: Navchalna kniga, p. 225–228. (in Ukr.)

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Denis Demenkov: *Sumy State Pedagogical University name is A. S. Makarenko: Sumy, Romenskaya str., 87, Ukraine.*
ORCID.ORG/0000-0001-5683-0052
E-mail: denisdemenkov1@mail.ru

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Selection of option of pregame warm-up in handball taking into account features of force of the nervous system of sportsmen

Helen Gant
Helena Bykova

Kharkiv State Academy of Physical Culture,
Kharkiv, Ukraine

Purpose: *to develop recommendations about the organization of warm-up for handball players of 13–14 years old taking into account force of the nervous system (NS) of players.*

Material & Methods: *28 handball players of 13–14 years old of Kharkov and Ternovka took part in the research; methods were used: analysis of scientific and methodical literature, technique of "Tapping-test".*

Results: *need of the search of new ways of the increase of efficiency of the competitive activity of young handball players is proved theoretically. Psychological characteristics of handball players of 13–14 years old with a different force of the nervous system are provided. Practical recommendations about the organization of pregame warm-up of handball players of 13–14 years old taking into account force of nervous system of sportsmen are developed.*

Conclusions: *handball players of 13–14 years old can be divided into five groups, concerning force of their nervous system by the results of the conducted research: strong NS (28,57%), average (21,43%), weak (17,86%) and average and weak (14,29%), average and strong (17,86%). Recommendations about the organization and carrying out pregame warm-up of handball players of 13–14 years old, taking into account force of the nervous system of sportsmen were developed, considering the results of the psychological research of sportsmen.*

Keywords: *pregame warm-up, handball players, force of the nervous system.*

Introduction

One of the relevant issues of sports science remain the search of ways of increase of efficiency of the competitive activity of sportsmen. It is shown in the researches, which were conducted on the basis of Kharkiv state academy of physical culture that it is necessary to improve constantly techniques of physical preparedness of sportsmen for success in the competitive activity [2–4; 8; 11], to pay attention to mental conditioning [5–6] and to place emphasis on the correct creation of the training process [1; 8; 11] and so forth.

At present it is proved by number of researches that typological features in manifestation of the main properties of the nervous system (NS) played a very essential role in the achievement of high level of sports skill. Sportsmen with different combinations of the main properties of NS can achieve the identical success in sport, but come to them in the peculiar way, with different degree of expense of time, forces, energy [9].

The analysis of the last researches and publications

It is shown in works of Ye. P. Ilyina, that anatomic, morphofunctional and biological features are the cornerstone of individual differences, the level of physical development and phenotypical physical qualities are caused. The properties of NS lie at the heart of typological features which define dynamics of adaptation to the environment [9], which combination is especially individually. M. N. Ilyina, Ye. P. Ilyin in their works claim that not only the absolute force of property of NS at this or that moment is essential, but also as far as it remains to constant, that is the degree of dynamic firmness. At the considerable firmness, force of reactions in each separate case depends on changeable circumstances in which a sportsman occures, and it adequate to them: the stronger external irritation causes the stronger reaction, the weaker irritation, – the weaker reaction. The strong irritation can cause either very strong or very weak reaction at individuals with the bigger instability, depending on very changeable condition of the personality, on the contrary; as well the weakest irritation can sometimes cause also very strong reaction. Most of authors confirm the fact that uniform pedagogical influence, that they are applied to different persons, leads to different results, and different forms of pedagogical influence, lead to identical results [9; 10]. Therefore, it is obvious that knowing features of NS of sportsmen, the opportunity to regulate duration and extent of their inclusion in the training -competitive process appears at coaches [3; 6].

Despite the numerous researches, which are directed to studying both physical, and psychological techniques of training of sportsmen, the question of the correct creation of pregame warm-up in handball is almost not studied, taking into account features of force of NS of sportsmen, that is caused the relevance of our work.

Communication of the research with scientific programs, plans, subjects

The research was conducted according to the subject of the plan of the RW of Kharkiv state academy of physical culture

2.8. “Improvement of the educational-training process in sports” (number of the state registration is 0111U003126).

Purpose of the research

Proceeding from the aforesaid, the purpose of our work – to develop recommendations concerning the organization of warm-up for handball players of 13–14 years old taking into account force of NS of players. The following *tasks* were solved according to the stated purpose:

1. To define perspective directions of improvement of pre-game warm-up of handball players taking into account force of NS of sportsmen on the basis of the analysis of scientifically-methodical sources.

2. To define individual properties of NS of handball players of 13–14 years old.

3. To develop recommendations concerning carrying out pre-game warm-up for handball players of 13–14 years old taking into account force of their of NS.

Material and Methods of the research

The research of individual indicators of force of NS is carried out at 28 handball players of 13–14 years old of the cities Kharkiv and Ternivka. The theoretico-methodological analysis of the problem is carried out for the foundation of relevance of the subject. The technique “Tapping-test” was used for studying of indicators of force of NS of handball players of 13–14 years old [12].

Results of the research and their discussion

By the results of the conducted research, handball players can be divided into five groups, by force of NS: strong NS, average, weak and average-weak. The results of distribution of sportsmen by force of NS are presented in tab. 1.

Table 1

Distribution of handball players by force of NS

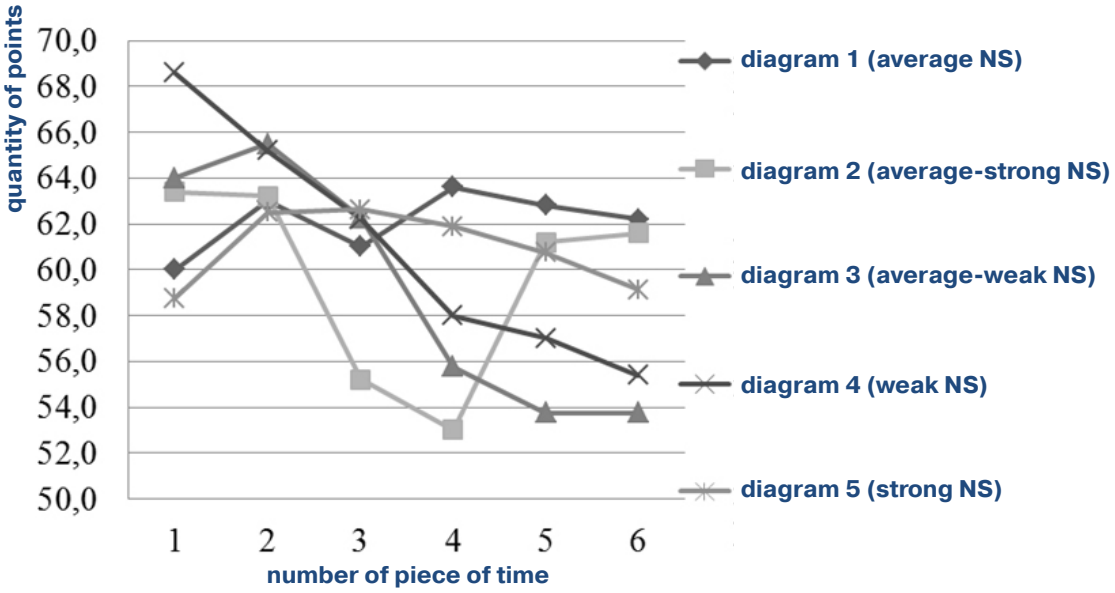
Force of NS	Handball players (n=28)	
	Abs. val.	%
Strong	8	28,57
Average	6	21,43
Weak	5	17,86
Average-weak	4	14,29
Average-strong	5	17,86

As shown in tab. 1, average force of NS is at 6 (21,43%) examined handball players of 13–14 years old. Speed at them increases to maximum in the first 10–15 s of work; it can decreases below the initial level in the following 25–30 s in work with “Tapping-test”. Persons with strong NS (28,57%) have practically the same maximum frequency of movements, as well as at persons with average-weak NS, however it is reached only on the second five-second piece of work. In this regard handball players with strong NS concede in speed to sportsmen with average NS in the first 5 s of work. Having begun to work almost at the same speed, as well as persons with average force of NS, handball players with strong NS due to the will, can increase speed whereas others cannot make it.

Handball players with weak NS (17,86%) are characterized by inability of nervous cells to maintain the long and concentrated excitement or braking at action of strong irritants. As such players are not capable to put up with strong and long tension, the coach has to consider it in the training competitive process, it is correct to dose loading in warm-up and so forth.

The results of the research of force of NS (mental working capacity) of handball players of 13–14 years old by the technique of «Tapping-test» are presented graphically in pic. 1.

As shown in pic. 1, speed of handball players with strong NS increases at the beginning of activity and then gradually de-



Pic. 1. Average indicators of results of “Tapping-test” and graphics of mental efficiency of handball players of 13–14 years old

creases (pic. 1, diagram 5). Sportsmen, usually, do not begin to work with strong NS at full capacity, and situations of additional motivation allow them to join in activity as much as possible. Such players are organized by reinforcement on warm-up in time, can show phenomenal results at the beginning of the game, but they also are quickly exhausted.

The maximum rate of working capacity decreases practically at once from the moment of activity and remains decreased to the end of work at handball players with weak force of NS; the difference between the best and worst result is essential (pic. 1, diagram 4). Players with weak force of NS cannot expect or suffer, they are not capable to put up with superstrong irritants. But such handball players own hypersensibility, high sensitivity, ability to distinguish superweak signals, their advantage consists in it at players with strong NS. It is necessary to remember in the work with such sportsmen that players begin to work with weak force of NS quickly, also quickly blow up their power reserves and therefore continue to work expensively. If to intimidate such handball players by complexity or volume of future works, they can make the resource psychologically or morally by the beginning of the competitive activity (previously having scrolled "all horror" of the future test in the head).

The decrease in rate of work practically at the beginning of activity and preservation its low or the periodic growth and fall during the whole work also characteristic to players with average weak force of NS, but the difference between the best and worst result will be insignificant here (diagram 3).

Nearly 21,43% of players from the group of the surveyed showed low lability, that is slow rate of work by the technique of "Tapping-test" (pic. 1, diagram 1). It means that these sportsmen are inclined to work at slow speed, and slow speed of their nervous processes is their individual characteristic.

Thus, individual differences in representation of force of their NS are found in handball players of 13–14 years old. The gradation of individual representation of force of NS – from weak till strong – appear in opportunity to maintain short-term, but intensive loadings – both physical, and psychological. It should be noted that characteristics of the tapping-test, changing at fatigue, can serve as the indicator of functional condition of handball players of 13–14 years old. Sportsmen with weak NS show the smaller speed to tapping at the action of stressful factors whereas persons with strong – much higher. The knowledge of these regularities allows coaches to resolve more strictly issue of diagnostics of resistance to stressful factors and to formulate individual recommendations from the organization of the training and competitive activity of handball players of 13–14 years old, pregame warm-up and so forth.

Considering the above-mentioned psychological characteristics of sportsmen with different force of NS, we offered two options of warm-up. The first option of warm-up – for sportsmen with strong NS, the second option of warm-up connected handball players with weak and intermediate types of NS.

It is necessary to remember at the organization and carrying out pregame warm-up of handball players of 13–14 years old with strong NS: sportsmen with strong NS need the certain time for inclusion in work at full capacity, it is necessary to begin to build warm-up with simple cyclic exercises. Gradually exercises have to gather speeds, difficulties when performing. To finish warm-up trace with such exercises which as if throw down a challenge to the handball player and will force it to be mobilized. The character of exercises must have mainly specific orientation, that is competitive exercises in warm-up has to be more in comparison with exercises of the general orientation. If the coach needs to make the remark, it needs to be done by the quiet and strong tone, without offending the player, but without leaving him the place for doubts.

Thus, it is necessary to distinguish from recommendations for warm-up for handball players of 13–14 years old with strong NS: to begin warm-up trace from kinds of walking and smooth run at slow speed; farther than exercise on the place: strech-exercises, relaxation exercises; then exercises get big power (swing and jumping exercises); to finish exercises on the place trace with difficult coordination exercises.

The part of special warm-up (exercise with balls): it is necessary to perform exercises, constantly being in the movement, that is legs of handball players should not stand still even when performing close passes at warm-up with passes. To finish this part of warm-up trace with passes with increased requirements to coordination opportunities of sportsmen (reception and pass in jump, pass after turn on 360°, and so forth).

It is necessary to use more shots on goal in jump after performance of various feints at warm-up of the goalkeeper and goal-shots to sportsmen. It is necessary to finish this part of warm-up with throws against the active defender or even two that for high-quality realization of throws will demand from the sportsman of mobilization of all his efforts.

It is necessary to remember at the organization and carrying out pregame warm-up of handball players of 13–14 years old with weak, average, average-weak and average-strong force of NS: such at once on full get into gear and are very quickly exhausted therefore it is necessary to create in pregame warm-up conditions of preservation of their maximum potential by the beginning of game. It is necessary not to allow exhaustions of their nervous-mental state for the necessary time earlier and to keep their working capacity at the high level as it is possible longer; at creation of pregame warm-up it is necessary to use more exercises of nonspecific orientation, exercises, for the general development and exercises that leave very well at such sportsmen; when performing exercises these handball players need to get support from the coach, to finish each part of warm-up with exercises which perfectly come out that will support their confidence in the forces on due levels before the game.

It is necessary to allocate among recommendations for warm-up for handball players of 13–14 years old with weak, average, average-weak and average-strong force of NS: to begin warm-up trace with run and kinds of walking; exercises for the general development should be begun, being in the movement, then to pass to performance of strech-exercises on the place. Warm-up with balls – when performing kinds of passes it is necessary to adhere to slow speed, filling interval after performance of pass to its technique with the nonspecific movements (trunk bending forward, back, performance of set and so forth). It is necessary to avoid difficult coordination movements when performing passes. All types of interaction with the partner have to be very familiar and "on forces" to sportsmen not to cause additional overstrain of NS.

Kneading the goalkeeper and carrying out goal-shots, sportsmen have to apply more often throws in basic situation or from the course. Carrying out throws from angular positions, it is necessary to increase firing angle of gate and to carry out them without obstacle of the defender who will facilitate task for the forward. It is necessary to avoid falling on platform surface.

It is necessary to avoid difficult conditions of performance of throws, that is to carry out them without the rival's resistance. The last goal-shot has to achieve the purposes, that is the sportsman needs to throw ball in gate surely.

Therefore, if players prevail with weak, average, average-weak and average- strong force of NS in the team, after the general part of warm-up, it is possible to give a motor game which distracts sportsmen from thoughts of competition which will be initiated soon. If the goalkeeper has the weak force of NS, then the last throws have to happen from sportsmen with strong NS who will carry out attack of gate, counteracting defenders that will increase chances of the goalkeeper to return ball and will maintain his self-confidence. In case when the goalkeeper has strong NS, handball players need to finish part of team warm-up with throws with weak NS in the conditions of free performance to throw which increases chances of the sportsman to throw ball in gate. If players had time before the game after the obligatory parts of warm-up, then players settle down in attack and defense, imitating competitive actions. If at association of team players to two parts (2 options of carrying out warm-up) in everyone there is number of players not multiple 2, then warm-up with balls can be done also in the three.

Conclusions

1. The analysis of scientifically-methodical literature on questions of the increase of efficiency of the game of handball players demonstrates that this problem remains relevant, and among priority and few studied directions are the accounting of features of NS of players when carrying out pregame warm-up.

2. By the results of the conducted research, handball players of 13–14 years old can be divided into five groups according to force of their NS: strong NS (28,57%), average NS (21,43%), weak NS (17,86%) and average-weak NS (14,29%), average-strong NS (17,86%).

3. Recommendations concerning the organization and carrying out pregame warm-up of handball players of 13–14 years old, taking into account force of NS of sportsmen were developed on the basis of results of the psychological research of handball players of 13–14 years old. The observance of the above-stated recommendations from the organization and carrying out pregame warm-up will allow handball players to begin game in optimum condition of mental working capacity which can act as guarantee of effective participation in competition.

The prospect of the subsequent researches consists in the experimental foundation of efficiency of the offered recommendations, taking into account features of force of NS of handball players of 13–14 years old in the course of pregame warm-up which will allow recommending their use to coaches.

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References

1. Bondarev, D. V. 2011, *Razminka v uchebnom protsesse studentov, zanimayushchikhsya futbolom* [Warm up in the learning process of students involved in football], Sevastopol: SevNTU, 28 p. (in Russ.)
2. Bykova, Ye. A., Strelnikova, Ye. Ya. & Strelnikov, G. L. 2012, [The use of swimming to improve the functionality of the handball players in the preparatory period of the annual cycle], *Problemy i perspektivy razvitiya sportivnykh igr i yedinoborstv v vysshikh uchebnykh zavedeniyakh: materialy VII mezhdunarodnoy nauchnoy konferentsii. 3 fevralya 2012 goda* [Problems and prospects of development of sports and martial arts in higher education: VII international scientific materials conference. February 3, 2012], Belgorod – Kharkov – Krasnoyarsk, pp. 17–20. (in Russ.)
3. Bykova, Ye. A. 2007, [Mental readiness for the competition as one of the factors determining the efficiency gandbolistok games], *Slobozhans'kii naukovo-sportyvnyi visnyk* [Slobozhanskyi science and sport bulletin], Kharkiv: KSAPC, No 12, pp. 121–124. (in Russ.)
4. Bykova, Ye. A. 2006, [Preparation akrobatycheskoy role in uchebno-trenyrovochnom protsesse handball], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 9, pp. 89–92. (in Russ.)
5. Gant, O. E. 2011, [Features of the cognitive performance of children in competitive and post-competitive activities], *Pedagogika, psikhologiya ta med.-biol. problemi fizichnogo vikhovannya* [Pedagogy, Psychology and med.-biol.problemy physical education], Kharkiv, KhDADM, No 6, pp. 284–289. (in Ukr.)
6. Gant, O. E. 2011, [Features mental disability children of secondary school age in terms of competitive position and competitive activity], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 2, pp. 215–218. (in Ukr.)
7. Gant, Ye. Ye. 2012, [Features self-esteem of the individual athletes in extreme conditions of sporting activities], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 1, pp. 137–142. (in Russ.)
8. Efimov, O. A. & Pomeshchikova, I. P. 2006, [Optimization of preparation before the game players in basketball], *Pedagogika, psikhologiya ta mediko-biologichni problemi fizichnogo vikhovannya i sportu* [Pedagogy, Psychology and med.-biol. problemy physical education] Kharkiv: KhDADM (KhKhPI), No 2, pp. 47–50. (in Ukr.)
9. Ilin, Ye. p. 2003, *Psikhomotornaya organizatsiya cheloveka* [Organization psychomotor man], SPb.: Piter, 384 p. (in Russ.)
10. Ilina, M. N. & Ilin, Ye. p. 1975, [On one of the conditions for diagnosing strength of the nervous system excitation by a tapping-test], *Psikhofiziologicheskiye osobennosti sportivnoy deyatelnosti* [Psychophysiological features of sports activities], L., pp. 183–186. (in Russ.)
11. Radygina, K. I. & Tretilova, T. A. 1985, [The methodology of the prelaunch workout] *Lyzhnyy sport* [Skiing], Moscow, Vol. 1, pp. 57–58. (in Russ.)
12. Raygorodskiy, D. Ya. 2001, *Prakticheskaya psikhodiagnostika. Metodiki i testy* [Practical psychodiagnostics. Procedures and tests], Samara: BAKhRAKh-M, 672 p. (in Russ.)

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Helen Gant: *PhD (Psychology), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0001-7729-4914
E-mail: lena.gant@mail.ru

Helena Biykova: *Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0002-7473-6673
E-mail: teleskopchik1@rambler.ru

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Correlation of quality of life with component questionnaire in children with acute broncho-pulmonary disease

Nataliya ***Ivasyk***

Lviv State University of Physical Culture, Lviv, Ukraine

Purpose: *to determine the effect of disease symptoms of quality of life in children with acute broncho-pulmonary diseases according to the developed questionnaire.*

Material & Methods: *survey 143 children with acute broncho-pulmonary diseases at children's Hospital conducted using a questionnaire developed. The results worked out using standard software packages SPSS for Windows 13.*

Results: *the quality of life in the surveyed children with acute broncho-pulmonary diseases is estimated as lowered. Determined correlation between the assessment of the quality of life questionnaire and components in school children with acute broncho-pulmonary diseases who were hospitalized.*

Conclusions: *the biggest impact on quality of life of children with acute broncho-pulmonary disease have seizures wheezing and walking up the stairs, moderate effect giving cough and its effect on the general condition, nasal discharge and presence of dyspnea, exercise or physical activity, the problem of pressure in chest, missing school because of broncho-pulmonary diseases, depressed state due to disease and the fear of what may worsen cough, because of the disease the child may lag behind the school program and the impact on sleep. But the most complicated nasal breathing and availability allocation cough and daily activity have little impact on the quality of life for these children by correlation factor.*

Keywords: *quality of life, broncho-pulmonary diseases, children*.

Introduction

For today, it is possible even more often to meet the data, concerning the quality of life (QL) which is the difficult, multicomponent phenomenon, which depends both on objective and various subjective factors in scientifically methodical literature [2]. The concept QL is very wide and philosophical, however scientists allocate three main types of definitions: global, component and narrow [9; 11].

Support of the quality of life, which is dependent on health, became one of the important components of health care in the world [7].

A global measure of perception by a patient of a disease and the functional status mean under the question of QL, which is connected with health [3; 10]. Therefore, considering question of QL of patients, estimate the degree of wellbeing and satisfaction with those aspects of life which illness and its treatment influences [6].

Various questionnaires are used for the purpose of an assessment of QL and definition of influence of a disease on state of a patient [1–4; 6]. Concerning the questionnaires of QL which concern broncho-pulmonary diseases, they are developed for persons with chronic pathologies [5; 8; 10].

As the interaction between a rehabilitologist and a patient is one of the factors of successful rehabilitation, we need to consider both objective data of inspections, and subjective estimates of state of a patient, by drawing up the program. Besides for today it is recognized that influence of a disease on an organism can't be estimated only by use objective criteria (a status assessment by a doctor) [1]. Therefore, we developed the questionnaire of poll for children with the sharp broncho-pulmonary diseases (BPD) for the purpose of definition of influence of symptomatology of a disease on motor activity and quality of life of a child [4].

Communication of the research with scientific programs, plans, subjects

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

Purpose of the research

To define influence of symptomatology of a disease on the quality of life of children with sharp broncho-pulmonary diseases according to the developed questionnaire.

Material and Methods of the research

143 children with sharp broncho-pulmonary diseases who came on treatments to regional children's hospital, the average age of which made 9,8±2,9 years old, took participation in the research. 64 children had pneumonia from them (com-

plicated by pleurisy at 2 of them) and 79 of the interrogated had different forms of bronchitis.
We did the statistical processing of results of researches by means of a standard package of the application program SPSS for Windows 13.

Results of the research and their discussion

When studying QL, we rely on the subjective estimation which was given the patient at the time of poll. Besides, it is necessary to consider that the subjective perception of various components of the quality of life by certain people can be very different. However, studying state of children with sharp broncho-pulmonary diseases, for the definition of influence of a disease on their state interested us as the child estimates displays of a disease on the state and motor activity, for the purpose of the subsequent accounting of these data on physical rehabilitation classes.

This questionnaire contains questions which can conditionally be divided on such as: «general questions», «symptoms», «activity», «influence of a disease», at the same time practically all questions (except «general») estimated a state for the last 3 days.

So, studying results by the questionnaire of poll of QL, which is developed by us, we saw that children on average gained 58,29±12,01 points from the maximum 156 points. To estimate this result, we applied calculation of index of the quality of life (IQL), applying the approach of calculation, which is used by authors of other techniques for calculation of IQL and evaluation criterion by the formula:

$$IQL = (1 - N_{fact.}/N_{max.}) x100,$$

where Nfact. – the actual number of points which is received by the specific patient; Nmax. – the maximum number of points which can be received by this questionnaire.

If IQL equals 80% and more, then QL consider satisfactory, 60–79% – lowered, 40–59% – low, 20–39% – very low, 19% and less – minimum [5].

Proceeding from these calculations, on average QL at the interrogated patients is estimated as lowered, as IQL made 62,6±7,8%. However, carrying out the statistical processing of frequencies by means of the standard package of the application program SPSS for Windows 13, we found out what QL is estimated as lowered at 69,2% of respondents, and at 30,8% of children with sharp broncho-pulmonary diseases – as low.

However, considering that the subjective estimate displays individual perception of the quality of life by the child and are based on subjective feelings and personal estimates [9], first, we want to pay attention to correlation communications of an assessment of QL with those questions, which concern an assessment of influence of symptomatology on a state of the child (tab).

Apparently from the table, irrespective of age, moderate influence on the quality of life, according to the questionnaire, children, with sharp broncho-pulmonary diseases has cough and its influence on a state of the child, allocation, from a nose and existence of get out of breath (0,30<r<0,49). However, complicated nasal breath and existence of allocation at cough have smaller influence on the quality of life of these children according to the correlation coefficient (0,20<r<0,29). The existence of attacks of whistling breath gives the greatest influence on the quality of life, according to the data of inspection. And there we want to pay attention that, estimating get out of breath on motor activity through the question, it was how difficult for children to go upstairs, we see that there is a strong impact on the quantity of life (r=0,682), than at the question concerning the existence of get out of breath at physical activity. In our opinion, it can be explained with that children don't differentiate these questions concerning get out of breath more often, and perceive them as one: «existence of get out of breath» at the time of poll, however they define more accurately it when a performance of specific action by them concerns a question. Concerning influence of a disease on restriction with sports or physical exercises for the last 3 days, we see that there is a moderate communication with the quality of life.

Correlation communication estimates of the quality of life with components of the offered questionnaire at children with sharp broncho-pulmonary diseases

General	
Age	r=–0,059
Quantity of SRVI per a year	r=0,251**
Concentration at school	r=0,263**
Admission of school	r=0,116
Disease duration to a hospital	r=0,175*
Friendship with coevals	r=0,038
Daily activity	r=0,236**
Symptoms	
Cough	r=0,424**
Exhaustion cough	r=0,313**
Allocations of a phlegm	r=0,220**
Breath by a nose	r=0,219**
Allocations from a nose	r=0,374**
Get out of breath at rest	r=0,486**
Get out of breath at PA	r=0,398**
Attacks of whistling breath	r=0,596**
Influence of disease	
Pressure in a breast	r=0,397**
Tension of neck/shoulders	r=0,118*
Admission of school because of BPD	r=0,386**
Clothing	r=0,270**
Concern which can worsen a state	r=0,401**
Concern about progress because of BPD	r=0,306**
Dejectedness because of health	r=0,198**
Restrictions because of cough/ get out of breath	r=0,428*
Dream	r=0,407**
Confidence outdoors	r=0,198*
Activity	
Engagement in sports / physical exercises	r=0,334**
Go upstairs	r=0,682**

Note: *QL – quality of life; PA – physical activity; SRVI – sharp respiratory viral infections; BPD – broncho-pulmonary disease; * – p<0,05; ** – p<0,01.*

Such interrelation, in our opinion, is explained by the general physical activity of children to a disease. According to our su-

pervision, children who spend a free time at the computer or the TV, consider that the disease doesn't limit him in this opportunity, and often and, on the contrary, carrying out treatment in hospital they attend class in MPC, thereby consider that their engagement in sports/physical culture are on due levels.

Here we can allocate pressure problems in breasts, transmission of school through BPD, dejectedness through a disease and fear concerning that which can worsen cough and that because of a disease the child can lag by the school program, rather the correlation communications which concern an assessment of QL and questions of influence sharp broncho-pulmonary disease on a state of the child. Also this analysis of results was confirmed by negative influence of a disease on a dream. Concerning the subgroup of the general questions, they have no close interrelation with an assessment of quality of life at the time of stay of the child in a medical institution, only the assessment of daily activity and an opportunity to concentrate at school has a weak influence (0,20<r<0,29).

Conclusions

According to the developed questionnaire, we found out that most of all influence of QL of children with sharp broncho-pulmonary diseases of attack of whistling breath and go upstairs. The moderated connection has cough and its influence on the general condition of the child, allocation from a nose, existence of get out of breath, sports or physical exercises, pressure problems in breasts, admissions of classes at school through BPD, dejectedness through a disease and fear of rather possible deterioration in cough and lag from the school program because of a disease, and also negative influence of a disease on a dream. But such data of a clinical picture as complicated nasal breath and existence of allocations at cough, and also daily activity, have a weak influence on the quality of life of these children according to the correlation coefficient.

Prospects of the subsequent research: to define correlation communications of QL of this questionnaire with other objective indicators of a state of children with sharp broncho-pulmonary diseases in the conditions of hospitalization.

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References

1. Bondarenko, A. V. 2014, [Description of the quality of life in children with primary immunodeficiency], *Perinatologiya i pediatriya* [Perinatology and pediatrics], No 1(57), pp. 74–76. (in Ukr.)
2. Libanova, Ye. M., Gladun, O. M. & Lisogor, L. S. 2013, *Vimiryuvannya yakosti zhittya v Ukraini. Analitichna dopovid* [Measuring quality of life in Ukraine. Analytical report], Kyiv, 50 p. (in Ukr.)
3. Boyko, T. Y., Tolstikova, T. M., Sorochan, O. V., Mosalova, N. M., Stoykevich, M. V. & Shevtsova, Z. I. 2001, [Changes in the quality of life in patients with chronic inflammatory bowel diseases under the influence of treatment], *Suchasna gastroyenterologiya* [Modern Gastroenterology], No 5(61), p. 36–40. (in Ukr.)
4. Ivasik, N. 2015, [Justification developing quality of life questionnaire for school-age children with acute broncho-pulmonary diseases], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 4(48), p. 46–49. (in Ukr.)
5. Klimenko, V. A. & Karpushenko, Yu. V. 2014, [The quality of life of children with allergies], *Astma ta alergiya* [Asthma and allergy]. No 3, p. 26–29. (in Ukr.)
6. Krivenko, V. I., Grinenko, T. Yu. & Kachan, I. S. 2011, [Quality of life as an effective objective criterion for diagnosis and treatment in modern medicine], *Zaporozhskiy meditsinskiy zhurnal* [Zaporozhye Medical Journal], T. 13, No 6, p. 1–96. (in Ukr.)
7. Nechitaylo, Yu. M. 2013, [Methodological basis of assessment of quality of life related to health in children], *Mezhdunarodnyy zhurnal pediatrii, akusherstva i ginekologii* [The International Journal of Pediatrics, Obstetrics and Gynaecology], T. 3, No 2, p. 3–13. (in Ukr.)
8. Kaminskiy, V. Ya. Pat. G06Q 50/00A61B 10/00. *Sposib viznachennya rivnya yakosti zhittya khvorikh na khronichniy nevirazkoviy kolit*, № 62530 UA : Zayavl. 07.04.2003; opubl. 15.12.2003 [Pat. G06Q 50 / 00A61B 10/00. Method of determining the quality of life of patients with chronic non-ulcer colitis, № 62530 UA: appl. 07.04.2003; publ. 15.12.2003]. (in Ukr.)
9. Pristupa, Ye. & Kurish, N. 2010, [Quality of life: categories, components and their measurement], *Fizichna aktivnist, zdorov'ya i sport* [Physical activity, health and sport], No 2, pp. 54–63. (in Ukr.)
10. Drossman, D. A., Li, Z., Leserman, J. & Patrick, D. L. 1992, Ulcerative colitis and Crohn's disease health status scales for research and clinical practice. *J. Clin. Gastroenterol*, No 15, R. 104–112.
11. Farquhar, M. 1994, Quality of life in older people. *Advances in Medical Sociology*, No 5, p. 139–158.

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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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The characteristics of the medicinal plants used in the herbal medicine of type 2 diabetes

Sergei Kalmykov
Julia Kalmykova

Kharkiv State Academy of Physical Culture,
Kharkov, Ukraine

Purpose: *consider the rational combination of the herbs in fytocomplexes applied in the rehabilitation of the type 2 diabetes.*

Material & Methods: *analysis of scientific and methodical literature on the use of herbal medicine in the complex rehabilitation for patients with diabetes.*

Results: *modern views on the necessity and the features of the use of herbal remedies especially in the diabetes type 2 are presented; the main medicinal plants used in this pathology are described. The main attention is paid to the peculiarities of forming up an integrated cure that contains a mixture of several kinds of medicinal plants. The classification of herbal drugs used for diabetes is given.*

Conclusions: *advantages of application of collection of medicinal plants over synthetic drugs in the complex treatment of the type 2 diabetes are proved.*

Keywords: *phytotherapy, diabetes mellitus type 2, medicinal plants.*

Introduction

Diabetes mellitus is one of the most widespread serious chronic illnesses. According to the International Diabetic Federation (IDF), today there are 382 million sick on DM in the world, and according to forecasts the total of sick on DM will reach 592 million to 2030. The situation is complicated also by the fact that not diagnosed cases of DM by 3–4 times exceed the number of the revealed patients on 1,1 million of the registered cases of DM of the 2nd type in Ukraine (according to the Center of medical statistics of MHC of Ukraine at the beginning of 2015). So, the prompt growth of incidence served as the reason of adoption of the Resolution of the O.U.N. 61/225 from 12/20/2006 about diabetes with the recommendation to all states «to develop national strategies of prevention and treatment of diabetes» [3; 8].

According to Institute of endocrinology and metabolism of NAMS of Ukraine, the prevalence of diabetes in Ukraine has increased by one and a half times over the last ten years, and 1 198,5 thousand patients are registered in the country as of January 1, 2015 that makes about 2,9% of all population (the data are provided without statistics of the Autonomous Republic of Crimea and occupied territories of the Donetsk and Lugansk regions). The number of patients with diabetes will increase at the expense of DM of the second type in the next years. 90–95% of all pathology makes in the structure of diabetes of DM of the 2nd type [8].

The most dangerous consequences of global epidemic of DM are its system vascular complications – nephropathy, retinopathy, defeat of the main vessels of heart, brain, peripheral vessels of the lower extremities. These complications are the main reason for invalidization and mortality of sick on DM [1; 15].

Communication of the research with scientific programs, plans, subjects

The work was performed on the priority direction, according to the law of Ukraine «About the priority directions of the development of science and equipment» on the number 3.5. «Sciences about lives, the newest technologies of prevention and treatment of the most widespread diseases» within the priority thematic direction 3.5.29. «Creation of standards and technology of introduction of a healthy lifestyle, technology of improvement of quality and safety of food».

The purpose of the research

To consider a rational combination of herbs in phyto-collecting which are applied in rehabilitation of diabetes of the 2nd type.

Research tasks.

1. To analyze modern special literature on a problem of phytotherapy of diabetes of the 2nd type.

2. To develop optimum combinations of herbs taking into account features of a course, clinical displays of diabetes and pharmacotherapeutic characteristics of vegetable means.

Material and Methods of the research

The analysis of scientific and scientific-methodical literature (theses, abstracts of theses, monographs, educational and methodical literature, articles in collections of scientific works and periodicals, and also theoretical provisions and practical recommendations which exist in medical, pedagogical and interdisciplinary sciences) concerning the application of phy-

totherapy in complex rehabilitation at diabetes.

Results of the research and their discussion

The major purposes in treatment of diabetes are: elimination of symptoms, optimum metabolic control, prevention of sharp and chronic complications, achievement of perhaps more quality life and availability to patients. Pathogenetically there are 3 options of treatment of diabetes now:

– substitutive therapy by insulin;

– substitutive therapy by oral anti-diabetic preparations;

– by preparations reducing activity of anti-insular extra-pancreatic factors [8].

However even adequate application of sugar-lowering preparations not always prevents the development of complications. Modern sugar-lowering therapy doesn't allow normalizing all types of a metabolism at sick on DM. Secondary resistance to the pelleted preparations is the consequence of decrease in mass of β-cells and/or increases in insulin-resistance. Besides, side effects of insulinotherapy at diabetes of the 2nd type are: body weight increase, frequent feeling of hunger, delay of liquid and sodium, risk of hypoglycemia, development in a number of sick allergic reactions that significantly limits the prescription of sugar-lowering preparations for sick on DM and prove the need of application of other types of therapy. The stated aims are achieved by means of the basic principles of treatment having paramount value for patients with diabetes of both types: diabetic diet, the dosed physical activity, phytotherapy, training and self-checking.

The advantage of the phytotherapeutic method of treatment of diabetes is multiple-factor positive influence on an organism. The centuries-old experience of application of phytopreparations showed their efficiency, generally for treatment of diabetes of the 2nd type. Phytotherapy can independently be applied at this type of diabetes or in combination with the pelleted preparations that allows reducing their dose [2].

Now there are rather numerous data on possibility of use at diabetes of a number of vegetable preparations, first of all, a little or almost nontoxic, softly affected. These data are based on researches of some phytopreparations, clinical supervision, the given traditional medicine and traditional medical systems (Tibetan, Central Asian and others). For example, ginseng, asparagus, cornel, astragalus are used in China for treatment of diabetes; such plants as galega, Maydis stigmatum, haricot, dandelion, etc. for treatment of easy forms of diabetes are applied in Bulgaria; in India – preparations from onions, garlic, fern, eucalyptus and other plants of national flora [4; 5].

Many of these herbs are recognized as scientific medicine as the means which are exerting positive impact on a carbohydrate exchange recently. Anti-diabetic action of plants depends on the presence of insulin-similar connections at them, derivative guanidin, arginine, levuleza. The advantage of these substances at insulin is that they are substances of the non-protein nature, aren't digested in the digestive channel and can work at intake [6].

The basic principles of phytotherapy are:

– individual selection of phyto-collecting taking into account the accompanying pathology;

– periodic substitute of one collecting by another (each 1–2 months);

– constant control of action of collecting, and their substitute, without waiting for complete cessation of medical action.

It should be noted among advantages of application of phytotherapy in rehabilitation of patients with diabetes:

– lack of sharp fluctuations of level of glucose in blood;

– lack of other by-effects from internals;

– positive influence on a carbohydrate exchange [9; 11].

Herbs have a number of advantages before synthetic preparations: they are low-toxic, have a soft effect, can be applied long without essential side effects, first of all allergic reactions, they are well combined with medicinal substances, strengthening their therapeutic effect. Herbs influence the carbohydrate exchange more physiologically, than synthetic anti-diabetic preparations. The stimulation of regeneration of β-cells of the insular device is noted at the application of some plants with insulin-similar action. The vegetable preparations, which are used at diabetes, can be applied in the form of mono- and complex preparations [13].

The following plants are used as the medicines which are applied for prevention of diabetes and treatment of its complications: Aralia tourn, Aralia mandshunca, Acorus calamus, Cydonia oblonga, Barberis vulgaris, Sambucus nigra, blackberry, Rhodiola rosea, Taraxacum officinalis, Galega officinalis, Inula helenim, Linum usitatissimum, Schisandra chinensis, Pulmonaria officinalis, Panax, Graphalium uliginosum, Helianthus tuberosus, Equisetum arvense, Cichorium intybus, Rosa majalis, Centruium erythraea, cultivated cabbage, Eleutherococcus, Callisia fragrans [10; 12; 14].

The good sugar-lowering effect at diabetes is rendered also: leaves of Betula Pendula, Vaccinium vitis-idaea, Ribes nigrum, Fragaria vesca, Mentha piperita, Orthosiphon aristatus, Urtica dioica, Circassian walnut, Plantago major; Veronica officinalis, Leonurus quinquelobatus, Thymus, Hypericum perforatum; Arctium tomentosum Mill, Leguminosae, Asparagus officinalis; Crataegus sanquinea, Rose majalis; Maydis stigmatum; Syringa vulgaris; flowers of Sambucus nigra; Linum usitatissimum; Phaseolus vulgaris [15; 16].

It is necessary to include the components possessing certain properties in the structure by drawing up the complex means containing mix of several types of medicinal plant crude drug (collecting of medicinal), for its use as hypoglycemic means:

– contributing *normalization of digestion of glucose* – leaves of fruits of Phaseolus vulgaris, sprouts (leaves) of Vaccinium myrtillus. These crude drug contain substances of group of guanidoizoamilen which promote a spontaneous transformation of glucose into fructose due to the creation in an organism of alkalescent environment and mannoze which assimilation doesn't require insulin. Besides, they, like biguanide, protect insulin from destruction of peptidase, improve glucose trans-

port in cells, suppress gluconeogenesis, and stimulate synthesis of proteins and fats;

– Eleutherococcus senticosus which is capable to strengthen physiological effect of insulin also is used for *normalization of digestion of glucose*. It makes active one of key enzymes of a metabolism of glucose – hexakinase which is necessary for glucose phosphorylation then glucose can be acquired by cells. Therefore application of preparations of Eleutherococcus in complex therapy of diabetes is justified pathogenetically;

– the plants containing chrome, for example, Phaseolus vulgaris also should be included in complex therapy of diabetes. Chrome is one of the most important factors of maintenance in an organism of normal tolerance to glucose and makes active glucose transport in cells. One more useful property of chrome – is to reduce thirst for sweet products;

– the components promoting *strengthening of regeneration of β-cells of islets of Langerhans* – sprouts of Vaccinium myrtillus, leaves of fetus of Phaseolus vulgaris. Active forms of oxygen cause violations in the structure of DNA of β-cells, and it in turn is the reason of decrease in synthesis of protein, including pro-insulin, and the subsequent death of β-cells. The antioxidants which are contained in vegetable crude drug possess protective properties in relation to β-cells of pancreas which is realized by the decrease in free radical oxidation;

– the components with *adaptogenny properties* restoring hormonal balance and normalizing metabolism – rhizomes and roots of Eleutherococcus;

– the components possessing *diuretic action*, glucose, necessary for removal of surplus, from an organism – Equisetum arvense, Hypericum, Matricāria chamomīlla, hips of Rosa;

– the components *improving work of all links of the immune system* of an organism – Matricāria chamomīlla, Hypericum, rhizomes and roots of Eleutherococcus, hips of Rosa;

– the components *preventing complications from organs of vision* at *diabetes* – fetus of Vaccinium myrtillus. Extractum of Vaccinium myrtillus have moderate vasodilating effect and improve microcirculation, especially concerning retina vessels which are surprised at diabetes. They promote restoration of photosensitivity of cells of retina. In addition preparations of bilberry are capable to block enzyme to aldose reductase which provides transformation of glucose in sorbitol, thereby slowing down the development of diabetic cataract;

– the components *interfering development of pathology of the cardiovascular system accompanying diabetes* – the chromcontaining plants (leaves of fruits of Phaseolus vulgaris). They possess hypolipidemic and hypocholesterolic action, interfere with the development of atherosclerosis and cardiovascular diseases, prevent increase and reduce the increased arterial pressure. Anti-sclerous action is noted also at hips of Rose [6; 7; 16; 18].

It is possible to recommend medicinal collecting «Arphasetin-E» which contains all listed above components as hypoglycemic means for the prevention and treatment of diabetes of easy and average weight. Collecting «Arphasetin» provides the complex impact on normalization of exchange processes at diabetes, reduces sugar level, improves functions of a liver, intestines, has the anti-inflammatory effect all-strengthening, promotes the increase of processes of regeneration of an endocrine parenchyma of a pancreas that leads to the improvement of its activity in general [7].

The analysis of literature showed that the plants possessing hypoglycemic activity are more than 150 types. These plants are on botanical signs representatives more than 50 kinds, and the active agents emitted from these plants belong to various classes of chemical compounds [17; 18].

The professor V. g. Pashinsky (1991) divided into several groups on the basis the pharmacotherapeutic characteristics, phytochemical composition all vegetable means applied in treatment of diabetes:

I. *The plants of the all-strengthening action activating the highest regulatory neuro-humoral systems, adaptogens:* liqueur of Schisandra chinensis, Oplopanax, Aralia tourn, Panax; extracts of Leuzea carthamoides, Rhodiola rosea, Eleutherococcus senticosus.

II. *The plants containing insulin-contained and other hormone-similar substances:* Urtнca diyica, roots of Arctium lбppa, roots and Taraxacum officinale, Paeonia anomala, Trifolium.

III. *Plants – metabolism regulators:* Arctostaphylos, Polygonum aviculare, Tilia, Plantбgo juice, Hypericum, Elymus repens, Gnaphalium uliginosum, Vaccinium myrtillus, Lнnum usitatнssimum.

IV. *The plants containing digestible sugar at the expense of which the general need for insulin decreases:* Fragбria, chicory, Cornelian cherries , wild Rubus idbeus, pear, pomegranate, grapes (juice of unripe berries).

V. *Plants, vitamin-rich, the organic acids and other useful substances increasing protective forces of an organism:* Rose, cowberry, mountain ash, and beer yeast cleared dry.

VI. *Garden cultures as sources of vitamins, digestible organic acids therefore they possess ability to regulate exchange processes:* peas, haricot, beet red, carrots sowing campaign, pumpkin, salad garden, girasol, potatoes, sowing campaign onions, garlic, wild garlic, cabbage, celery, spinach, oats, barley [13].

Thus, taking into account features of course, clinical displays of diabetes and pharmacotherapeutic characteristics of vegetable means, the following phyto-collecting is recommended:

- Leaves of Rubus caesius – 20 g, leaves of Ribes nigrum – 20 g, leaves of Mentha piperita – 20 g, leaves of Arctostбphylos uva-ursi – 20 g, leaves of Vaccinium myrtillus – 20 g. One tablespoon of mix is filled in with a glass of boiled water and insisted 30 min. Accept 1/2 glasses 3 times a day.

- Roots of Oplopanax – 10 g, Equisetum arvense – 10 g, Rosa majalis – 10 g, Bidens tripartita – 10 g, roots of Inula helenium – 10 g, leaves of Vaccinium myrtillus – 20 g, Hypericum perforatum – 10 g, Matricaria chamomilla – 10 g, Mentha piperita – 10 g. One tablespoon of mix is filled in with a glass of

boiled water and insisted 30 min. Accept 1/3 glasses to food 3 times a day.

- Walnut leaves – 20 g, leaves of Vaccinium myrtillus – 20 g, leaves of Phaseolus – 20 g, roots of Arctium – 20 g, roots or flowers of Sambucus – 20 g. Mix is filled in with 2 glasses of boiled water; to insist 5 hours, filter. Accept 1/2 glasses after food 3 times a day.

- leaves of Vaccinium myrtillus – 25 g, leaves of Rubus caesius – 25 g, leaves of Fragaria vesca – 25 g, berries of Rosa– 25 g. One tablespoon of the crushed mix is filled in with a glass of boiled water and insisted 30 min., filtered. Accept 1/2 glasses 3 times a day to food.

- leaves of Vaccinium myrtillus – 20 g, leaves of Phaseolus – 20 g. One tablespoon of mix is filled in with a glass of boiled water, boiled 15 min. and insisted 30 min. Accept 1/2 glasses 3–4 times a day to food.

- leaves of Vaccinium myrtillus – 20 g, roots of Taraxacum – 20 g, leaves of Urtнca diyica – 20 g, and Hypericum perforatum – 20 g, Equisetum arvense – 20 g. One tablespoon of the crushed mix is filled in with a glass of boiled water and insisted 30 min. Accept 1/3 glasses 3 times a day before food.

- Fetus of Juniperus – 25 g, Linum seeds – 25 g, leaves of Vaccinium myrtillus – 25 g, leaves of Vaccinium vitis-idaea – 25 g. All mix is crushed in the Mixer. One teaspoon of the crushed mix is filled in with boiled water and boiled at the closed cover of 5 min. Insist 30 min., filter. Accept 1/3 glasses 3 times a day before food.

Thus, it should be noted the validity of application of phytotherapy in rehabilitation of patients with diabetes of the 2nd type of easy and moderate severity in a complex with dietotherapy and drug treatment. Phytotherapy isn't applied at a heavy course of DM of the 2nd type [5; 8].

Conclusions

1. The analysis of literature showed that plants which possess hypoglycemic activity are more than 150 types. These plants are on botanical signs representatives more than 50 kinds, and the active agents emitted from these plants belong to the different classes of chemical compounds (glycosides, saponin, alkaloids: etc.) which have a therapeutic effect at diabetes.

2. Herbs have a number of advantages at synthetic preparations in treatment of diabetes: they are low-toxic, have a soft effect, can to be applied long without essential side effects, first of all allergic reactions, they are well combined with medicinal substances, strengthening their therapeutic effect; synthetic anti-diabetic preparations influence a carbohydrate exchange more physiologically, than; stimulation of regeneration of β-cells of the insular device is noted at application of some plants with insulin-similar action.

3. It is recommended to apply combinations of herbs taking into account features of course; clinical displays of diabetes and pharmacotherapeutic characteristics of plant means in phytotherapy of diabetes of the 2nd type.
Studying of activity of application of sugar-lowering mono - and complex plant preparations at diabetes according to the basic principles of chromotherapy, taking into account the time of natural rise in level of glucose in blood that will allow to reduce a dosage of sugar-lowering preparations and, thereby, to reduce risk of emergence of complications of treatment is **the prospect of further researches** in this direction.

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References

1. Aleksandrov, A. A. 2010, [Cardiovascular complications and modern algorithm hypoglycemic therapy], *Russkiy meditsinskiy zhurnal* [Russian Medical Journal], No 14, pp. 879–880. (in Russ.)
2. Voloshin, O. I. & Glubochenko, O. V. 2010, [Modern aspects of diabetes herbal medicine], *Mezhdunarodnyy endokrinologicheskiy zhurnal* [International Journal of Endocrinology], No 5(29), pp. 47–55. (in Ukr.)
3. Tronko, N. D., Sokolova, L. K., Vlasenko, M. V. & Kostyukevich, A. A. 2015, [Achieving the goals of the treatment of patients with diabetes in Ukraine. The results of the International study on the practice of conducting diabetes (IDMPS)] *Endokrinologiya* [Endocrinology],T. 20, No 4, pp. 658–668. (in Russ.)
4. Ivanov, V. A. 1994, *Mudrost travolecheniya: iz opyta primeneniya lekarstvennykh rasteniy v narodnoy meditsine* [Wisdom of herbs: from the experience of the use of medicinal plants in folk medicine]. SPb.: Bratstvo, 398 p. (in Russ.)
5. Kalmikov, S. A. 2010, *Fitoterapiya* [Phytotherapy], Kharkiv: KhDAFK, 205 p. (in Ukr.)
6. Kit, S. M. & Turchin, I. S. 1986, *Lekarstvennyye rasteniya v endokrinologii* [Herbs in endocrinology], Kyiv: Zdorov'ya, pp. 19–31. (in Russ.)
7. Kovalov, V. M., Pavliy, O. I. & Isakova, T. I. *Farmakognoziya z osnovami biokhimii roslin* [Pharmacognosy basic biochemistry of plants: [textbook for students pha. teach. institutions and pha. faculties of higher educational institutions III-IV level], Kharkiv: Vidavnitstvo NFaU, MTK-kniga, 2004, 704 p. (in Ukr.)
8. Kondratskaya, I. N. 2015, [Type 2 diabetes mellitus. The criteria for diagnosis. principles of primary antihyperglycemic therapy], *Problemi yendokrinnoi patologii* [Problems endocrine disorders], No 2, pp. 119–122. (in Russ.)
9. Savchenko, V. N., Yabluchanskiy, N. I., Khvorostinka, V. N. & Sokol, K. M. 2004, *Lekarstvennyye rasteniya i fitoterapiya* [Medicinal plants and herbal medicine], Kharkov: Grif, 272 p. (in Russ.)
10. Mamchur, F. I. 1984, *Dovidnik z fitoterapii* [Handbook of herbal], Kyiv: Zdorov'ya, 264 p. (in Ukr.)
11. Matkovskaya A. N. & Trumpe, T. Ye. 1991, [Phytotherapy in treatment of diabetes], *Problemy endokrinologii* [Problems of Endocrinology], T. 37, No 4, pp. 35–38. (in Russ.)
12. Nosov, A. M. 2005, *Lekarstvennyye rasteniya ofitsialnoy i narodnoy meditsiny* [Herbs official and traditional medicine], Moscow: Eksmo, 800 p. (in Russ.)
13. Pashinskiy, V. g. 1991, *Lekarstvennyye rasteniya v terapii sakharnogo diabeta* [Medicinal plants in the treatment of diabetes], Odessa: Variant, 30 p. (in Russ.)
14. Reshetnyak, V. V. & Tsigura, I. V. 1993, *Travnik* [Herbalist], Kharkov: Prapor, 463 p. (in Russ.)

15. Zhestovskiy, S. S., Petrova, L. V. & Ametov, A. S. 2007, [The course state of the problems of prevention and treatment of diabetes], *Terapevticheskiy arkhiv* [Handbook of Medicinal Plants], T. 79, No 10, pp. 46–50. (in Russ.)
16. Sokolov, S. Ya. & Zamotayev, I. p. 1985, *Spravochnik po lekarstvennym rasteniyam* [Handbook of Medicinal Plants], Moscow: Meditsina, pp. 78–99. (in Russ.)
17. Sokolov, S. Ya. 2000, *Fitoterapiya i farmakologiya* [Herbal medicine and pharmacology], Moscow: Med. inform. agentstvo, 976 p. (in Russ.)
18. Chekman, I. S. 2003, *Klinichna fitoterapiya* [Clinical Phytotherapy], Kyiv: Vid. ASK, 552 p. (in Ukr.)

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Sergei Kalmykov: *PhD (Medicine); Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0002-6837-2826
E-mail: srgkalmykov@gmail.com

Julia Kalmykova: *PhD (Physical Education and Sport); Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0002-6227-8046
E-mail: yamamaha13@gmail.com

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Planning of competitive activity of highly skilled athletes-sprinters during the annual macrocycle

Svetlana Karaulova

Zaporizhzhya National University, Zaporizhzhya, Ukraine

Purpose: *substantiate the planning system of competitive activity of highly skilled athletes, specializing in the sprint, the annual macrocycle.*

Material & Methods: *in the study to take part six of athletes specializing in the sprint at the age of 19-23 years, and which have sports rank master of Sport and international master of sports.*

Results: *defined system of planning competitive activities of athletes which takes account of the optimal number of competitions of various species and their distribution within a year of the macrocycle.*

Conclusions: *shown, that the optimal amount of competition contributes to the willingness of athletes to achieve good results at major competitions an annual macrocycle.*

Keywords: *competition period, the training process, microcycle, competitions, sprint.*

Introduction

The system of sports competitions is the system-created and integrated factor which most significantly influences all parts of training of athletes in the Olympic sport, they define the whole system of the organization, technique of training of athletes, for the productive competitive activity, and in particular in track and field athletics [1]. At present most of experts consider competitions not only as the subject of the aimed activity of an athlete, but also as a powerful factor of the improvement of sports skill. Especially visually it is shown in the course of training of high-class athletes, at the stage of the maximum realization of individual opportunities, where the increase in part of special exercises including competitive, in total amount of training means [2] became the important methodical principle. At the same time experts note that competitions have to join in the system of preparation only in that volume in which they will promote ensuring preparedness of an athlete for the highest achievements in the main starts of year and four years [7].

The analysis of modern scientifically-methodical literature allowed to come to conclusion that it is necessary to consider unity of training and competitive activity of athletes in the system of preparation which final result is dynamics of training and competitive results during an annual macrocycle [5; 6].

Modern training of the strongest runners of the world prevails examples of saturated competitive loadings. Now track and field athletics competitions in the world are held annually that is one of the prerequisites of professionalizing of track and field athletics [3; 4]. Experts note ability of high-class athletes to compete constantly throughout the whole annual cycle, actively using competitions, different in the importance, both in short, and in long series of starts.

The improvement of sports results in running types of track and field athletics of the leading athletes of Ukraine, demands planning of the optimum system of competitions during an annual cycle, therefore, consideration of question concerning planning of competitive training of highly skilled sportswomen is relevant.

The work performed within the state budgetary subject «Development of modern approaches of improvement of system of the renewed actions among athletes» No. of the state registration – 1/15, IP 0115U000819 for 2015–2016.

Purpose of the research

To prove the system of planning of competitive activity of highly skilled sportswomen who specialize in sprint, in an annual macrocycle.

Research tasks:

1. To analyze the creation of an annual macrocycle of sportswomen who specialize in sprint.

2. To define the optimum number of starts of sportswomen of high qualification during an annual cycle.

3. To prove the system of planning of competitions of highly skilled sportswomen in an annual macrocycle.

Material and Methods of the research

We conducted examinations of 6 sportswomen, who specialize in sprint, of 19–23 years old, and who have the sports rank of MS and MSIC within the experiment. Three sportswomen were the part of the national team of Ukraine on track and field athletics.

For receiving the experimental data we conducted the survey of the leading coaches, the theoretical analysis of diaries of sportswomen, the analysis of result cards are made [8; 9], the

data were processed by methods of mathematical statistics.

Results of the research and their discussion

The structure of an annual cycle of training of sportswomen was in details considered. The analysis of structural elements allowed to define that the pre-cycle system of creation of an annual macrocycle was the basis for model of planning of training process of highly skilled sportswomen in sprint. So, two rather independent macrocycle were allocated in the structure of an annual cycle of preparation: the first-autumn-winter macrocycle and the second- spring- summer macrocycle.

The autumn – winter preparatory period, the winter – competitive period, the sprng – summer preparatory period, the summer – competitive period and two transition periods were allocated respectively in the structure of each macrocycle. Sportswomen took part both in the winter-competitive period, and in the summer competitive period. Speeches of sportswomen in large international starts became the main criterion of each separate macrocycle.

The main competitions of the first macrocycle became – the winter European championship (Paris, 2011), the second – team championship of Europe (Stockholm, 2011) and the World Cup (Daegu, 2011).

Leaving the research tasks, the number of competitions was defined during the autumn – winter first macrocycle at sportswomen (tab. 1).

So, sportswoman used control competitions at the end of the autumn – winter preparatory period at distances of 60 m, 150 m and 200 m in the first autumn – winter macrocycle. It should be noted that the main task of control starts at distances of 150 m and 200 m – assessment of level of physical and functional preparedness of organism of sportswomen after large volume of training load of mainly aerobic and anaerobic orientation (with intensity 80□85% from maximum) which was executed at the all-preparatory stage of the autumn – winter preparatory period.

Control start at distance of 60 m was carried out within the precompetitive mesocycle on the specially-preparatory stage which task was determination of preparedness of sportswomen for running loading of high intensity in the winter – competitive period.

The winter competitive period consisted from two competitive mesocycles where sportswomen took part in run at distance of 60 m. The duration of the first competitive mesocycle – 5 weeks, the second competitive mesocycle – 4 weeks.

The sportswoman took part in eight competitions within the first competitive mesocycle: from them 3 – control competitions, 1 – elimination competitions (the Cup of Ukraine) and 4 – admissing (model) competitions (sportswomen took part in the international starts which enter sports calendar of the World international association of track and field athletics federations). The determination of level of high preparedness of sportswomen for performance in main competition of the winter competitive period became the main task of these starts.

Only the main competitions of the winter competitive period – the winter European championship (Paris, 2011) were planned within the second winter competitive mesocycle, where one gold and silver medals were received by the Ukrainian sportswomen.

The distribution and the number of competitions in the second spring-summer macrocycle of training of high-class sportswomen who specialize in sprint (tab. 2), were analyzed by the similar way.

The sportswoman took part in one control competition at distance of 200 m on the specially-preparatory stage within the control and preparatory mesocycle. The elimination competitions (the Cup of Ukraine) in run were planned for 200 m and relay of 4x100 m within precompetitive mesocycle.

The summer competitive period is the longest, it included at itself two competitive stages (duration of 15 weeks). The first competitive stage – the admissing (model) competitions lasting 8 weeks. The main task of this stage – improvement of the maximum high-speed opportunities, support of optimum level of special high-speed endurance, technical skill, mental conditioning, achievement of good results, in series of control starts.

The structure of the first competitive stage was made by two competitive mesocycle and precompetitive mesocycle. The

Table 1

Distribution and the number of competitions in the first autumn – winter macrocycle of high-class sportswomen who specialize in sprint

Period	Autumn-winter preparatory				Winter preparatory	
Stages	All-preparatory		Specially-preparatory		Competitive 1 (control, qualifying and admissing competitions)	Competitive 2 (main competitions)
Mesocycles	BM 1	BM 2	CPM	PCM	CM 1	CM 2
60 m				1(2)	8 (15)	1(3)*
150 m		1				
200 m		1				

Note. *Here and further: BM – basic mesocycle, CPM – control and preparatory mesocycle, PCM – precompetitive mesocycle, CM – competitive mesocycle; * – the number of starts in competitions, to take into consideration runnings, semi-finals, finals is given in brackets.*

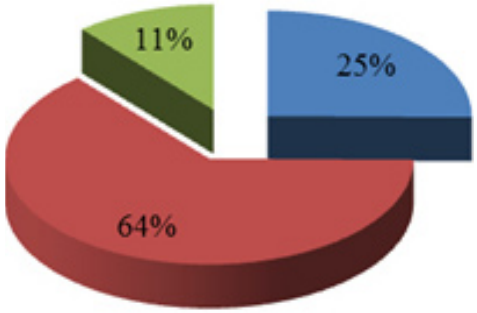
Table 2

Distribution and number of competitions in the second spring-summer macrocycle of high-class sportswomen who specialize in sprint

Period	Spring-summer preparatory				Summer competitive				
Stages	All-preparatory		Specially-preparatory		Competitive (control, qualifying and admissing competitions)			Competitive (main competitions)	
Mesocycles	BM 1	BM 2	CPM	PCM	CM 1	PCM	CM 2	PCM	CM 3
100 m					5(6)		1(2)		4(5)*
200 m			1	1(2)	3		1(2)		2
4x100 m				1	2		1		1(2)

sportswoman took part in 10 starts, the team championship of Europe became basic of which (Stockholm, 2011) in the first competitive mesocycle of the summer competitive period. Also sportswomen spoke at the international competitions "Diamond League" at distance of 200 m which entered sports calendar of the World international association of track and field athletics federations. Competitions of the second competitive mesocycle were planned in three weeks prior to the main start of the whole annual macrocycle – the World Cup therefore they had nature of model competitions. The sportswomen took part in three competitions in run on 100 m, 200 m, and relay of 4x100 m.

The structure of the second competitive stage (duration of 7 weeks) was made by precompetitive and competitive mesocycle in which sportswomen started in 7 competitions. Within this stage the main competitions of the whole annual cycle – the World Cup (Daegu, 2011) were planned in which sportswomen won bronze awards in relay of 4x100 m.



Pic. 1. Distribution of types of competitions which were planned during an annual macrocycle at sportswomen of high qualification

It is necessary to define that the system of planning of competitions has some features of competitive preparation during an annual macrocycle on the basis of the carried-out analysis of planning of competitive activity of high-class sportswomen who specialize in sprint (tab. 3).

Uneven distribution of competitions during an annual macrocycle was noted on the basis of experimental data which are presented in table 3. The sportswomen took part in 35 competitions of different level. So, the gradual increase in number of starts from May till September, the decrease in October, the increase and stabilization in the competitive periods were noted, that demonstrates wavy distribution of competitive loading for year.

The second feature consists in different ratio of distribution of types of competitions for year (pic. 1).

So, 64% from the whole number of competitions for an annual macrocycle were taken away on qualifying, admissing (model) competitions, 25% for control competitions and 11% were taken away on the main competitions of an annual macrocycle.

Conclusions

Results of the research demonstrate that the two-cycle system of preparation, where the winter European championship, the team championship of Europe and the World Cup, were the main competitions of annual cycle, was used during the creation of annual macrocycle of training of sportswomen of national team of Ukraine on track and field athletics. The optimum number of competitions were planned according to the calendar of national and international competitions and regularities of acquisition of sportswear. Separate competitions

Table 3

Distribution and number of competitions in an annual cycle of training of high-class sportswomen who specialize in sprint

Distance	Autumn-winter preparatory period	Winter preparatory period	Spring-summer preparatory period	Summer preparatory period	Total
60 m	1(2)*	9(18)			10(20)
100 m				10(13)	10(13)
150 m	1				1
200 m	1		2(3)	6(7)	9(11)
4x100 m			1	4(5)	5(6)
Total competitions	3(4)	9(18)	3(4)	20(25)	35(51)

are obliged to solve the concrete tasks of the current stage of preparation. The greatest number of starts were taken away on elimination and model competitions as effective remedies of the integrated training of sportswomen for the main competitions of annual macrocycle – the World Cup. In general planning of the competitive activity is the integral component of the training process and serves one of the powerful factors for the achievement of high sports results.

Prospects of the subsequent researches consist in the subsequent studying of question concerning features of planning of the competitive activity of highly skilled sportswomen who specialize in sprint, in the Olympic annual macrocycle.

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References

1. Balakhnichev, A. V. 2004, *Sistema sorevnovaniy v mnogoletney podgotovke begunov-sprinterov*: dis. ... kand. ped. nauk : 13.00.04 [System of competitions in the preparation of multi-year sprinter : PhD diss.], Moscow, 164 p. (in Russ.)
2. Vrublevskiy Ye. p. 2011, [Theoretical and methodological grounds programming macrocycle training athletes specializing in speed-ylovyh kinds of athletics], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 4(27), pp. 74–77. (in Ukr.)
3. Kozlova Ye. K. 2008, [Competition in terms of professionalization of athletics], *Pedagogika, psikhologiya i mediko-biologicheskiye problemy fizicheskogo vospitaniya i sporta* [Pedagogy, Psychology, and medico-biological problems of physical education and sport], No 12, pp. 1–11. (in Russ.)
4. Mirzoyev, O. M., Bodrova, N. D., Bodrov, I. V. 2014, [Athletics. Modern tendentsiп bihu of 100 m], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 1(39), pp. 66–74. (in Ukr.)
5. Ozolin, E. S. 2010, *Sprinterskiy beg* [Sprint Run], Moscow: Chelovek, 176 pp. (in Russ.)
6. Platonov, V. N. 2004, *Sistema podgotovki sportsmenov v olimpiyskom sporte. Obshchaya teoriya i yeye prakticheskiye prilozheniya* [The system of training athletes in Olympic sports. The general theory and its practical applications], Kyiv: Olimp. l-ra, 807 p. (in Russ.)
7. Yushko, B. N. [Using the basic adaptation of laws in the training process of skilled runners on short distances], *Materialy IKh Mezhdunarodnogo kongressa «Olimpiyskiy sport i sport dlya vsekh»* [Materials IX International Congress "Olympic Sport and Sport for All"], Kiyev: Olimpiyskaya lit-ra, 2005, 449 p. (in Russ.)
8. *Ofitsialnyy sayt Mezhdunarodnoy Federatsii legkoy atletiki* [The official website of the International Athletics Federation], Available at: http://www.iaaf.org/results/. (in Russ.)
9. *Ofitsiyniy sayt Federatsii legkoi atletiki Ukraini* [Official site of the Athletics Federation of Ukraine], Available at: http://uaf.org.ua/. (in Ukr.)

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Svetlana Karaulova: *PhD (Physical Education and Sport), Associate Professor; Zaporizhzhya National University: Zhukovsky str. 66, Zaporizhzhya, 69000, Ukraine*.
ORCID.ORG/0000-0003-1582-2368
E-mail: karaulova@mail.ru

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Influence author methodic teaching swimming on coordination quality of children 6–10 years old with hearing disabilities

Julia Karbunarova

Lviv University of Physical Culture, Lviv, Ukraine

Purpose: *to determine the influence of the author's methodic of teaching swimming on coordination skills of children with hearing disability of primary school age.*

Material & Methods: *in 20 deaf children's who are studies in special school of Lviv region we make experimental and control groups, and defined the level of static balance by methodic of Romberg and Bondarevskyy, preserve the active balance while walking on the increase by test «Walk on gymnastic beam» and comprehensive display of coordination skills we used test «Three somersaults forward». The survey was conducted before and after the implementation of our methods of teaching swimming.*

Results: *revealed low level of capacity to preserve static balance and ability to preserve the active balance while walking on the increase at the beginning of research.*

Conclusion: *the defined positive impact of the methodic of teaching swimming in deaf children of experimental group according to results of static balance.*

Keywords: *deaf, coordination, primary school age, swimming*.

Introduction

The younger school age is the period of formation and development of intellectual, mental and physical properties of organism of a child. For this reason this period is important for the creation of motive compensations and correction of the broken functions of organism which arose in consequence of a defect. The analysis of references showed that pathological processes which arise in the acoustical system change the function of vestibular mechanism, which in turn, influences the formation of the motive sphere of children with defects of hearing, and, as a result, such children are characterized by low indicators of vestibular firmness (that is brightly shown in lag in the development of coordination qualities) [1; 2; 8; 9; 11]. Besides, it is established by the numerical pedagogical researches and supervision that, except the main defect, children with defects of hearing, often have available and associated diseases [1; 3; 9].

Classes by systematic physical activity promote the harmonious development and creation of compensations in children with disability [3; 5; 7; 11; 12]. The problem of motive correction of coordination qualities of deaf children of younger school age was considered on examples of use of game sports, outdoor games, kinds of gymnastics (H. E. Gurinovich (2007), S. M. Fedorchak, L. K. Kozhevnikova and M. Yu. Korzhevsky (2009), A. A. Ivakhnenko (2011) [6]. Swimming as improving means, which action is connected with specific properties of the water environment, is the powerful component of physical education of children including children with violation of the acoustic analyzer as promotes the development of all physical abilities, and also develops ability of organism to opposition to adverse factors of environment [10]. The efficiency of use of swimming in work with children with disability is proved by experts on physical education. So, D. F. Mosunov, A. V. Kubasova, L. Ya. Kovalyova (2004) lead up the efficiency of swimming in work with children with deviations of mental and physical health. The positive influence on cardiovascular, respiratory systems, musculoskeletal system and mental processes of deafs, are lead up researches and supervisions of D. F. Savkin (2010), O. V. Revyakina (2012), O. M. Fetisov (2013) and others [5; 6] in work with children with defects of hearing signal, use of swimming is not allocated as means of correction of vestibular mechanism and correction of coordination abilities however.

Purpose of the research

To define influence of the author's technique of study of swimming on coordination qualities of children of younger school age with defects of hearing.

Material and Methods of the research

The researches were conducted on the basis of specialized educational institutions (SEI) for children with defects of hearing of the Lviv region, in which 20 deaf children of younger school age took part. Children were divided into two groups: experimental and control, about 10 deaf pupils, in whom there were no associated diseases, from which on 2 girls and 8 boys in everyone entered each of which. Pupils who were included into the experimental group attended swimming classes twice for a week, and children of the control group two times for a week – classes on game sports (soccer, volleyball, basketball). All children couldn't to swimm for the beginning of the research. Methods: analysis, generalization, synthesis of references, medicobiological.

We did statistical processing of results of researches by means of standard package of the SPSS for Windows 13 application program, using the standard statistical methods.

Results of the research and their discussion

The analysis of scientific sources showed that pathological the processes which arise in the acoustical system change function of vestibular mechanism, than influence the formation of the motive sphere at children with defects of hearing [1; 2; 3; 7; 9 but other]. So, the specific development of the motive sphere of children of this category what is shown in lag at the development of all physical qualities, and also small motility, coherence of movements separate body elements in time and space, switching of movements, differentiation and rhythm of movements, relaxations by difficulty of preservation of static and dynamic balance that generally is the lag in development of coordination qualities, are shown in the pedagogical researches, which have got the generalization in the works of B. Sermeyev (1982), L. Shapkova (2003), S. Evseyev (2005) and others [4; 8; 9].

We used the following tests: Romberg and Bondarevsky's difficult test, tests «Warking on the gymnastic balance beam», «Three somersaults forward» for the definition of level of development of coordination qualities. The choice of these tests and functional tests is predetermined by their availability and clearness to performance for deaf children.

We carried out these tests at the beginning of the research and through 20 tainings after physical education.

We used the test «Warking the gymnastic balance beam» for the purpose of determination of ability to store active balance when walking on increase.

For the results of our research, the output data at children of EG were on average estimated at 1,9±1,1 points, and children of CG had 1,9±0,9 points ($p>0,05$).

Apparently from the table 1, 40% of children of EG and 30% of pupils of CG showed result which answers assessment in 3 points by the beginning of trainings in the pool. 10% of pupils in each of groups could not perform this task at the beginning of our research. 30% of pupils of EG and 20% of pupils of CG did not perform task up to the end, and 20% of pupils of EG and 40% of pupils of CG showed very unstable walking at which almost fell from the block and did from 2 to 4 stops at distance, such result was estimated then at 2 points.

The average point of the test «Warking on the gymnastic balance beam» improved on 1,2 points after swimming classes at pupils of EG and makes 3,1±0,73 points ($t=–6,00$; $p<0,01$) which is still characterized as unstable walking on the gymnastic balance beam and need to stop when passing distance.

Analyzing the absolute measures after swimming classes, we found out that 30% of pupils of EG performed this task with assessment 4 points after swimming classes, that is walking on the balance beam was a little not accurate, at the same time they did not carry out any stop.

Half of pupils (50%) of EG performed this task for 3 points where pupils still carried out stops during the test, 20% of pupils of EG showed result which is estimated at 2 points, however, it should be noted that these pupils could not execute this test in general by the beginning of classes swimming, at the same time falling from the balance beam having hardly begun task, and such actions were estimated at 0 points.

The repeated inspection of walking on the gymnastic balance beam at pupils of KG showed that the gain makes 0,2 points, and average value makes – 2,1±0,7 points ($t=1,96$; $p>0,05$). 50% of children of younger school age with defects of hearing which were included into the control group could perform this task with result in 2 points at the repeated inspection, in 30% of children of younger school age with defects of hearing in CG we observed unstable walking on the balance beam which is estimated at 3 points. Another 20% of children of CG for the period of completion of research could not reach the end of the balance beam. And though generally the test «Warking on the gymnastic balance beam» after 20 classes remains still difficult to performance for 20% of children of younger school age of EG and for 70% of pupils of CG, and it is difficult for these children to store active balance when walking on height, nevertheless according to this test we can see the best indicators concerning ability to store active balance during walking on height at pupils of EG, than in CG ($t = 9,00$; $p<0,01$).

We carried repeatedly out the test "Three somersaults forward" for identification of changes of rather complex manifestation of coordination abilities. If the average value at pupils of EG made 11,42±6,3 s at the beginning of our research, but was defined as the low level of complex manifestation of coordination abilities, then now, after carrying out twenty classes in the pool, pupils spend on 2,5 s less that makes 8,9±2,4 s ($t=1,92$; $p>0,05$), it is also characterized as the average level of manifestation of coordination abilities.

We observed the low level of manifestation of coordination qualities as at them average time on performance of this task made 12,4±6,7 s in the control group for the beginning of the research. The repeated indicator of the test "Three somersaults forward" is on 1,8 s smaller day off, and the average time of its performance by children of the control group makes 10,8±2,9 s now ($t=1,85$; $p>0,05$), it is also characterized as the low level of manifestation of coordination qualities. And though here we do not observe the reliable changes at children of both groups, nevertheless the tendency to improvement of complex manifestation of coordination qualities at children of EG is more expressed.

Having carried out repeatedly the difficult test of Bondarevsky after 20 swimming classes, we found out at children of EG that indicators of static balance according to this test at the examined children improved as when standing with opened and blindly a little. Actually, we obtained the data which spoke about low manifestation of coordination qualities at pupils both groups by the beginning of our research. So, the indicator of test of Bondarevsky made 4,5±2,5 s, and on left – 3,4±2,3 s at contents of the provision with open eyes on the right leg at children of EG. Blindly on the right leg, children could stay 1,4±1,7 s, and on left – 1,0±1,2 s. Besides the analysis of absolute measures by the beginning of study of swimming in this group of children showed that 40% of pupils could not perform this task blindly and 10% of pupils of EG by the beginning of study of swimming, could not perform this task with open eyes.

The standing indicator on the right leg with EG with opened

Table 1

Change of indicators of the test "Warking on gymnastic balance beam" in EG and CG (n_1=n_2=10)

Points and meanings	Before		After	
	EG	CG	EG	CG
0 – the child falls from the balance beam, having hardly begun the task	1/10	1/10	0/0	0/0
1 – The pupil falls from the balance beam, without having reached the end	3/30	2/20	0/0	2/20
2 – Very unstable walking on the balance beam. The pupil almost falls. 1 or more time can stop. On execution of the test more than 6 seconds are allotted	2/20	4/40	2/20	5/50
3 – Unstable walking on the balance beam. 1 or more time stops. To end of the test requires more than 6 seconds	4/40	3/30	5/50	3/30
4 – Something unstable walking on the balance beam. He finishes the test within 6 seconds	0/0	0/0	3/30	0/0
5 – Perfect walking on the balance beam. Balance is not necessary to check. The pupil finishes the test till 6 seconds	0/0	0/0	0/0	0/0

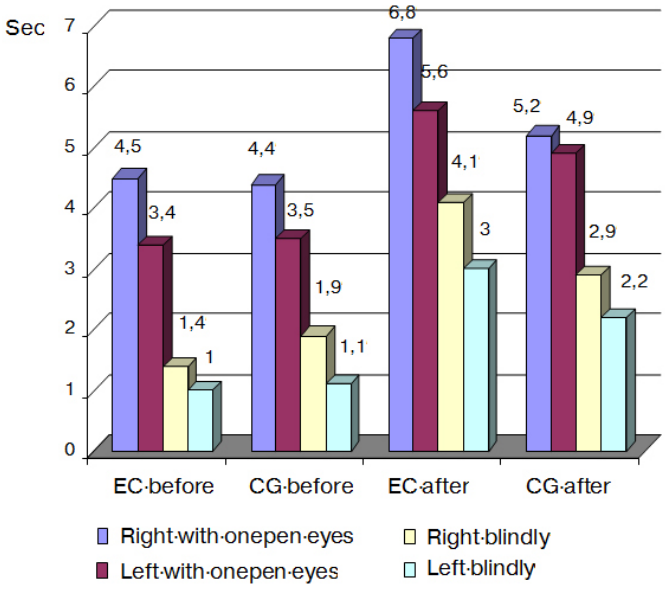
Note. *In numerator – the number of pupils, in denominator – percentage ratio.*

eyes at children improved on 2,3 s and made 6,8±2,1 s (t=–6,73; p<0,01) after study to swimming, and the indicator of maintenance of motionless position on the left leg improved also on 2,2 s that makes – 5,6±1,7 s (t=–8,82; p<0,01). Also indicators of maintenance of the provision on one leg blindly improved. The indicator on the right leg increased on 2,7 s, and now made – 4,1±1,4 s (t=–10,37; p<0,01), and the indicator at contents of the provision on the left leg increased on 2 s and made 3,0±1,05 now s (t= –9,48; p<0,01). Children of CG for the beginning of the research when performing the test of Bondarevsky held situation with open eyes on the right leg 4,4±2,3 s, and at repeated inspection this indicator improved on 0,8 s and made 5,2±1,7 s (t=–2,05; p>0,05). These could stay 3,5±1,9 s on the left leg with open eyes by the beginning of the researches, and this indicator improved on 1,7 s and made 5,2±1,7 s in 20 classes (t=–5,25; p<0,05). At children of CG we also observed improvement of results at contents of the provision on one leg blindly. So, they could stay 1,9±1,2 s on the right leg by the beginning of the research, and the result of the repeated research improved on 1 s, and makes – 2,9±1,1 s (t= –3,87; p<0,05). When standing on left, the initial indicator made 1,1±0,9 s, and the repeated one improved also – on 1, 2 s, and makes–2,1±0,7 s (t= –4,74; p<0,05). Besides 30% of pupils could not carry out the test of Bondarevsky blindly and in CG for the beginning of carrying out our research (pic. 1). That is all children began to carry out the difficult test of Bondarevsky after classes.

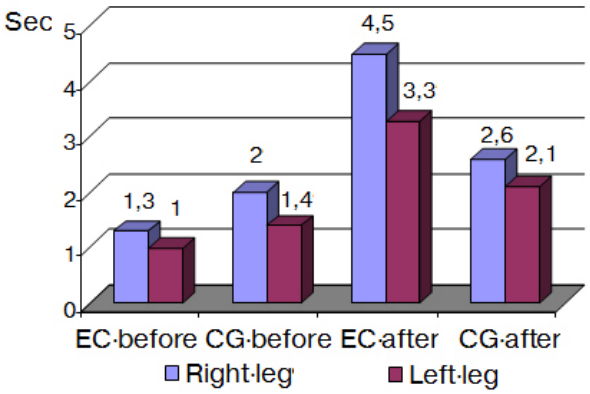
And though the data, which are obtained by us during the repeated inspection, still speak about the low manifestation of static balance at children of both groups, however we observed the bigger gain of these indicators when performing the test of Bondarevsky at children of EG, than at children of CG.

The average value of test of Romberg on the right leg made 1,3±1,25 s, and on left – 1,0±0,8 s by the beginning of swimming classes at pupils of the experimental group that is estimated at 2 points and answers assessment «unsatisfactorily» as children could not hold motionless situation over 2 seconds.

The gain at contents of the motionless provision on the right leg at pupils of EG makes 3,2 s, and average value of this test makes 4,5±1,26 s (t=–9,79; p<0,05) after carrying out swimming classes. The improvement of result makes 2,5 s, and the average value – 3,3±1,5 s (t=–8,35; p<0,05) on the left lower extremity (pic. 2).



Pic. 1. Change of indicators of the difficult test of Bondarevsky at children of younger school age with defects of hearing of both groups



Pic. 2. Change of results of the test of Romberg at children with defects of hearing of both groups

Rather the control group, the average value of the difficult test of Romberg made 2,0±1,1 s on the right leg and on left – 1,4±0,8 s by the beginning of our research. The repeated inspection of pupils of CG showed that the gain at contents of the provision on the left leg makes 0,7 s, therefore the value of the test of Romberg makes 2,1±0,7 s now (t=–3,28; p>0,05), and on the right leg – 0,6 s, and standing on this leg averages 2,6±0,8 s (t=–2,25; p>0,05). Thus, such results in the experimental and control groups on data of the difficult test of Romberg, as well as by the beginning of our research, are estimated further at 2 points and answer assessment «unsatisfactorily» as pupils could not hold motionless situation over as 5 s. However we observe the best indicators of the gain of static balance and according to the difficult test of Romberg, at the same time it is smaller at pupils of CG.

Conclusions

As a result of the carrying out research, it was established that the offered author's technique of study swimming of deaf children of younger school age has the positive effect concerning ability of preservation of static balance according to Romberg's test ($p<0,01$) and to the manifestation of coordination abilities by the result of the test «Walking on the gymnastic balance beam» ($p<0,01$).

The prospect of the subsequent researches consists in deeper studying of influence of means of swimming for physical condition of children with defects of hearing.

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References

1. Bernshteyn, N. A. 1966, *Ocherki po fiziologii dvizheniy i fiziologii aktivnosti* [Essays on the physiology of movements and activity physiology], M. : Meditsina, 349 p. (in Russ.)
2. Boskis, R. M. 2004, *Glukhiye i slaboslyshashchiye deti* [Deaf and hard of hearing children], Moscow: Sovetskiy sport, 304 p. (in Russ.)
3. Vygotskiy, L. S. 1983, *Osnovy defektologii* [Fundamentals of Defectology], Moscow: Pedagogika, T. 5, 365 p. (in Russ.)
4. Yevseyev, S. p. 2005, *Teoriya i organizatsiya adaptivnoy fizicheskoy kultury* [Theory and organization of adaptive physical education], M.: Sovetskiy sport, T. 2, 448 p. (in Russ.)
5. Karbunarova, Yu. 2016, [Analysis of coordination skills of primary school children with hearing the results of the initial examination], *Naukoviy chasopis NPU im. Dragomanorva : naukovo-pedagogichni problemi fizichnoï kulturi (fizichna kultura i sport)* [Science magazine Drahomanorva: scientific-pedagogical problems of physical training (physical culture and sports)], No 1(70)16, pp. 29–33. (in Ukr.)
6. Karbunarova, Yu. 2014, [Analysis methods of swimming training of elementary school children with hearing problems in a specialized educational institution], *Fizichna kultura, sport ta zdorov'ya natsii* [Physical education, sports and health of the nation], No 17, pp. 142–147. (in Ukr.)
7. Pay, F. F. 1975, [On the psychological foundations of auditory speech perception in deaf childre] *Defektologiya* [Defectology], No 1, pp. 26–34. (in Russ.)
8. Sermeyev, B. V. 1982, [Features of physical training of abnormal children] *Defektologiya* [Defectology], No 3, pp. 29 – 32. (in Russ.)
9. Shapkova, L. V. 2003, *Chastnyye metodiki adaptivnoy fizicheskoy kultury* [Private technique of adaptive physical education], Moscow: Sovetskiy sport, 446 p. (in Russ.)
10. Sheyko, L. V. 2016, [Features of a technique of acceleration of the initial swimming training method crawl on his back], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 1(51), p. 112–116. (in Russ.)
11. Gheysen, F., Loots, G. & Waelvelde, H. 2007, Motor Development of Deaf Children With and Without Cochlear Implants. *Jornal of Deaf Studies and Deaf Education*, No 13, pp. 215–224.
12. Levesque, J., Theoret, H. & Champoux, F. Reduced procedural motor learning in deaf individuals. Available at: http:// journal.frontiersin.org/article/10.3389/fnhum.2014.00343/full (date of appeal 9.01.2016).

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Julia Karbunarova: *Lvov University of Physical Culture: Kosciusko str. 11, Lviv, 79007, Ukraine.*
ORCID.ORG/0000–0003–1573–5264
E-mail: billiejean@i.ua

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The dynamics of somatic indicators of basketball players under the influence of the special exercises which are directed to the increase of stability of the vestibular analyzer

Yevgeniy Kharchenko

Kharkov State Academy of Physical Culture, Kharkov, Ukraine

Purpose: *to determine stability of the vestibular analyzer of basketball players of the team of KhSAPC by indicators of somatic displacements after the standard vestibular irritations on the Barany chair, after the introduction of the special exercises in the educational – training process, which are directed on the increase of stability of the vestibular sensor-based system.*

Material & Methods: *the analysis of references, methods of definition of a functional condition of the vestibular analyzer on indicators of somatic displacements before and after the irritation on the Barany chair, methods of mathematical statistics. 12 boys – basketball players of the men's national team of KhSAPC took part in the researches.*

Results: *somatic indicators of a functional condition of the vestibular analyzer of students – basketball players of the team of KhSAPC, and, their changes under the influence of rotary loadings before the pedagogical experiment are given in the article.*

Conclusions: *the analysis of the results which were received after the experiment showed the considerable improvement of indicators, according to the testing of the motive test (4x9 m (s)), hand dynamometry of 100% of a maximum and 50% of a maximum of the right and left hands ($p<0,05$), both before and after a rotation. The exception was made by indicators of dynamometry of the left hand of 50% of a maximum, both before and after a rotation where changes weren't essential and statistically doubtful ($p>0,05$).*

Keywords: *vestibular analyzer, basketball players, rotary loadings.*

Introduction

One of the most important conditions for the achievement of high sports results in sports games is ability of a sportsman to keep balance and to be guided freely in space, despite considerable exercise stresses and counteraction of the opponent. Generally these functions are carried out due to the functional activity of visual and vestibular sensor-based systems.

Sports activity of a basketball player is caused by the continuous activity of the vestibular analyzer which receptors perceive any change of a position of a head and a body in space. Level of functioning of vestibular sensor-based system directly depends on intensity of adequate rectilinear and angular accelerations.

Therefore studying of reactions of organism to vestibular irritations, and also search of the new ways, allowing to improve the studied function, is essentially important for the improvement of the training process in sports games.

Methodological basics of training of the vestibular analyzer of the different contingent of people were covered in the works of A. S. Rovnyi (2001), L. Ye. Shesterova (2004), I. P. Maslyak (2007), Ye. K. Moiseyenko (2015) [1–11]. The authors point to the rather high degree of interrelation between indicators of the development of physical qualities and separate indicators of the vestibular sensor-based system in their researches [1; 4; 5]. However the works, which are devoted to the determination of vestibular stability under the influence of the special exercises, which are directed to activization of vestibular functions of students-basketball players in the available literature, are revealed insufficiently.

Purpose of the research

The determination of stability of the vestibular analyzer of basketball players of the team of KhSAPC on indicators of somatic displacements after standard vestibular irritations on the Barany chair, after introduction of the special exercises in the educational training process, which are directed to the increase of stability of the vestibular sensor-based system.

The stated purpose defines the following tasks of the research:

1. To study the features of functioning of the vestibular sensor-based system on the basis of the analysis of scientific and methodical literature.

2. To investigate the level of activity of the vestibular analyzer before and after the standard vestibular irritation on the Barany chair of basketball players of the team of KhSAPC.

3. To carry out the comparative analysis of stability of the vestibular analyzer of basketball players of the team of KhSAPC before and after rotary loadings before the pedagogical experiment.

Material and Methods of the research

12 boys – basketball players of the men's national team of KhSAPC took part in the research. All students were rather healthy and were under supervision of the sports doctor.

Research methods: analysis of references, methods of definition of functional condition of the vestibular analyzer on indicators of somatic displacements before and after irritation on the Barany chair, methods of mathematical statistics.

Results of the research and their discussion

The program material of the educational-training process of basketball players was added complexes of the special exercises and outdoor games, which are directed to the increase of stability of the vestibular analyzer during 6 months. The preparatory and the main part of classes included acrobatic exercises, various accelerations and jumps with various starting positions, both before, and after rotary loadings, instant stops, roll overs and so on which were carried out with the gradual increase of their coordination and functional complexity.

However, the greatest effect was observed from those exercises, which were the part of this or that technique. So, the modified exercises consisting of kinds of throws, passes, dribblings, in couples, three, four, which are carried out on various distance with various speed and trajectory of flight, by one and two balls, after turns on 90, 180, 360 degrees, also after falling, roll overs, acceleration, were used in the work.

The adapted exercises were also included into the section of special physical training. The repeated rotations with various position of a head were used, then various complicated-coordinating tasks on the coache's signal were performed, and also the modified outdoor games, relays were applied.

The increase in loading was once a month, and it made about 60 percent of all exercises, which were used in trainings, and it was distributed in equal shares between the exercises, which are aimed at the functionality development the semicircular channels and the otolithic device.

The research of indicators of speed of performance of the task (4x9 m), hand dynamometry of the right and left hands of 100% of a maximum and 50% of a maximum before the pedagogical experiment, before and after the standard vestibular irritation established that the data of sportsmen-basketball players worsened after rotations, however reliable distinctions between them weren't revealed (p>0,05) (tab. 1).

The analysis of data of definition of the set time (10 s) established the improvement of results of testing after rotation on the Barany chair. This function, according to experts experts, is connected with the definition of temporary intervals in the game, is rather stable size and more depends on the number of repetitions (p>0,05) (tab. 1).

It should be noted that this research was conducted brfore the educational -training classes at the end of the preparatory period of the year macrocycle, however the analysis of the data, which were obtained when testing, revealed rather big differences before and after the vestibular irritation. So, the difference in indicators of speed of performance of the task (4x9 m (s)) before the rotation made 1 s, dynamometry indicators – on average about 2 kg.
Thus, it is possible to note that the separate functions of the vestibular analyzer are developed insufficiently at the studied contingent of sportsmen and demand introduction in the educational-training process of complexes of the specially-selected exercises, which are directed to the stabilization of vestibular functions and elimination of vestibulo-vegetative and vestibulo-somatic manifestations.

As a result of the research of indicators of accuracy of the set time (10 s) before and after the vestibular irritation after the pedagogical experiment, it is established that these distinctions were insignificant and had a doubtful character (p>0,05) (tab. 2).

The implementation of the motive test (4x9 m (s)) after vestibular loading, after application of the special exercises, which are directed to activization of vestibular functions established the reliable distinctions between indicators, both before, and after rotation (p<0,05) (tab. 2).

The analysis of data of hand dynamometry of 100% of a maximum and 50% of a maximum of the right and left hands after the pedagogical experiment, both before, and after rotary loadings, established the statistical distinctions between the studied indicators (p<0,05) (tab. 2).

The exception was made by indicators of dynamometry of the left hand of 50% of a maximum, both before, and after rotation on the Barany chair where changes are not essential and statistically doubtful (p>0,05) (tab. 2).

Conclusions

1. The analysis of references on this problem demonstrates that it remains relevant and requires the solution of number of questions among which the research of development of the

Table 1

Indicators of vestibular stability of basketball players of the team of KhSAPC before and after rotary loadings on the Barany chair before the pedagogical experiment, X±m (n=12)

Tests for the determination of the vestibular stability	Before rotations	After rotations	t	p
Definition of the set time (10 s)	1,2±0,9	0,3±0,4	0,9	>0,05
Speed of performance of task (4x9), s	10,1±0,9	11,1±0,9	0,8	>0,05
Dynamometry of 100% of maximum (right), kg	49,8±2,4	51,2±2,6	0,4	>0,05
Dynamometry of 100% of maximum (left), kg	43,3±2,9	45,1±3.4	0,4	>0,05
Dynamometry of 50% of maximum (right), kg	34,8±2,7	27,4±2,9	1,9	>0,05
Dynamometry of 50% of maximum (left), kg	26,6±3,1	27,1±3,4	0,1	>0,05

Table 2

Indicators of vestibular stability of basketball players of the team of KhSAPC before the pedagogical experiment, X±m (n=12)

Period of measurement of indicators	Before the experiment	After the experiment	t	p
Definition of the set time (10 s)				
before rotation	1,2±0,9	0,5±0,2	0,8	>0,05
after rotation	0,3±0,4	0,2± 0,1	0,2	>0,05
Speed of performance of task (4x9), s				
before rotation	10,1±0,9	8,2±0,3	2,0	<0,05
after rotation	11,1±0,9	8,9±0,4	2,2	<0,05
Dynamometry 100% of a maximum (right), kg				
before rotation	49,8±2,4	55,6±1,5	2,1	<0,05
after rotation	51,2±2,6	58,4±2,1	2,1	<0,05
Dynamometry 100% of a maximum (left), kg				
before rotation	43,3±2,9	36,1±2,1	2,1	<0,05
after rotation	45,1±3.4	36,8±2,1	2,1	<0,05
Dynamometry 50% of a maximum (right), kg				
before rotation	34,8±2,7	27,9±2,1	2,1	<0,05
after rotation	27,4±2,9	28,7±2,1	0,4	>0,05
Dynamometry 50% of a maximum (left), kg				
before rotation	26,6±3,1	21,1±1,2	1,7	>0,05
after rotation	27,1±3,4	19,2±1,9	2,1	<0,05

vestibular analyzer under the influence of various factors is the leader.

2. The research of indicators of functional condition of the vestibular analyzer before the pedagogical experiment, before and after rotary loads of basketball players of the team of KhSAPC didn't reveal the reliable distinctions between them (p>0,05), however the majority of indicators worsened, that is became the reason for introduction of the sets of exercises in the educational-training process of basketball players, which are directed to the activization of vestibular functions.

3. The analysis of the results, which were received after the experiment showed the considerable improvement of indicators according to the testing of the motive test (4x9 m (s)), hand dynamometry of 100% of a maximum and 50% of a maximum of the right and left hands (p<0,05), both before, and after rotation. The exception was made by indicators of dynamometry of the left hand of 50% of a maximum, both before, and after rotation, where changes were not essential and statistically doubtful (p>0,05).

Prospect of further researches. Questions of the research of vestibular functions after training loads, different in size, in the different periods of the year macrocycle are interesting.

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References

1. Kuzmenko, I. O. 2011, [Effect of specially designed exercises on the functional state of the visual and vestibular analyzers Junior classes], *Moloda sportivna nauka Ukraini* [Young sports science Ukraine], Lviv: LDUFK, T. 2, pp. 110–115. (in Ukr.)
2. Kuzmenko, I. A. & Shesterova, L. Ye. 2011, [Changes in the functional state of sensory systems pupils of the middle classes under the influence of specially designed exercises], *Vysokiye tekhnologii, fundamentalnyye i prikladnyye issledovaniya v fiziologii, farmakologii i meditsine, T. 1: Sbornik statey Vtoroy mezhdunarodnoy nauchno-prakticheskoy konferentsii "Vysokiye tekhnologii, fundamentalnyye i prikladnyye issledovaniya v fiziologii i meditsine"* [High-tech, basic and applied research in physiology, pharmacology and medicine, Volume 1: The second collection of papers of the international scientific-practical conference "High technologies, fundamental and applied research in physiology and medicine"], Sankt-Peterburg: Politekhn. u-t, pp. 48–50. (in Russ.)
3. Maslyak, I. P., Shesterova, L. Ye. & Terentyeva, N. N. 2004, [The relationship stability of the vestibular analyzer and the level of mobility students], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 7, pp. 14–16. (in Russ.)
4. Maslyak, I. P. 2007, *Zmina rivnya fizichnoi pidgotovlenosti molodshikh shkolyariv pid vplivom spetsialnikh vprav, spryamovanikh na pokrashchennya funktsionalnogo stanu analizatoriv* avtoref. kand. nauk z fiz. vikh. i sportu [Changing the physical fitness of young students under the influence of special exercises to improve functional condition analyzers: PhD thesis], Kharkiv, 22 p. (in Ukr.)
5. Moiseyenko, O. K., Koval, M. V. & Kharchenko, Ye. S. 2015, [Definition of vestibular stability girls basketball team HGAFK], *Zdorovye, sport, reabilitatsiya* [Health, sport, rehabilitation], No 1, pp. 69–70. (in Russ.)
6. Pomeshchikova, I. p. 2007, [Determining the speed of visual - motor reaction of students with disorders of the musculoskeletal system], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 11, pp. 25–28. (in Russ.)
7. Rovniy, A. S. 2001, *Sensorni mekhanizmi upravlinnya tochnisnimi rukhami lyudini* [Touch control mechanisms and precise movements of the person], Kharkiv: KhDAFK, 220 p. (in Ukr.)
8. Rovniy, A. S. 2001, [Mechanism touch control precise movements of athletes during training sessions], *Teoriya i metodika fizichnogo vikhovannya i sportu* [Theory and methods of physical education and sport], No 1, pp. 31–34. (in Ukr.)
9. Rovniy, A. S. 2000, [Formation of the touch control and precise movements of athletes], *Teoriya i metodika fizichnogo vikhovannya i sportu* [Theory and methods of physical education and sport], No 2–3, pp. 59–63. (in Russ.)

10. Shesterova, L. Ye. *Vpliv rivnya aktivnosti sensornikh funktsiy na vdoskonalennya rukhovikh zdibnostey shkolyariv serednikh klasiv*: avtoref. k. nauk z fizichnogo vikhovannya i sportu [The impact of the activity sensor functions to improve motor skills classes Junior: PhD thesis], Kharkiv, 2004, 20 p. (in Ukr.)

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Yevhen Kharchenko: *Kharkiv State Academy of Physical Culture: Klochkovskaya str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0002-3080-3002
E-mail: selezen23@mail.ru

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Adaptation rearrangements of heart of young sportsmen depending on the orientation of the training activity

Viktor ***Lastochkin***[1]
Anatoliy ***Rovnyy***[2]

[1]*Sumy State A. S. Makarenko Pedagogical University, Sumy, Ukraine*
[2]*Kharkiv State Academy of Physical Culture, Kharkiv, Ukraine*

Purpose: *studying of the main parameters of morphofunctional condition of the left ventricular cavity of heart of sportsmen in the conditions of the training and competitive activity.*

Material & Methods: *three groups of children (n=30) of 7–9, 10–12, 13–14 years old, who begin to train in sports with the manifestation of endurance and high-speed and power qualities, the qualified sportsmen at the age of 15–16 years old, who are engaged in run on 400 m with barriers, and karatekas (n=15+n=15), not engaged children of the same aged groups (n=40). The following methods of the research were applied: analysis of special literature, pedagogical supervisions, pedagogical experiment, echocardiological methods of the research.*

Results: *the considerable connection of types of heart of young sportsmen with indicators of exercise stress of various orientations is established. Sportsmen with the optimum vegeto-rhythmic indicators have the essential advantages in adaptation morphofunctional displacements in heart and warm productivity at sportsmen with satisfactory vegetative-rhythmic indicators.*

Conclusions: *adaptation morphofunctional displacements in activity of the cardio-respiratory system are closely connected with the prevailing orientation of the training process and can be used as the objective test of adaptation to the special loadings in sport.*

Keywords: *echocardiological indicators, vegetative-rhythmic indicators, training work, endurance, high-speed and power qualities, sportsmen.*

Introduction

The new term “sports heart” appeared in scientific literature last century. Big experimental material which confirms legitimacy of the existing term is collected in modern literature. Wide opportunities of studying of structural and functional changes of heart, which are formed under the influence of exercise stresses, were received by the method of ultrasonic echocardiography, which is offered by I. Edler, S. Hertz [12].

The first researches in the USSR, which were carried out with use of ultrasonic echocardiography, showed big informational content and value for supervision over sportsmen. But indications of these researches had a contradictory character.

So, the researches of A. G. Dembo [6] established that the accurate thickening of the back wall of myocardium of left ventricle at rather small increase in its cavity is established at most of athletes, who are engaged in sports, where the advantage is endurance.

The increase in cavity of left ventricle is observed at wrestlers at the same time at the full absence of the increase in thickness of myocardium of the back wall. A. G. Dembo with coauthors [6; 8] gives examples of hypertrophy of myocardium of left ventricle at weight-lifters and its notable dilatation at skiers-racers. The powerful data on condition of cavities and walls of myocardium after loadings of different character and in the renewal period after the termination of their performance are obtained [5; 7; 10; 15].

Modern researches which are conducted with skiers-racers of high qualification and healthy people, who do not play sports, demonstrate the increase in stroke output of blood at representatives of both groups [2; 3; 4]. At the same time it increases mainly due to the reduction of sacral-systolic at sportsmen, and at not sportsmen – due to the increase in sacral-diastolic volume. This fact, according to authors, is caused by fuller supervision of left ventricle at sportsmen.

Much earlier [12; 13; 16] the results were received with sportsmen skiers-racers and wrestlers, which demonstrate that there is not increase in sacral-diastolic diameter of left ventricle at the top of loading, but its reduction.

The researches of condition of cardiac cavities at sportsmen at load of endurance showed that cavities of left ventricle increase whereas high-speed and power loading promotes the increase in thickness of warm wall of left ventricle [1; 4; 9; 11].

The majority of researches were conducted with highly skilled adult sportsmen and adults who did not play sports.

However, as show researches of some authors, morpho-functional changes of heart, are observed at early stages of sports activities and depend on specifics of motive activity of sport.

At the same time the systematic researches of condition of heart walls and cavities at children were not carried out. It is proved that the method of ultrasonic echolocation of morpho-functional reorganizations of heart activity allows receiving objective indicators and is of great importance for the creation of the training process at all stages of preparation.

Purpose of the research

Studying of key parameters of morpho-functional condition of cavity of left ventricle and myocardium of back wall of left ventricle which will allow determining the studied parameters at all sportsmen in the conditions of training and sports activity.

Material and Methods of the research

Ultrasonic researches of young sportsmen were conducted by means of echocardiograph MARK-300 which provides the qualitative echogram in the mode of monoplaned cut through vertical projection of heart.

The locator sensor in the 5–4 – th intercostals space, to the left of breast in the place of absolute warm dullness was attached to investigated in situation, lying.

Runners on 400 m with barriers of 16–17 years old and karatekas of the same age took part in the research. The control group was made by young men of 16–17 years who do not play physical education and sports.

The following parameters were defined during the research: D_s –systolic size of left ventricle; D_d –diastolic size of left ventricle; T_{ms} – thickness of myocardium of back wall in the diastole, %ΔS – extent of reduction of the front and back size; V_s – systolic volume of left ventricle; V_d – diastolic volume of left ventricle; SO – stroke output; FE – fraction of emissions in %. Indicators of D_s, D_d, T_{ms} and T_{mu}, were registered directly from echocardiogram by the direct measurement. D_s and T_{ms} were measured on electrocardiogram at point R, and D_d and T_{mu} – at the beginning of the complex. Such formulas were applied to calculation of parameters which are not possible for measuring in the direct measurement:

$$\%S = \frac{Dd - Ds}{Dd}\%; \cdot V_s = 0{,}994 \cdot D_s^3; \cdot V_d = 0{,}837 D_d^3; \cdot SO = V_d - V_s; \cdot FE = \frac{SO}{Vd} 100.$$

Results of the research and their discussion

It is established that indicators of Echo of CG of the studied sportsmen significantly differ from children of the same age who do not play sports (tab. 1). Indicators of the general fitness testify to considerable thickening of back wall of myocardium of left ventricle, increase of the front and back size of cavity of left ventricle and its total amount. The powerful hypertrophy of myocardium is observed at insignificant increase in volume of cavity of left ventricle at karatekas who used in training process high-speed and power loading.

Training regime of runners on 400 m with barriers which are aimed at the development of high-speed endurance promoted more substantial increase of heart emissions due to increase in total amount of left ventricle.

Materials of the research of sportsmen demonstrate that the absolute sizes of heart, thickness of back wall of left ventricle, volume of its cavity much more in both groups, than in the investigated control group.

It gives the grounds for the statement that the myocardium hypertrophy already at early stages of preparation is the most characteristic sign of adaptation of heart to exercise stresses. At the same time in nature of hypertrophic changes at children it is observed considerable variety, which can play crucial role in the achievement of sports achievements in sports, which are connected with endurance development. Rather moderate hypertrophy of walls of left ventricle at significant increase in its cavity characteristic for this group of children. Shock emissions at the same time increase, reduction of volume of cavity of left ventricle in systole much more, than at children who have considerable hypertrophy of left ventricle.

The typical changes of heart – moderate hypertrophy of wall of left ventricle are established at significant increase in its cavity [9; 14] in special series of researches of sportsmen of high qualification runners on average distances. This group of sportsmen has also optimum vegetative-rhythm ratio (HR and steps, the frequency of breath and steps). It confirms our researches, and the vegetative-rhythm index can be applied as the test to selection of young sportsmen with orientation to sports with endurance manifestation.

Researches of aged features of formation and development of cardio-respiratory functions in children (tab. 2) during the systematic motive activity give the grounds for estimation of positive displacements of adaptation processes at application of long low-intensive motive activity. This type of muscular activity needs to be considered as the main development tool of endurance at children with orientation to sports with manifestation of types of endurance.

It is established earlier [12; 15; 16] that differences of adaptation changes in heart are result of heterogeneity of age groups. Our researches demonstrate that the powerful communication between adaptation reorganizations of heart with orientation of the training process is established at early stages of sports specialization. The more certain increase in volume of left ventricle at insignificant thickening of its walls is observed at young sportsmen who train with low-intensive loadings. The considerable hypertrophy of myocardium is followed insignificant to increases in volume of left ventricle at young sportsmen who train with orientation on manifestation of high-speed and power qualities.

It is possible to consider that the first type of adaptation reorganizations of heart is more charitable. It leads to significant increase in stroke output of heart and provides thus the increased blood-groove volume, without forcing heart rate. It promotes possibility of change of stride rate at distance [4; 9; 11].

Conclusions

1. The increase in volume of left ventricle at insignificant hypertrophy of myocardium is observed at young sportsmen-runners on 400 m with barriers.

Table 1

Echocardiological indicators at young sportsmen and children who do not play sports

Direction of the training process	Age	Main indicators of Echo of CG								
		D_s	D_d	T_{ms}	T_{mu}	%	V_s	V_d	SO	FE
Runners on 400 m with barriers	15–16	3,90	5,33	1,40	0,97	26,3	59,09	125,44	66,69	52,38
Karatekas	15–16	3,37	4,52	1,59	1,06	25,13	37,79	76,92	39,13	50,42
Young men who do not play sports	15–16	3,23	4,43	0,87	0,61	29,50	33,60	82,71	50,56	60,70

Table 2

Aged changes of adaptive opportunities of heart on the basis of Echo of CG of indicators with different orientation of the training process

Direction of the training process	Age	Main indicators of Echo of CG								
		D_s	D_d	T_{ms}	T_{mu}	%	V_s	V_d	SO	FE
On development of high-speed endurance	7–9	3,22	4,44	0,97	0,68	25,80	33,9	72,69	38,78	53,0
	10–12	3,30	4,89	1,28	0,88	28,93	42,66	92,78	48,16	52,8
	13–14	3,73	5,02	1,36	0,94	25,2	51,54	104,94	53,58	50,18
On development of high-speed and power qualities	7–9	2,84	3,99	1,23	0,88	28,53	22,6	52,7	30,11	56,8
	10–12	3,05	4,29	1,32	0,98	28,30	28,17	65,56	37,34	56,33
	13–14	3,13	4,38	1,48	0,89	28,09	30,46	69,93	39,47	55,94
Children who do not play sports	7–9	2,82	3,92	4,71	0,47	27,02	22,24	50,02	27,70	50,0
	10–12	3,04	4,30	0,85	0,58	28,8	28,13	66,02	37,86	56,9
	13–14	3,05	4,43	0,85	0,59	32,45	28,81	72,12	46,31	63,82

2. The considerable hypertrophy of myocardium of left ventricle at insignificant increase in its cavity is observed at young sportsmen-karatekas.

3. The adaptation morpho-functional displacements in activity of the cardio-respiratory system are closely connected with overwhelming orientation of the training process and can be applied as the objective test of adaptation to specific loadings in sport.

The prospect of the subsequent researches consists in studying of regularities of the development of morpho-functional characteristics of heart depending on orientation of training and competitive activity.

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References

1. Bayevskiy, R. M. & Ivanov, G. G. 2001, [Heart rate variability: the theoretical aspects and clinical applications], *Utltrozvukovaya i funktsional-naya diagnostika* [Ultrasound and functional diagnostics], No 3, pp. 106–109. (in Russ.)
2. Bereznyy, Ye. A., Rubin, A. M. & Utekhina, G. A. 2005, *Prakticheskaya kardiologiya* [Practical Cardiology], Moscow, 140 p. (in Russ.)
3. Bogatov, A. A. 2003, [Contact index of voltage systems and other indicators of heart rhythm with special performance skiers], *Teoriya i praktika fizicheskoy kultury* [Theory and Practice of Physical Culture], Moscow, No 1, pp. 54–58. (in Russ.)
4. Vanyushin, Yu.S. & Sitdikov, F.G. 2001, [Adaptation of the cardiac activity of adolescents to stress the rising power], *Fiziologiya cheloveka* [Human Physiology], T. 27, No 2, pp. 91–97. (in Russ.)
5. Datskiv, p. P. & Yaremenko, Ye. O. 2003, [Structures heart rate in athletes-runners during exercise different power], *Pedagogika, psikhologiya ta mediko-biologichni problemi fizichnogo vikhovannya i sportu* [Pedagogy, psychology and medical-biological problems of physical education and sport], Kharkiv, No 24, pp. 72–78. (in Ukr.)
6. Dembo, A. G. 1980, [Rhythm Serce and its importance in the study of athletes], *Aktualnyye problemy sportivnoy meditsiny* [Actual problems of sports medicine], Kyiv: KGIFK, pp. 15–18. (in Russ.)
7. Dunets-Lesko, A. 2010, [Changes in heart rate variability qualified karate athletes under the influence of test Winteite], *Sportivniy visnik Pridniprov'ya* [Sports Bulletin Dnieper], No 2, pp. 256–259. (in Ukr.)
8. Yevdokimov, Ye. I. & Golets, V. A. 2008, [Control of the reaction of the cardiovascular system of sportsmen at the graduated exercise as a way to prevent pathological conditions], *Fiz. vospit. studentov teoreticheskikh spetsialnostey* [Physical training of students of theoretical specializations], No 4, pp. 64–72. (in Russ.)
9. Mishchenko, V. S., Lysenko, Ye. N. & Vinogradov, V. Ye. 2007, *Reaktivnyye svoystva kardiorespiratornoy sistemy kak otrazheniye adaptatsii k napryazhennoy fizicheskoy trenirovke v sporte* [The reactive properties of the cardiorespiratory system as a reflection of adaptation to strenuous physical exercise in sports], Kyiv: Naukoviy svit, 351 p. (in Russ.)
10. Kovalenko S. O. 2006, [Individual features of the wave structure of heart rate when dosed physical load], *Sportivna meditsin*a [Sports Medicine], No 1, pp. 3–9. (in Ukr.)
11. Bernardi, L.& Passino, C. 2001, Wilmerding Breathing patterns cardiovascular autonomic modulation during hypoxia induced by simulated. *J. Hypertens*, V. 19, No 5, pp. 947-952.
12. Edler, I. & Hertz, C. 1954, *Kurgl. Fysiogr. Sallad. Lund Forhandle*, No 245, pp. 17.
13. Bussotti, M., Agostoni, p. & Durigato, A. 2009, Do maximum flow-volume loops collected during maximum exercise test alter the main

cardiopulmonary parameters, *Chest*, V. 135, No 2, pp. 425-433.
14. Otto, C. M. & Schwaegler, R. G. 2008, *Echocardiograhy review guide: companion to the text-book of clinical echocardiographia*. Philadelphia: Saunders Elsevier, ill, Index: pp. 343-349.
15. Persson, p. B. 1997, Spectrum analysis of cardiovascular time series. *Am J. Physiol*, vol. 273, pp. 1201-1210.
16. Verschoor, N., Woltjer, H. H. & Vander Meer, B. J. 1996, The lowering of stroke volume measured by means of impedance cardiography during end expiratory breath. *Physiol. Meas*, V. 17, No 1, pp. 29–35.

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Viktor Lastochkin: *Sumy State A. S. Makarenko Pedagogical University: st. Romenska 87, Sumy, 40002, Ukraine.*
ORCID.ORG/0000-0002-0689-0791
E-mail: lastochkinviktor76@gmail.com

Anatoliy Rovnyy: *Doctor of Science (Physical Education and Sport), Professor; Kharkiv State Academy of Physical Culture: Klochkovska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0003-0308-2534
E-mail: tolik.rovnyy@mail.ru

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Features of change of condition of a biogeometrical profile of bearing of students in the course of physical education

Sergey Lopacki

Ivano-Frankivsk national medical University,
Ivano-Frankivsk, Ukraine

Purpose: *to study features of condition of a biogeometrical profile of bearing of students in the course of physical education.*

Material & Methods: *401 studentsof the 1–4 courses who are studied on a day form of education took part in the research. The following methods of research were used for the performance of the given tasks: analysis of scientific and methodical literature and documentary materials; pedagogical supervision; pedagogical experiment (carrying out the stating experiment) visual screening of condition of a biogeometrical profile of bearing [7]; methods of mathematical statistics.*

Results: *it is established during the research, on the basis of visual screening that 74% of students had violations of bearing, and the largest number among them was made by students with scoliotic bearing. Tendencies and statistically reliable distinctions are established in values of assessment of condition of a biogeometrical profile of bearing of students in the direction of their reduction from course to course. The obtained data confirm the existence of the process of aggravation of symptoms of bearing of students.*

Conclusions: *the obtained data will be used at the scientific foundation and development of technology of correction of violations of bearing of students in the course of physical education taking into account the level of condition of their biogeometrical profile.*

Keywords: *students, physical education, biogeometrical profile of bearing.*

Introduction

Transformational processes which happen in the Ukrainian society except some positive shifts are reflected by the negative phenomena in activity of people – decrease in life expectancy, reduction of physical activity, increase of level of noninfectious chronic diseases, essential reduction of financial security, loss of reference points on healthy lifestyle, alienation of children, youth and adults from physical culture [5].

The present stage of reforming of the system of higher education is characterized by considerable intensity of the educational process. Many experts observe the decrease in volume of physical activity of students in Ukraine in recent years [8]. Such tendency is negatively reflected in physical development, physical preparedness and functional state of youth which causes the special social importance of preservation and promotion of health of student's youth [3].
Recently state of health of students becomes the subject of close attention of experts [1; 2; 9]. The numerous researches, which were conducted in recent years, demonstrate that functional violations of bearing are one of the most widespread deviations in skeletal and muscular system at modern students [7; 10].

The analysis of the published results of empirical researches and scientific publications demonstrates that, despite of the existence of the numerous scientific achievements, which are devoted by scientific and practical question of development of technologies, approaches and techniques of prevention and correction of violations of bearing of student's youth in the course of physical education, remain not solved questions concerning the definition and theoretical foundation of technology of correction of violations of bearing of students in the course of physical education taking into account state their bio-geometrical profile.

Communication of the research with scientific programs, plans, subjects

The work is performed according to subject of the Built plan of the RW in the sphere of physical culture and sport for 2011–2015 of the Ministry of Ukraine of family, youth and sport, by the subject 3.7. «Improvements of biomechanical technologies in physical education and rehabilitation taking into account specific features of motility of a person» (number of the state registration is 0111U001734).

Purpose of the research

To learn features of changes of condition of the bio-geometrical profile of bearing of students in the course of physical education.

Research task:

1. To learn the main types of violations of bearing of students in the course of physical education.

2. To learn the level of condition of the bio-geometrical profile

of bearing of students in the course of physical education.

Material and Methods of the research

401 students of the1–4 courses who study on day form of study took part the in research.

Such methods of the research were used for the performance of the put tasks: analysis of scientifically methodical literature and documentary materials; pedagogical supervision; pedagogical experiment (carrying out the stated experiment); visual screening of condition of the bio-geometrical profile of bearing [7]; methods of mathematical statistics.

Results of the research and their discussion

The analysis of data of special scientifically methodical literature and information sources demonstrates that the bearing is one of the main and objective characteristics of physical state and health of modern young people, especially representatives of student's youth as intensity of the educational process, development of social and economic and living conditions of activity and study of students influence the level of their motor activity, morphological condition of organism and physical working capacity that in conclusion cause condition of the bio-geometrical profile of bearing and manifestation of appropriate the level of somatic health.

In our opinion, this situation truly displays powerful need to exercise first of all constant control and definition of dynamics of changes not only morphological indicators and indicators of physical preparedness of students, but also indicators, their spatial organization bodies which define condition of their bio-geometrical profile of bearing.

All students according to data of their medical records and according to methodical documents of the department of physical education of Galitskyi academy belonged to the main group of physical education and regularly attended class after physical education according to the established schedule – 2 trainings for week (4 educational hours).

We stated violations of bearing of students on all courses of study which were confirmed and testified by the orthopedic surgeon during the analysis of bearing (pic. 1).

The obtained data demonstrate that normal bearing is observed only among 33,0% of students of the 1st course. The subsequent consideration of results of the analysis of bearing helped to establish the negative tendency to reduction of number of students with normal bearing from the 1st to the 4th course. So, it is revealed that on the 2nd course the number of students with normal bearing equals already 28,8%, on the 3-rd course – 21,6%, on the 4th course – only 19,8%.

The established negative tendency of aggravation of symptoms of bearing of students from the 1st to the 4th course is confirmed by changes among the number of students with such functional violations as rounded back and scoliotic bearing. It is defined that 11,3% – on the 1st course of students with functional violation of bearing rounded back, on the 2nd course – 13,9%, on the 3-rd course – already 16,5%.

The greatest alarm is caused by the growth of number of students with scoliotic bearing: there were 37,4% on the 1st course of such students, on the 2nd course – the number increased to 40,7%, on the 3-rd course – to 49,5% and on the 4th course –exceeded half of number of students and made 53,1%.

The number of students with such functional violations as flat back and rounded - concave back, was almost equal and did not exceed on average 10%. So, the number of students with flat back made: the 1st course – 9,6%, the 2nd course – 8,3%, the 3rd course – 5,2%, the 4th course – 7,4%; with – rounded concave back: the 1st course – 8,7%, the 2nd course – 8,3%, the 3rd course – 7,2%, the 4th course – 7,4%.

The threatening number of students with normal bearing and the received negative tendency of increase of number of students with its different functional violations put sharp requirement of urgent informative definition of state of the bio-geometrical profile of bearing of students. We applied the method of visual screening by means of the advanced card of express control the bio-geometrical profile of bearing for the solution of this task [7]. This approach of definition of state of the bio-geometrical profile of bearing of students was approved in the conducted researches of M. V. Dudko [2].

The characteristic of total score of the bio-geometrical profile of bearing of the surveyed finally testified the deterioration in its state when comparing the values of students of 2–4 courses with data of students of the 1st course (pic. 2).

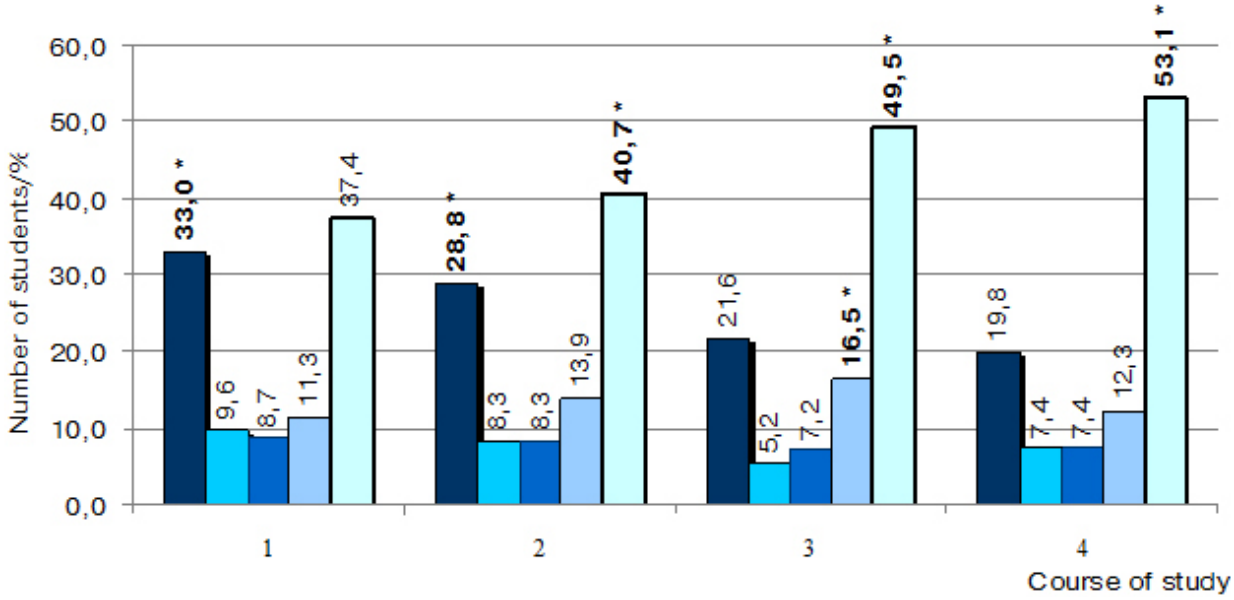
The reliable reduction of value of total score in comparison with value of total score of students of the 1st course (31,6±4,48 points) was observed at students of 3 and 4 courses with normal bearing and high level of condition of the bio-geometrical profile of bearing (29,3±3,48 and 29,5±2,82 points respectively).

Also the reliable difference towards reduction of number of points of total score of the bio-geometrical profile of bearing was noted also at the average level of its state: the total score equaled 17,2±3,93 and 20,8±4,01 points at students of the 4th and 3rd courses with normal bearing while at students of the 1st course average value of total score answered 22,8±3,61 points.

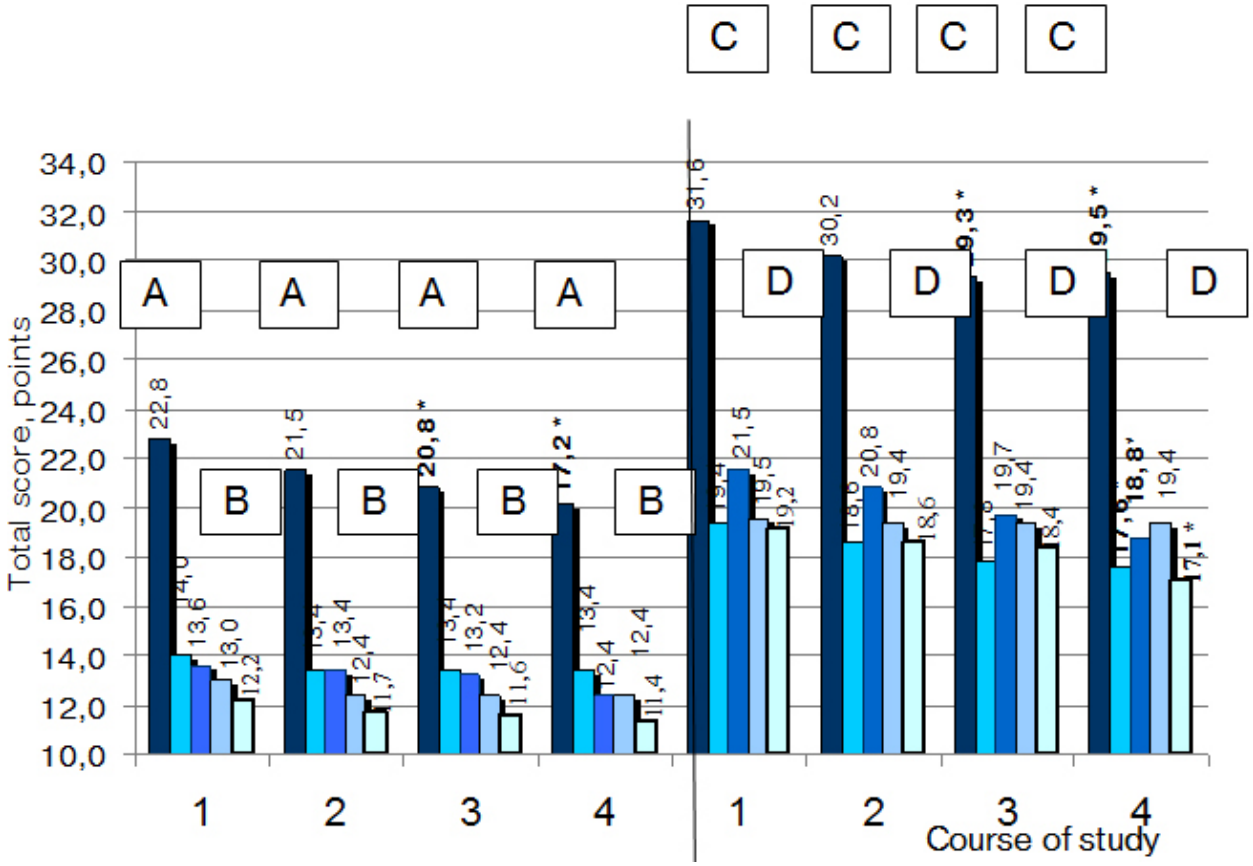
Values of total score of the bio-geometrical profile reduced automatically at students with the established functional violations of bearing as follows: flat back (students the 4th course – 17,6±2,91 points in comparison with students of the 1st course – 19,4±3,38 points); rounded-concave back (students the 4th course – 18,8±3,46 points in comparison with students of the 1st course – 21,5±4,52 points); scoliotic bearing (students the 4th course – 17,1±3,07 points in comparison with students of the 1st course – 19,2±4,28 points).

The established tendencies and reliable differences in values of assessment of the bio-geometrical profile of bearing of students towards their reduction from the course to the course testified the existence and continuous development of the process of deterioration in its state as a result of transition to the lowest level.

It should be noted that students with different types of violations of bearing who have the low level of state of the bio-geometrical profile get to so-called preclinical state OPA [2]. Considering this fact, it is expedient to note that the correction



Pic. 1. Distribution of students of 1–4 courses according to the established functional violations of bearing: *– normal bearing; – flat back; – rounded-concave back; – rounded back; – scoliotic bearing; * – changes of sign are statistically reliable (p<0,05).*



Pic. 2. Total score of condition of the bio-geometrical profile of bearing of students 1–4 courses: *– normal bearing; – flat back; – rounded-concave back; – rounded back; – scoliotic bearing; A – normal bearing (the average level of the bio-geometrical profile of bearing); B – flat back, rounded-concave, rounded back, scoliotic bearing (the low level of the bio-geometrical profile of bearing); C – normal bearing (the high level of the bio-geometrical profile of bearing); D – flat back, rounded- concave, rounded back, scoliotic bearing (the average level of the bio-geometrical profile of bearing); * – changes of sign are statistically reliable (p<0,05).*

of level of condition of their bio-geometrical profile of bearing has to be the prime task of work with such students.

Conclusions

It is established during the experiment that 74% of students who took part in the research, had functional violations of bearing, and the largest number among them was made by students with scoliotic bearing. The fact could not remain unnoticed that the number of students with normal bearing decreased, and the number of functional violations in parallel increased at ratio of results of inspection of types of bearing of students of the 1st and the 4th courses of study.

Besides, we determined the accurate consistent pattern of decrease in the level of condition of the bio-geometrical profile of bearing towards its deterioration at students of major courses (the 3rd and the 4th course) in comparison with data of junior students (the 2nd and especially the 1st course).

Prospects of the subsequent researches in this direction. The development of technology of correction of violations of bearing of students in the course of physical education taking into account the level of condition of their bio-geometrical profile is provided on the basis of the obtained data.

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References

1. Aloshina, A. I. 2015, *Profilaktika i korektsiya porushen oporno-rukhovogo aparatu u doshkilnyat, shkolyariv ta studentskoi molodi u protsesi fizichnogo vikhovannya* [Prevention and correction of the musculoskeletal system in preschoolers, schoolchildren and students in physical education], Lviv: Feniks, 365 p. (in Ukr.)
2. Dudko, M. V. 2016, *Profilaktika porushen biogeometrichnogo profilyu postavi studentiv u protsesi fizichnogo vikhovannya* : avtoref. kand. nauk z fiz. vikhovannya i sportu [Prevention of bioheometrychnoho Profile posture of students in physical education : PhD thesis], Kyiv, 20 p. (in Ukr.)
3. Kashuba, V. A. 2003, *Biomekhanika osanki* [Biomechanics of posture], K., 248 p. (in Russ.)
4. Kashuba, V. A., Futornyy, S. M. & Dudko, M. V. 2015, [To the question of the use of innovative technologies of forming of healthy way of life of students in the process of physical education], *Naukoviy chasopis Nats. ped. un-tu im. M. p. Dragomanova* [A scientific magazine of M. p. Dragomanova National of pedagogical universitetet], Kyiv, Vip. 8(63), pp. 28–32. (in Russ.)
5. Kolos, M. A., Malinskiy, I. Y. & Yaremenko, V. V. 2015, [Tipical features of carriage of students of junior and senior courses of the National university of government tax service of Ukraine], *Naukoviy chasopis Nats. ped. un-tu im. M. p. Dragomanova* [A scientific magazine of M. p. Dragomanova National of pedagogical universitetet], Kyiv, T. 1, Vip. 7(33), pp. 363–368. (in Ukr.)
6. Martynyuk, O. A. 2011, *Korrektsiya narusheniy prostranstvennoy organizatsii tela studentok v protsesse fizicheskogo vospitaniya: avtoref. dis. na soiskaniye uchen. stepeni kand. nauk po fiz. vospitaniyu i sportu* [Correction of violations of spatial organization of body of students in the process of physical education], Kyiv, 20 p. (in Russ.)
7. Nosova, N. L. & Dudko, M. V. 2015, [Estimation of the state of carriage of students in the process of physical education on the basis of visual skrine], *Sportivna nauka Ukraini* [Sport science of Ukraine], Lviv, pp. 30–35. (in Russ.)
8. Ponyrko, Ye. A. 2013, *Korrektsiya osanki u studentok vuzov sredstvami ozdorovitelnykh vidov gimnastiki* : avtoref. kand. ped. nauk [Correction of carriage for the students of institutes of higher facilities of health types of gymnastics : PhD thesis], SPb, 22 p. (in Russ.)
9. Retivykh, Yu. I. 2009, *Metodika korrektsii narusheniy osanki studentov sredstvami ozdorovitelnoy fizicheskoy kultury na osnove ucheta vidov i stepeni deformatsiy pozvonochnika*: avtoref. kand. ped. nauk [Method of correction of violations of carriage of students by facilities of health physical culture on the basis of account of kinds and degree of deformations of spine: PhD thesis], Volgograd, 23 p. (in Russ.)
10. Rudnitskiy, O. V. 2016, *Korektsiya tilobudovi studentok zasobami ozdorovchogo fitnesu* : avtoref. kand. nauk z fiz. vikhovannya i sportu [Correction of bodybuilding students by facilities of health fitnes : PhD thesis], Kyiv, 24 p. (in Ukr.)

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Sergey Lopacki: *Ivano-Frankivsk national medical University: Galician str, 2, Ivano-Frankivsk, 76018, Ukraine.*
ORCID.ORG/0000-0001-7380-1739
E-mail: slopatskyi@gmail.com

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Application of medical physical culture at extensive deep burns

***Vjacheslav Meleshkov*[1]**
***Oleksandr Petruhnov*[2]**

[1]*Kharkov State Academy of Physical Culture, Kharkov, Ukraine*
[2]*Kharkov National Medical University, Kharkov, Ukraine*

Purpose: *describe the role of medical physical culture at extensive deep combustions for prophylaxis of development of congestive pneumonia, contractures and a muscular atrophy, and also for restoration of adaptation of an organism to household and labor loads after an dermoplastika.*

Material & Methods: *analysis and generalization of scientific and methodical literature.*

Results: *the main agent of physical aftertreatment – medical physical culture is considered; its application at treatment of patients with extensive deep combustions is proved; techniques of medical physical culture during the periods of a septicotoxemia and reconvalescence are described in detail.*

Conclusions: *it is established that functional treatment will promote restoration of function of a locomotorium, the cardiovascular and respiratory systems.*

Keywords: *dermoplastika, deep burns, medical physical culture, septicotoxemia, reconvalescence.*

Introduction

The relevance of a problem of a burning injury is defined by the considerable frequency of defeat, both adults, and children, complexity and duration of treatment, long disability and rather high lethality of victims [5; 12; 13].

According to the data of WHO, thermal damages make 6% of number of injuries of a peace time. The tendency to the increase in quantity of these injuries is noted around the world. Annually from 1,8 till 3 million people got burns in the USA. From 20 till 22 thousand of people are hospitalized with heavy burns within a year in France. This type of damages makes from 5 till 10% of all types of injuries in the countries of CIS. And the frequency of thermal damages doesn't decrease, and has an obvious tendency to the growth in the certain countries [8].

Deep burns even on a limited site can often lead to cicatrical deformations, defects of tissues, trophic ulcers and to cause various violations of internals, bones and the central nervous system. Therefore rehabilitation therapy is appointed in early terms after a trauma; its contents constantly changes depending on the course of the wound process and the carried-out surgeries. It is carried out for the purpose of prevention of infection of a burning injury, acceleration of its clarification from necrotic masses, stimulation of growth of granulations and epithelization in the initial stage; further – for the prevention of contractures and keloid cicatrix [1; 10].

Analysis of the last researches and publications

Burns of the III(B) and the IV degrees are deep. The necrosis of skin extends to all its depth; bubbles with hemorrhagic contents are observed at the III(B) degree. If the burn scab (crust) is formed, then it has yellow, gray or brown color. The necrosis of all layers of skin and the deep-lying tissues comes at the IV degree. Burn scabs are formed brown or black various thickness and density. A surgical treatment is applied to close a burn surface – autoplasty, when skin from a healthy part of the body is replaced to the burned place, or alloplasty, when skin from other person is replaced to the burned place. A treatment usually continues 3–6 months [7; 9].

A burn proceeds mainly as local suffering at superficial burns affecting up to 10–12% of a surface of a body (at deep – to 5–6% of a surface of a body). Various violations of activity of bodies and systems which set can be considered as a burn disease are observed at more extensive defeats [8; 11; 13].

Four periods are distinguished during a burn disease. The 1st period – is a burn shock. It arises in the presence of deep burns on the area more than 15-20% of a surface of a body. Period duration – is till 2 days. The 2nd period – is a sharp burn toxemia. Period duration – is 2–14 days. The 3rd period – is a burn septicotoxemia. It develops at deep defeats or at an operation failure (a rag hasn't got accustomed). It is followed by the development of inflammation and suppuration in a burning injury, loss of a significant amount of protein. Period duration – from 1,5 months till 1 year. Intensive conservative and expeditious treatment is applied. General condition of patients is heavy: they are sluggish, grow thin, they have no appetite. Pneumonia often occurs, and also the inflammatory centers in various bodies and tissues. The compelled immobilized position of a patient is followed by developing of decubitus, development of contractures of large joints, atrophy of muscles, and formation of the pulling together hems. The development of burn exhaustion can be heavy complication of this period – cachexia. The 4th period – is the recovery period. It begins with the moment of healing of deep burning injuries at successful expeditious restoration of an integument and it proceeds 2–4 months. Plastic surgeries are applied further at

formation of the pulling together hems on skin. It should be noted that quite often under the influence of timely effective treatment the period of recovery comes, passing a stage of a burn septicotoxemia [6; 8; 10].

One of the important components of modern complex treatment of thermal injuries is medical physical culture. It is considered as the necessary means promoting return of victims of burns to socially useful work on condition of timely and systematic application. Regular trainings by medical physical culture promote not only to the restoration of functionality of a patient and the increase of degree of re-adaptation to physical activities; treatment terms are reduced under their influence that has a great social value. Physical exercises exert the toning, trophic, normalizing impact on all systems of an organism. Physical exercises promote the formation of the compensatory and replaceable skills facilitating the patient's adaptation to life and work in cases of profound morphological changes in the fabrics struck as a result of a burn when normalization of functions is impossible [13].

Medical physical culture is shown to almost all patients at any localization of a burn, irrespective of degree and the area of defeat of tissues. The variety of clinical displays of a burn disease doesn't allow defining in advance all states at which medical physical culture is temporarily contraindicated [11].

The purpose of the research

To characterize a role of medical physical culture at extensive deep burns for the prevention of development of stagnant pneumonia, contractures and muscular atrophy, and also for the restoration of adaptation of an organism to household and labor loadings after thermoplastics.

Research tasks:

1. To study special literature on a problem of rehabilitation of patients with deep burns and a burn disease.

2. To consider a technique of medical physical culture at treatment of patients with extensive deep burns and at development in them of the III–IV periods of a burn disease.

Material and Methods of the research

Material and methods of the research: analysis and generalization of scientific and methodical literature.

Results of the research and their discussion

The main method of treatment of burns of the third and fourth degrees is free skin transplantation which quite often should be made repeatedly combustiolog. Repeated landmark reconstructive plastic surgeries with the use of free skin plasticity, local plasticity (various triangular cuts and mutual movement of the formed rags), the Italian plasticity, plasticity Filatov-Gillies tubed pedicle flap, etc. are made for the elimination of the created contractures and other cosmetic and functional defects. If in the gravity of defeat it is necessary to resort to amputations, wounds of a stump whenever possible close free skin rags. Preparation of the sites of skin which are subject to change and the subsequent stimulation of healing of a wound and restoration of normal mobility of those segments of body, from which rags for plasticity are taken, has essential value at all autoplastic operations. And after and before it, it is necessary to reduce to operation, whenever possible, terms of stay of a patient in a bed. If the general condition of a patient and localization of burns allows, it is necessary that he sit more and walking. Plasticity by large rags demands the big area of donor places. It creates difficulties in selection of physical exercises in the postoperative period, but at the same time does them especially necessary as from movements are switched off not only the burned segments, but also parts of a body from which rags are taken. The contractures breaking functions of these segments and parts of the body can be created in the postoperative period [4].

Healing of a burning injury takes place certain stages which duration and character depends on many reasons, mainly on depth of a burn, its area and degree of intensity of a burning injury by microbes. N. I. Krause in 1942 allocated 2 options of healing of wounds [12]. There is its resorption on the periphery at the I option in the process of maturing of granulations and contraction of a wound owing to the formation of a hem at the same time. Epithelization comes after the rapprochement of edges of a wound to 1–1,5 sm. At such healing there is a narrow soft mobile hem, and wound defect is closed by shift on it the uninjured surrounding skin. At the II option maturing of granulations isn't followed by a resorption of the formed hem. At a number of patients the hem becomes pathological, gaining keloid or hypertrophic character [12].

The most important feature of a technique of classes of medical physical culture at a burn disease is need of repeated performance during the day of the special exercises which are directed to the prevention or elimination of malfunction of the musculoskeletal device. The large role in the increase of activity of a patient is played by the accounting of efficiency of classes [13].

Problems of the decrease in an adverse effect of a long bed rest, the increase of the general tone of the patient are solved; the prevention of malfunction of not struck segments of the musculoskeletal device is carried out in the third period. Loading on classes depends on the degree of exhaustion of a patient. It isn't necessary to cancel classes of medical physical culture, it is only possible to reduce loading even at the progressing exhaustion [9].

Exercises with the local and dosed muscular tension selectively influence the tissues and segments affected with a burn allow switching off from movements these or those segments (in connection with the made change applied by the tire or a plaster bandage), promote replacement of the died tissues with functionally adapted cicatricial tissue, reduce expressiveness of secondary changes in the tissues which are switched off from movements in connection with painful contractures or immobilization, cause the shift of sinews on all their length and interfere with education or promote elimination of their soldering with the tendinous vaginas and tissues having cicatricial changes [4].

The active movements in a zone of a burn are carried out with amplitude causing only small morbidity. The extension exercises, with a resistance and with special shells and devices (sponges, balls, pieces of rubber of various elasticity, expanders, etc.) belong to the active movements. The last are applied at later stages of a burn disease, at the increasing resistance of the formed hems when there is insufficient impact

only of the active movements. If weight of a burn, nature of surgery, immobilization doesn't allow to carry out the active movements, the static stress of muscles is shown [11].

The passive movements are applied when the active movements are impossible (damage at a burn of the muscles, sinews and nerves participating in the movement) or when they make insufficient impact on the formed cicatricial tissue. They shouldn't be sharp and causing pain. Force of the stretching influence has to increase slowly, gradually. Passive exercises should be combined with a parcel of impulses to tension of muscles at complication of burns by paresis. It is necessary to pay much attention to active power exercises for groups of the muscles at contractures which are constantly in the stretched situation and to relaxation exercises for contracture muscles.

It is necessary to do restoration of the coordination of movements broken in the connection with a burn except mobility in joints and forces of muscles. This requirement is especially essential at burns of the lower extremities [4; 9–11].

It is recommended to stop medical physical culture temporarily at emergence of heavy complications [3]. But at the same time the early application of means of medical physical culture – is the best prevention of complications. The complex of breathing exercises needs to be carried out already next day after the operation as the arising hypoxia can lead to the development of cardiovascular insufficiency, hypostasis of lungs, and thrombosis of vessels [1; 9].

V. E. Vasilyeva uses the stretching exercises in treatment of a burn disease at the formation of the deforming hems, and after full formation of hems – mechanotherapy. She recommends also in the third period of treatment application of elements of sports, and also broad application of work therapy [2].

The preoperative and postoperative periods are allocated at surgeries on skin transplantation in a technique of medical physical culture at deep burns.

Problems of medical physical culture in the preoperative period: removal of an emotional pressure at a patient before the operation; improvement of a functional condition of cardiovascular and respiratory systems; improvement of blood circulation in the struck and donor segments of a body; training in chest type of breath – in need of the compelled position of a body, lying on a stomach, after operation [1; 10].

Preparation of a patient for new conditions of breath or situation after the operation is carried out in need of the preoperative period. Teaching in belly breath in the preoperative period will facilitate a condition of a patient after change of a transplant in a neck and a breast. Strengthening of muscles of a back in the preoperative period will allow a patient easier to transfer the compelled situation, lying on a stomach [11].

During preparation for plastic surgeries appoint the all-strengthening exercises and exercises on preparation of tissues for the forthcoming operation (the active movements in adjacent segments and careful static tension in the struck segment) [3].

Problems of medical physical culture in the postoperative period: prevention of postoperative complications (pneumonia, thrombophlebitis, intestines atony); improvement of activity of cardiovascular and respiratory systems; activation of a blood-groove in a donor segment of a body and in the place of change of tissues – for the purpose of healing acceleration; prevention of rigidity in joints and atrophy of muscles [10].

V. P. Pravosudov recommends a complex of breathing exercises and active movements by healthy extremities to carry out in 2–4 hours after the operation. Besides, patients are recommended to carry out 5–10 deep not forced respiratory movements in each hour, using individually picked up plastic tubes. The special attention should be paid to breathing exercises at skin transplantation on area of a breast, stomach and back. Application of medical physical culture after operation can be temporarily postponed in the connection with deterioration in the general condition of a patient, violation of activity of cardiovascular and respiratory systems, emergence of bleedings in the field of the replaced skin rags during performance of exercises. The development of hypostatic pneumonia isn't contraindication for performance of breathing exercises [11].

Static and dynamic breathing exercises and the simple all-developing exercises for distal departments of extremities in classes are included after operation. Physical exercises begin to carry out in the uninjured joints, with gradual involvement of joints which integuments are burned. However it is necessary to begin the movement in the operated area not earlier than for the 6–7th day after the surgical intervention not to cause tension of muscles and not to displace the replaced skin autografts. The movements are carried out only passive or active and passive, with a small amplitude and effort in the beginning in an operation zone after the 6–7th day. The active movements are joined in classes in the process of replantation of transplants [1; 7; 10].

V. K. Dobrovolsky recommends to begin at an autoplastic not earlier than 6–8 in the afternoon, at homoplastic – 8–10 days, at the plasticity which is carried out with a considerable tension replaced and the hemmed rags – the 12–15th day small on amplitude, slowly carried out active movements causing a tension of tissues in surgery sites. It is important to carry out exercises and at the plaster bandages applied after operation, steaks, and the immobilizing tires. At plasticity "marks" (when the skin rag is cut on pieces) between them form the hems reducing mobility as in the joints which are under burn surfaces and in nearby segments. The functional result at the same time is, as a rule, worse, than at plasticity continuous rags. Timely application of physical exercises helps to keep mobility at the expense of stretching of tissues in a zone of change and assistance to formation of elastic hems, smaller by the sizes, between "marks" [4].

The successful resorption of skin autografts defines the beginning of the next period of a burn disease – the recovery period. Problems of medical physical culture in the period of convalescence: formation of compensations of the irreversible violations caused by a burn disease; adaptation of an organism to household and labor loadings [10; 12].

The general duration of classes in this period reaches till 40 min. and more. Physical exercises in treatment of burns should be repeated, applied repeatedly systematically and it is long (sometimes for many years) [3].

Functional treatment promotes restoration of function of the

musculoskeletal device, cardiovascular and respiratory systems. Classes of medical physical culture are given in the form of morning hygienic exercises, remedial gymnastics, independent classes, and gymnastics in water. Also work therapy, sport elements, outdoor games are applied mechano-and work therapy. Performance of exercises in a heat bath (36–38os) allows using the small force of atrophied muscles and that to promote prevention of different types of contractures [1; 7].

The absolute recovery or irreversible disability can be an outcome of a burn disease. It is necessary to apply widely the applied movements (grab of various objects, clothing of clothes, the letter, combing, sewing etc.) and sports exercises (walking, climbing, elements of sports, walking on skis), especially in the conditions of out-patient and sanatorium stages of treatment. Sometimes patients come to clinic repeatedly within 2–3 years for reconstructive operations. If throughout all this time not to care for a condition of the musculoskeletal device, in particular for preservation of mobility in joints, laying hopes only for surgery can sharply increase rigidity in joints and other violations of functions which don't manage to be eliminated with any subsequent reconstructive operations. It is important that a patient didn't interrupt studies medical physical culture all this time and was under control of experts in this area [4; 9; 13].

Conclusions

1. The offered techniques of medical physical culture at treatment of patients with extensive deep burns after an autoplastic or alloplasty promote the restoration of function of the musculoskeletal device, cardiovascular and respiratory systems.

2. Various localization of a burn, unequal depth and the area of defeat, variety of individual clinical displays of a burn disease don't allow using any standard complexes of remedial gymnastics in clinic. Even selection of special exercises at identical localization of a burn has to be strictly individual, considering concrete violations of functions at this patient.

Prospects of further researches

Studying and justification of application of medical massage in physical rehabilitation of patients with deep burns is perspective.

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References

1. Bogolyubov, V. M. 2007, *Meditsinskaya reabilitatsiya. Rukovodstvo v 3 tomakh* [Medical rehabilitation], Moscow: Bogolyubov V. M., T. 2, pp. 459–476. (in Russ.)
2. Vasilyeva, V. A. 1970, *Lechebnaya fizicheskaya kultura* [Therapeutic physical culture], Moscow: FiS, pp. 157–158. (in Russ.)
3. Gotovtsev, P. I., Subbotin, A. D. & Selivanov, V. P. 1987, *Lechebnaya fizicheskaya kultura i massazh* [Therapeutic physical culture and massage]. Moscow: Meditsina, pp. 140–142. (in Russ.)
4. Dobrovolskiy, V. K. 1974, *Uchebnik instruktora po lechebnoy fizicheskoy kulture* [Tutorial Instructor therapeutic physical training], Moscow: FiS, pp. 340–357. (in Russ.)
5. Kornilov, N. V. 2005, *Travmatologiya i ortopediya* [Traumatology and orthopedics], SPb.: Gippokrat, 544 p. (in Russ.)
6. Marchenko, O. K. 2012, *Osnovy fizicheskoy reabilitatsii* [Fundamentals of physical rehabilitation], Kyiv: Olimp. lit., pp. 508–509. (in Russ.)
7. Mukhin, V. M. 2000, *Fizicheskaya reabilitatsiya* [Physical rehabilitation]. Moscow: VLADOS, pp. 129–130. (in Russ.)
8. Vikhriyeva, B. S. & Burmistrova, V. M. 1986, *Ozhogi: rukovodstvo dlya vrachey* [Burns: A Guide for Physicians], L.: Meditsina, 272 p. (in Russ.)
9. Polesya, G. V. 1979, *Lechebnaya fizkultura v lechenii ozhogovoy bolezni* [Exercise therapy in the treatment of burn disease], Kiyev: Zdorov'ya, 94 p. (in Russ.)
10. Popov, S. N., Valeyev, N. M. & Garaseyeva, T. S. 2014, *Lechebnaya fizicheskaya kultura* [Therapeutic physical culture], Moscow: Izdatelskiy tsentr «Akademiya», 416 p. (in Russ.)
11. Pravosudov, V. P. 1980, *Uchebnik po lechebnoy fizicheskoy kulture* [Textbook of medical physical culture], Moscow: FiS, pp. 297–308. (in Russ.)
12. Yudenich, V. V. & Grishkevich, V. M. 1986, *Rukovodstvo po reabilitatsii obozhzhennykh* [Guide for the rehabilitation of burnt], Moscow: Meditsina, 365 p. (in Russ.)
13. Meleshkov, V. 2015, Application of medical physical culture at extensive superficial burns of the I–II degree. *Slobozans'kij naukovo-sportivnij visnik,* Kharkiv: KSAPC, No 5(49), P. 52–56.

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Vjacheslav Meleshkov: *Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0002-3976-787X
E-mail: arey3@mail.ru

Oleksandr Petruhnov: *Kharkiv National Medical University: Nauky Avenue 4, Kharkiv, 61022, Ukraine.*
ORCID.ORG/0000-0003-1004-2290
E-mail: Petrukhnov-alex@rambler.ru

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Analyses of the efficiency of technique for improving the accuracy of performing power serve in jump by skilled volleyball players

Alina Melnik

Kharkiv State Academy of Physical Culture, Kharkiv , Ukraine

Purpose: *investigating the results of replicate experiment, in which the proposed technique for improving the accuracy of performing serve was used, and carrying out a comparative analysis the corresponding results of the current and initial experiments.*

Material & Methods: *the analysis of the video, pedagogic observations, statistical methods of processing the results.*

Results: *the replicate experiment has been carried out. The detailed analysis of the characteristics of moving ball has been performed. The approach for estimating the accuracy of the performing serve has been proposed. The estimation of statistical validity of differences between the results of the comparative analysis of the corresponding characteristics of both experiments has been performed using criteria Student and Fisher.*

Conclusions: *in the replicate experiment a reliable change of the characteristic, which is associated with the accuracy of performing power serve in jump, has been identified. Using techniques developed by the author in the practice of training process can be considered that it is effective.*

Keywords: *experiment, correlation, accuracy criterion, statistical validity, modeling characteristics.*

Introduction

Introductions of a power serve in jump and change of rules in calculation of points at its performance substantially changed the productivity and dynamic of games in modern volleyball. The analysis of statistical data of the games of the national championships of the countries of Europe, America and other greatest international competitions of volleyball showed that this serve plays the important role in the achievement of success in the competitive activity. It turned from the way of introduction of a ball in the game into the powerful mean of the attacking actions of contradictory teams that allows winning the point directly after its performance. However it should be noted also the large number of mistakes at its performance which in turn can lead to loss of scores and even to defeat of a team. Therefore one of the decisive factors of increase of the level of game of teams and achievement of success in competitions of different rank of modern volleyball is the technical -tactical improvement of a power serve in jump. In turn, the increase of efficiency of this serve in the competitive activity can be reached, paying close attention to the solution of this problem during the training process.

The technique of a power serve in jump is rather difficult and demands, first of all, knowledge of the main regularities of the movement of ball after its performance [6–8]. In our works [1; 7] the detailed analysis of different characteristics, which define the trajectory of flight of the ball is carried out, and their dependence on the corresponding kinematic variables, is studied. It was noted that studying of opportunities of improvement of accuracy of its performance is of great importance for the solution of the problem of increase of efficiency of a power serve in jump. We offered and made the corresponding experiment for this purpose (see works [2–4]).

The analysis of efficiency of the technique offered by us for the increase of accuracy of performance of a power serve in jump by the qualified volleyball players is carried out in this work. In works [2–4] the experiment was made with the group of volleyball players to whom certain tasks for the purpose of the solution of this problem were delivered. We developed practical recommendations for the increase of accuracy of this serve on the basis of results of the carried-out analysis of statistical data of the noted experiment and conclusions of the pedagogical supervision during its performance [4].

The important task is recognition of positive effect of introduction of the offered technique in practice of the training process. For this purpose, according to practice of sports researches, we offered the same group of volleyball players which consists of five people, during the certain time to use our recommendations during the corresponding trainings. Then, the repeated experiment, which scheme and details are described in works [1–4; 7], was made. 10 productive serves in performance by each volleyball player were considered unlike the noted works in the repeated experiment.

Communication of the research with scientific programs, plans, subjects. The research is executed according to the plan of the research work of the department of the Olympic and professional sport, the department of sports and outdoor games of Kharkiv state academy of physical culture. The direction of the research answers the subject of the Built plan of the research works in the sphere of physical culture and sport for 2011–2015 by the direction: “Improvement of the educational-training process in sports” (number of the

state registration No. 0111U003126) for 2016–2018 by the subject "Definitions of influence of different exercise stresses on the accuracy of performance of movements".

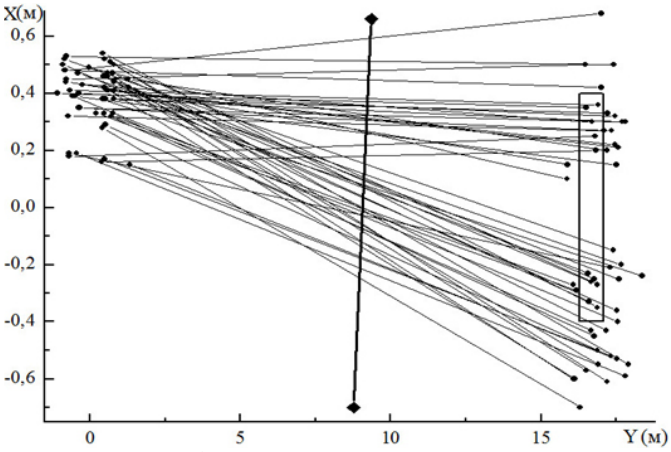
Purpose of the research: to carry out the comparative analysis of the corresponding results of the primary and repeated experiment in which the offered technique of increase of accuracy of performance of a power serve in jump was used.

Material and Methods of the research

Methods: analysis of video filming, pedagogical supervision, mathematical methods of processing of results.

Results of the research and their discussion

The relevant statistical data of the repeated experiment are submitted in pic. 1. Let's remind that the target in the form of square of 0,8 x 0,8 m in size served as the purpose in both experiments that was represented on the platform plane between 1 and 6 zones. The fragment of the central line of the platform is shown for the descriptive reasons in pic. 1. Axis Y of the Cartesian reference system, which was elected by us, crosses this line at an angle which equals about 67°.



Pic. 1. Results of the repeated experiment *(points answer the ball projection coordinates to the platform plane at the initial moment of its flight and the place of its landing)*

It is visible from the comparison of coordinates of touch-down of the ball that given on pic. 1and the corresponding drawing in the work [4], that the accuracy of performance of serves in the repeated experiment considerably improved. Lines, in pic.1, characterize the direction of flight of the ball as along these lines, its rectilinear movement to the corresponding speed happens. It should be noted that 28% of all executed serves have got precisely to the target. The direction of flight of the ball was elected by players correctly approximately in 40% of cases; however reached range of its flight didn't allow getting to target precisely. That is in this case, in the target only those serves, which direction answers with value of the angle α, had probability of hit of the ball, in the interval $0.23^{\circ} \geq \alpha \geq 3.1^{\circ}$. α – is the angle between the direction of the movement of the ball and the axis Y [4] which is defined by the corresponding coordinates of the ball in initial and final phase of its flight.

On the basis of the analysis of this experiment we defined different characteristics of flight of the ball and kinematic variables which describe trajectories of its movement. The following designations are used for them: d та R – deviation of initial coordinates of the movement of ball from reference mark of the elected system of coordinates and coordinates of the place of its landing from the target coordinate, L – range of the movement of ball, v_0 – the initial speed of its movement, θ – ball outing angle concerning the platform plane. In tab. 1 the provided data of the average analysis of these sizes which details are in details described in the work [4].

The correlation analysis of these sizes similar carried out in [4], showed that the greatest values have coefficients of linear correlation r_{La} and r_{Lv_0} which equal 0,5 and 0,59 respectively. It specifies on the average communication with the positive direction between characteristics which define these coefficients. Let's note that the correlation coefficient between kinematic variables θ та v_0 r_{qv_0}=–0,69, the average communication with the negative direction answers. The weak interrelation is observed between other characteristics of trajectory of flight of the ball.

From the practical point of view, the most convenient way of assessment of accuracy of performance of serve in these experiments, in our opinion, there is measurement of R, which is considered by us in the work of [4] characteristics which defines ball touch-down point deviation from the target. The simplest assessment of efficiency of the technique, which was offered by us, can be carried out within the popular method of average sizes, using the comparative analysis of results for the characteristic of R that received in both experiments. In this method the key parameters of the primary quantitative information on sizes R are: arithmetic average value $\bar{X}_R$ and average square deviation σ_R. Let's note that values of size R in the corresponding variation row submit to the normal law of distribution.

The comparison of the noted parameters determined in this work ($\bar{X}_R$=0.70 m і σ_R=0.31 m) і в [4] ($\bar{X}_R$=1.16 m, σ_R=0.53 m), shows that the improvement of the corresponding parameters of variation ranks which are considered, is observed in the repeated experiment. Thus, it is possible to draw conclusion that the high-quality improvement of the characteristic of R took place in the repeated experiment what is connected with the accuracy of performance of a power serve in jump.

Further, we will use formalism of the selective method (see, for example [5]) for more reliable assessment of efficiency of the developed by us technique, which is traditionally used in the solution of certain tasks of physical culture and sport, when determining various characteristics of sports activity on the basis of the analysis of results of the corresponding researches or these made experiments. Many problems of selective method can be classified as class of comparative tasks. It is possible to include any parameters and characteristics of the training process in basis of the comparative analysis of two or more samples.

Actually, conclusions from the comparative analysis of results which were received when processing statistical these both experiments, will answer only the group of volleyball players, which is marked out above, who were tested by us. However, as often becomes in practice of sports researches, we will assume that this group of volleyball players is selection of population which is rather part large number of volleyball players of the same qualification and sports experience, as this group is. The same reasoning is fair also for results of the average

Table 1

Results average statistical analysis of data of experiment

$\bar{X}_{v_0}$ m·s^{-1}	σ_{v0} m·s^{-1}	$\bar{X}_{\alpha}$ degr.	σ_{v0} degr.	$\bar{X}_L$ m	σ_L m	$\bar{X}_{\theta}$ degr.	σ_{θ} degr.	$\bar{X}_R$ m	σ_R m	$\bar{X}_d$ m	σ_d m
17,65	1,11	–1,73	1,35	16,91	0,89	5,28	1,32	0,70	0,31	0,76	0,23

analysis of the data connected with performance by these volleyball players of power serve in jump. Proceeding from it, the corresponding results can be extended to the whole contingent of volleyball players, which was discussed above.

The perfect method for clarification of reasonable effect of use of the offered technique is statistical reliability of results of such comparative analysis. The offered technique is correct in the presence of reliable positive changes in these results.

The assessment of statistical reliability of differences between selections of characteristics of *R,* which were defined in primary and repeated experiments, can be executed within the selective method by means of criteria of statistical reliability. We will use the criterion of Student for resolving of the task which gives the chance to investigate different big selections which answer the normal law of distribution. This criterion is used for the comparison of selections on value of their average values in practice of sports researches.

In this case the criterion of Student *t* is defined by the ratio:

$$t = \frac{|\overline{x_R^1} - \overline{x_R^2}|}{\sqrt{m_1^2 + m_2^2}} \qquad (1),$$

where $\overline{x_R^1}$ ($\overline{x_R^2}$) *– the arithmetic average value of sample of the characteristic of R for the primary (repeated) experiment,* m_1 *and* m_2 *– the corresponding errors of representativeness.*

Errors of representativeness define deviations $\overline{x_R^1}$ and $\overline{x_R^2}$ from the arithmetic averages of values of the characteristic *R* corresponding populations. The formula for definition of this error for enough big selections has appearance:

$$m_i = \frac{\sigma_i^R}{\sqrt{n_i}}, \ (i = 1,2), \qquad (2),$$

where σ_i^R *i* n_i *– the average square deviation and volume of the corresponding selection.*

Using results of the analysis of statistical data, which are obtained in both experiments, for the noted above sizes, such values were found:

$\overline{x_R^1}$=1.16 m, σ_i^R=0.53 m at n_1=40 – in the work [4] i $\overline{x_R^2}$=0.70 m, σ_i^R=0.31 m at n_2=50 – in this work. Having estimated, at first, the corresponding errors of representativeness $m_1 \approx 0.084$ m i $m_2 \approx 0.044$ m, we find for the criterion of Student according to the formula (1) of value $t \approx 4.8$. We find the extreme value of this criterion t_{rp}=1.99 for volumes of selections which are stated above at reliability of *P*=0.95, that is, as a rule, used in sports researches, according to the table of Student (see, for example [5]).

As from comparison of both criteria, it comes up that $t \geq t_{gr}$, the difference between characteristics which were considered, is statistically reliable.

When comparing the different big selections for which observance of the normal law of distribution is not obligatory, is applied Fischer's criterion [5].

By means of this criterion, it is possible to compare the corresponding characteristics by the dispersion factor that is dispersions of selections which are investigated.

Fischer's criterion *F* is defined by the following expression:

$$F = \frac{(\sigma_1^R)^2}{(\sigma_2^R)^2}, \qquad (3),$$

where $(\sigma_1^R)^2$, $(\sigma_2^R)^2$ *- dispersions of the corresponding selections. At the same time* $(\sigma_1^R)^2 > (\sigma_2^R)^2$.

When comparing the different big selection samples of characteristics of *R* which are discussed for Fischer's criterion according to formula (3) is obsessed $F \approx 2.9$. Choosing reliability of *P*=0.95, we found the extreme value of criterion F_{gr}=1.6 from the table of Fischer [5] for volumes of the corresponding selections of n_1=40 and n_2=50. As comparison of both criteria shows that $F > F_{gr}$, difference is necessary to consider statistically reliable between characteristics, which are considered.

Model characteristics, which display some reference points at certain stages of their sports preparation, play the important role for the qualified athletes of different types of sport. As a rule, definition of model characteristics is based on the assessment of the corresponding average indicators, using possibilities of selective method. The certain zone which is in limits lower and top confidential borders this method is defined at their assessment near the normal value of the characteristic.

Let's define the model characteristic for size *R* in the repeated experiment in which $\overline{x_R^2}$=0.70 m, σ_2^R =0.31 m. We used the value of error of representativeness which equals $m_2 \approx 0.044$ m, and the extreme value of the criterion of Student t_{gr}=1.99, as it is noted above, when determining confidential boarders. Thus, values of the model characteristic are in the boarders, which are defined by formula:

$$\overline{x_R^2} - m_2 t_{gr} \leq \overline{x_{R_m}} \leq \overline{x_R^2} + m_2 t_{gr} \qquad (4).$$

That is, value of this model characteristic has to be in such limits: 0.62 m$\leq x_{R_m} \leq$0.79 m. As a rule, at the final choice of the model characteristic that from its extreme values which is more rigid in performance, is chosen. In this case we receive $x_{R_m} \approx 0.62$ m.

This model characteristic is rather easy way of assessment of

accuracy of performance of a power serve in jump. It does not make difficulty to introduce such assessment of accuracy of performance of serve in practice of the training process at working off of technique of its execution, by measurement of distance of R from point of touch-down of the ball to the center of the chosen target. If the value $R<\overline{x_{R_m}}$ is observed at the player after the serve, that the corresponding assessment can be considered positive, and negative otherwise. The value of the model characteristic changes over time that demands introduction of the corresponding corrections at its assessment.

Conclusions

The corresponding characteristics of trajectory of flight of the ball were calculated on the basis of statistical data of the repeated experiment, and also the correlation the analysis of these characteristics for assessment of intercommunication between them was carried out. It is offered to estimate the accuracy of performance of serve by measurement in the noted experiments value of such characteristic as deviation of point of touch-down of the ball after serve from the center of the target. The efficiency of the developed by us technique was investigated on the basis of the comparative analysis of the corresponding characteristics, which was defined in both experiments. The assessment of statistical reliability of differences between them was carried out within the selective method by means of Student's and Fischer's criteria. The uses of the developed by us technique, in practice of the training process, are possible to consider effective, considering the reliable change of these characteristics. The model characteristic for assessment of accuracy of performance of a power serve in jump was also defined on the basis of the analysis of data of the repeated experiment.

Prospects of the subsequent researches. The subsequent work is connected with use of the model characteristic, which was investigated in this work, in practice of the training process of volleyball teams. It is possible to estimate the corresponding dynamics in time aspect, fixing the value of this characteristic as for one volleyball player, and the whole team, during the certain time. Volleyball players can improve stability and accuracy of performance of a power serve in jump and by that to achieve the certain progress in the competitive activity, equaling on the noted characteristics.

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References

1. Melnik, A. Yu. 2015, [An analysis of the laws of motion of the ball when the power supply in the jump], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 1(45), p. 81–84. (in Russ.)
2. Melnik, A. Yu. 2015, [Study of kinematic characteristics of the ball on the accuracy of the power supply in a jump in volleyball], *Problemy i perspektivy razvitiya sportivnykh igr i yedinoborstv v vysshikh uchebnykh zavedeniyakh* [Problems and prospects of development of sports and martial arts in higher education]. Kharkov : KhDAFK, T 2, p. 112–114. (in Ukr.)
3. Melnik, A. Yu. & Gradusov, V. O. 2014, [Improving the accuracy of the power supply in a jump in volleyball], *Tezi dopovidi XIV Mizhnar. nauk.-prakt. konferentsiï «Fizichna kultura, sport ta zdorov'ya» (10–12.12.2014)* [Abstracts XIV Intern. nauk. and practical. Conference "Physical education, sport and health" (10-12.12.2014)], Kh. : KhDAFK, p. 97–100. (in Ukr.)
4. Melnik, A. Yu. & Gradusov, V. O. 2015, [Development of methods for increasing the precision of the power supply in a jump in volleyball], *Naukoviy chasopis, Fizichna kultura i sport* [Physical Education and Sport], K., Vipusk 8(63)15, pp. 54–57. (in Ukr.)
5. Nachinskaya, S. V. 1987, *Osnovy sportivnoy statistiki* [Fundamentals of sports statistics], Kyiv: Vishcha shkola, 189 p. (in Russ.)
6. Asai, T. et al. 2010, Fundamental aerodynamics of a new volleyball. *Sports Technology*, Vol. 3 – No 4, pp. 235–239.
7. Melnik, A. 2015, Studying the physical laws of moving ball at the power serve in jump. *Slobozhanskyi herald of science and sport*, No 1(45), Kharkiv, pp. 76–81.
8. Samson, J. & Roy, B. 1976, Biomechanical analysis of the volleyball spike. *Biomechanics IB.* University Park Press, Baltimore-London, Tokyo, pp. 332–336.

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Alina Melnik: *Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0001-5612-0333
E-mail: alina.melnik87@mail.ru

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The relationship model of technical and tactical and morpho-functional characteristics of highly skilled swimmers specializing in 50 m butterfly

Yelena Politko

Kharkov state academy of physical culture, Kharkov, Ukraine

Purpose: *development of model of the technical and tactical actions, morpho-functional characteristics of highly qualified athletes-swimmers specializing in the 50m butterfly way.*

Material & Methods: *the analytical synthesis of scientific literature data, filming of competitive activity, getting of timing, anthropometry, methods of mathematical statistics.*

Results: *developed model of technical and tactical actions, morphofunctional characteristics of highly qualified swimmers and determined the most important factors affecting athletic performance.*

Conclusions: *the identification and assessment of the most important for the success of sports perfection indicators will allow drawing conclusions about the correctness of the training process according to chosen swimming specialization.*

Keywords: *models of highly skilled swimmers, 50 m butterfly, technical and tactical actions, morphological and functional characteristics.*

Introduction

Practice of sport of the highest achievments in the conditions of intensification of the training and competitive process underwent a number of essential changes in recent years. The increase of level of the competition and the growth of sporting achievements on the international scene in sports swimming shows that the most talented sportsmen, who are adapted for performance of high loadings both on volume, and on intensity, became champions [5; 6].

Training of high-class sportsmen in modern sport is inseparably linked with modeling – the process of development and use of various types of the models reflecting the structure of competitive activity and readiness of sportsmen [5].

Today the significant amount of works is connected with the research of morphofunctional models in the field of sports swimming, determining the level of readiness of sportsmen [1; 2; 7; 8]. A number of works are devoted to modeling of the structure of the competitive activity [3; 5; 6; 9], to consideration of combination of components of the structure of the competitive activity and readiness [4]. In spite of the fact that the large volume of experimental material is stored up in this field of knowledge at the moment, the developed model characteristics became outdated a little for today. Therefore the matter demands addition of scientific knowledge according to the current trends of development of sports swimming. In this regard the development technical and tactical, morphofunctional model characteristics and determination of informative parameters will allow to allocate the most priority criteria, defining achievements of sportsmen in modern swimming. The comparison of individual data of a sportsman to model indicators allows defining the compliance of his opportunities to the requirements dictated by specifics of this or that swimming discipline to reveal reserves of the further improvement of his skill.

Communication of the research with scientific programs, plans, subjects

The work was performed within the Consolidating plan of RW in the sphere of physical culture and sport of Ukraine for 2011–2015 on a subject 2.13 “Modeling of technical and tactical actions of the qualified sportsmen in swimming and high-speed and power disciplines of track and field athletics” (No. of the state registration is 0111U000191).

The purpose of the research

The development of model technical and tactical and morphofunctional characteristics of the highly skilled sportsmen-swimmers, specializing in a distance of 50 m by using the way butterfly.

Material and Methods of the research

Methods of the research: analytical synthesis of data of scientific literature, video filming of competitive activity, timekeeping, anthropometry, methods of mathematical statistics.

Data collection was carried out during the educational-training camps. The research was conducted during the championships and Cups of Ukraine on swimming and educational-training camps which were organized by the Federation of swimming of Ukraine (2010–2015). The examined group of sportsmen consisted of the strongest swimmers, members of a national team of Ukraine on swimming (HMS, MSIC, MS), participants of final races at a distance of 50 meters in swimming by using the way butterfly.

Results of the research and their discussion

The analysis of technical and tactical actions of the swimmers, acting at a distance of 50 meters butterfly was carried out with use of the author's computer program Videochronometr (A.s. No. 27884). The technology of the software fixes: time and rate of fungal movements of the sportsman during passing of control pieces of a distance; to calculate automatically speed and «step» of a cycle of fungal movements. Unlike already existing ways of breakdown of competitive distances on various sites [5; 9], we used more detailed method of the accounting of indicators. 6 sites were allocated as the main for the 50-meter pool: starting site where length (m) and speed ($m \cdot s^{-1}$) of overcoming of a piece from a starting table till appearance of the sportsman on a water surface were considered; a piece from "coming up" after start to a mark of 15 m; remote swimming on sites: 15–25 m, 25–35 m, 35–45 m; finishing site of 45–50 m. This approach allows to calculate in more detail individual values of the structure of competitive activity of sportsmen and to reveal reserves of achievement of the planned indicators of the competitive activity.

Processing of video of heats allowed obtaining data on temporary and spatial characteristics of swimmers. These data formed the basis for development of quantitative model of structure of competitive activity of highly skilled swimmers when passing a distance of 50 m butterfly (pic. 1).

The tendency of decrease in indicators of speed, speed and "step" of a cycle of rowing movements as approaching the finish is noted when forming models of the structure of competitive activity of sportsmen. The greatest indicators of rate of movements are observed in the first half of a distance (62,43 $cycle \cdot min^{-1}$) which gradually decrease under the influence of the increasing exhaustion that leads to reduction in the rate of swimming. At the same time sizes of "step" of a cycle of rowing movements of swimmers are rather stable. Therefore, the deduction of optimum sizes of frequency and power of rowing movements in the second half of a 50-meter distance can be a reserve of increase of sports results of swimmers.

The carried-out correlation analysis allowed establishing a number of the interrelations between the main components of competitive activity influencing sports result at swimming by of a 50-meter distance by using the way butterfly (tab. 1).

The highest rates of the return interrelation are established between sports result and the speed shown on remote sites: "coming up – 15 m" (r=–0,91), "15–25 m" (r=–0,86) and "35–45 meters" (r=–0,90). The average level of correlation is revealed between sports result and indicators of speed of swimming on starting (r=–0,62) and finishing (r=–0,69) pieces. High productivity at a distance of 50 m butterfly is shown by those sportsmen who carry out "coming up" more effectively and overcome with higher speed the second half of a distance.

Rather high values of frequency of strokes more influence the level of sporting achievements at a 50-meter distance. The return interrelation is established between sports result at a distance and rate of rowing movements on cyclic pieces: "15–25 m" (r=–0,76), "25–35 m" (r=–0,84), "35–45 m" (r=–0,76).

In turn swimming speed indicators on pieces "start – "coming up" and "15–25 m" correlate with rate of rowing movements on sites: "coming up – 15 m" (r=0,96 and 0,74), "15–25 m" (r=0,95 and 0,97), "25–35 m" (r=0,83 and 0,99), "35–45 m" (r=0,78 and 0,97), "45–50 m" (r=0,89 and 0,76 respectively). Average degree of interrelation is established between swimming speed on a piece of "35–45 m" and rate of movements on a site of "25–35 m" (r=0,70).

On a site "coming up – 15 m" indicators of speed of swimming and "step" of a cycle of rowing movements have the sufficient degree of interrelation (r=0,82). Besides, speed indicators on sites of "35–45 m" and "45–50 m" correlate with the size of "step" on a piece "coming up – 15 m" (r=0,77 and 0,96 respectively). Between speed on a site of "45–50 m" and length of a stroke by a hand on a piece of "15–25 m" the sufficient interrelation (r=0,71) is noted.

Thr comparison of specific features of sportsmen to model technical and tactical characteristics allows to predetermine the content of the training process, especially at the final stages of long-term training of swimmers.

It is known that characteristics of a constitution significantly influence physical working capacity and have the high hereditary conditionality that allows to define prospects of swimmers. Therefore in the course of definition of remote specialization of swimmers the account their individual morhofunctional features is necessary [1; 2; 7].

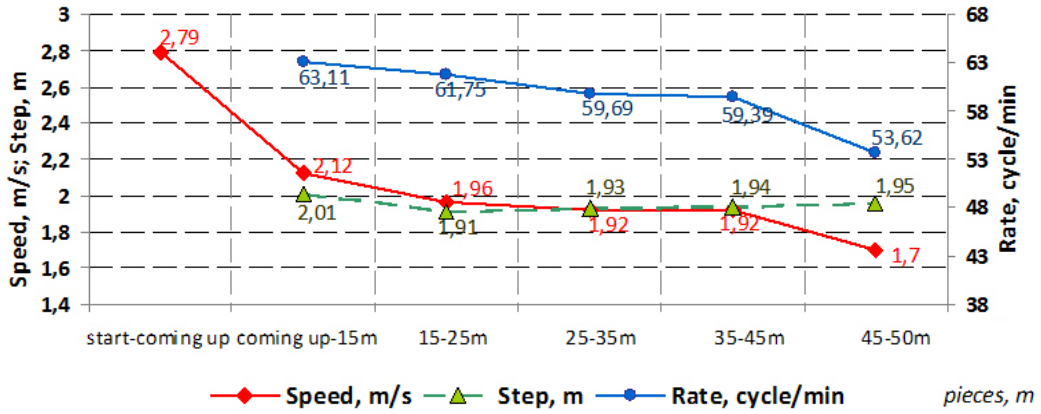
We studied the longitudinal and girth sizes of a body, body weight, LVC, indexes of physical development for the purpose of the development of morphofunctional model characteristics of the strongest swimmers specializing in a distance of 50 m butterfly. 40 parameters were analyzed in total.

The comparative analysis of swimmers sprinters with average model of other swimming specializations [7] showed that they are rather athletic and have high rates of body weight, total and girth sizes of a body, LVC that allows them to perform successfully high-speed and power work in an anaerobic zone of power supply (pic. 2).

The carried-out analysis of the obtained data allowed to define interrelation of sports result with various morphofunctional parameters of the swimmers sprinters who performed at a distance of 50 m butterfly and to allocate the most significant indicators having high coefficient of correlation (pic. 3).

So, it was established that the sports result closely correlates with an index of relative lung vital capacity (RLVC) (r=0,99), and also length of a foot (r=0,98). Average values of interrelation are revealed between time shown at a distance and body proportion indexes: "body length/length of an arm" (r=0,72) and "width of a pelvis/ body length" (r=0,73). The return interrelation of sports result is revealed with: length of a shin (r=–0,98), body length (r=–0,88), hand (r=–0,78), leg (r=–0,77), absolute surface area of a body (r=–0,86), width of shoulders (r=–0,78), girth of a wrist (r=–0,83), shin (r=–0,72), shoulder (weakened) (r=–0,70), indicator of the "width of shoulders/width of a pelvis" index (r=–0,76), and also with the flexibility test "mobility in shoulder joints" (r=–0,69).

Besides, the various degree of interrelation was established between morphofunctional parameters of swimmers and speed of swimming on various sites of a distance.

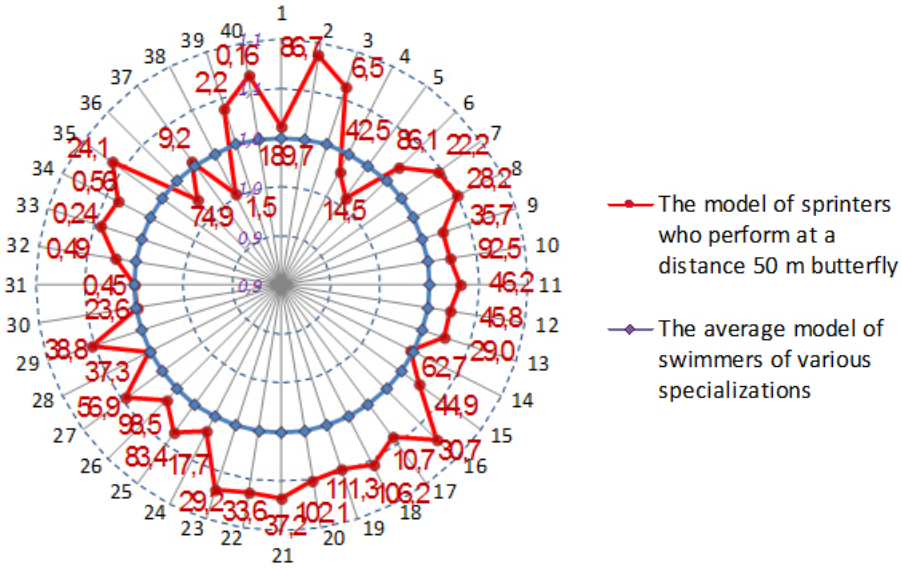


Pic. 1. **Dynamics of indicators of speed of swimming, speed and "step" of a cycle of rowing movements of sportsmen at a distance of 50 meters in swimming by using the way butterfly**

Table 1

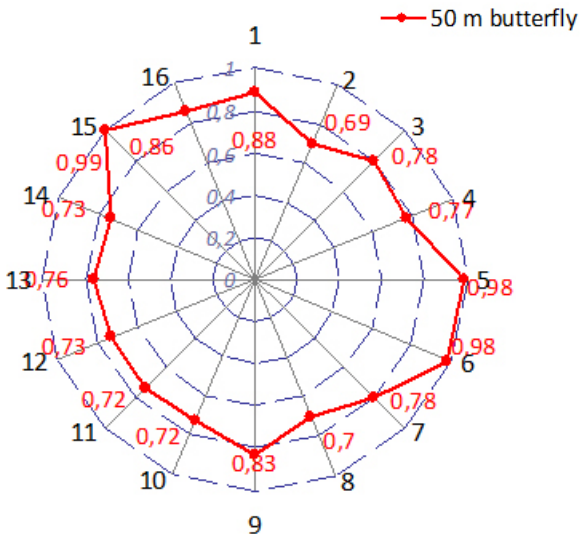
Correlation indicators between sports result and components of competitive activity of swimmers at a distance of 50 m butterfly

Pieces of distance	Speed, m·s^{-1}	Rate, cycle·min^{-1}	Step, m
Starting piece	–0,62	–	–
Outlet– 15 m	–0,91	–0,4	–0,52
15–25 m	–0,86	–0,76	0,01
25–35 m	–0,21	–0,84	0,71
35–45 m	–0,9	–0,76	0,63
45–50 m	–0,69	–0,36	0,09



Pic. 2. **Model morphofunctional characteristics of the high-class swimmers specializing in a distance of 50 m butterfly:**

1 – body length, sm; 2 – body weight, kg; 3 – LVC, l; 4 – mobility in humeral joints, sm; 5 – inclination down, sm; 6 – length of an arm, sm; 7 – length of a hand, sm; 8 - length of a forearm, sm; 9 – length of a shoulder, sm; 10 – length of a leg, sm; 11 – length of a hip, sm; 12 – length of a shin, sm; 13 – length of foot, sm; 14 – length of a trunk, sm; 15 – width of shoulders, sm; 16 – width of a pelvis, sm; 17 – width of a hand, sm; 18 – OT at rest, sm; 19 – OT on a breath, sm; 20 – OT on an exhalation, sm; 21 – girth of a shoulder (intense.), sm; 22 – girth of a shoulder (weakened.) sm; 23 – girth of a forearm, sm; 24 – firth of a wrist, sm; 25 – girth of a waist, sm; 26 – girth of buttocks, sm; 27 – girth of a hip, sm; 28 – girth of a knee, sm; 29 – girth of a shin, sm; 30 – girth of an anklebone, sm; 31 – length of an arm/ body length, sm; 32 – length of a leg/length of a body, sm; 33 – width of shoulders/body length, c.u. 34 – OT/body length, c.u.; 35 – Kettle's index, kg·m^{-}l; 36 – RLVC, ml·kg^{-1}; 37 – excursion of a thorax, sm; 38 – width of shoulders/width of a pelvis, c.u.; 39 – absolute surface area of a body, ml; 40 – width of a pelvis/ body length, c.u.



Pic. 3. Structure of interrelation of sports result and morphofunctional characteristics of the swimmers specializing in a distance of 50 meters by using the way butterfly:

1. – body length; 2. – mobility in shoulder joints; 3. – length of a hand; 4. – length of a leg; 5. – length of a shin; 6. – length of a foot; 7. – width of shoulders; 8. – girth of a shoulder (weakened); 9. – girth of a wrist; 10. – girth of a shin; 11. – body length/length of an arm; 12. – width of shoulders/body length; 13. – width of shoulders; 14. – width of a pelvis/body length; 15. – RLVC; 16. – Absol. sq.

So, speed on a starting site closely correlates with girth sizes of a body: wrist (r=0,91), knee (r=0,90), shin (r=0,98), and also with length of a shin (r=0,76), indicator of excursion of thorax (r=0,81) and the test "mobility in shoulder joints" (r=0,98). The interrelation is traced between a swimming speed indicator on a site "coming up – 15 m» and body length (r=0,77), length of a hand (r=0,91), leg (r=0,95), shin (r=0,82), width of shoulders (r=0,91), indicator of absolute surface area of a body (r=0,81), the index "width of shoulders/width of a pelvis" (r=0,72) and the test "inclination forward from a standing position" (r=0,70). Swimming speed on a piece of "15–25 m» correlates with a length of a shin (r=0,95), girth of a shin (r=0,94) and wrist (r=0,84), mobility in shoulder joints (r=0,82), the index "width of shoulders/width of a pelvis" (r =0,84). On a piece of "25–35 m» speed of swimming is interconnected with indicators of body weight (r=0,84), length of a forearm (r=0,90), length of a hip (r=0,77), width of a hand (r=0,78), girth of a knee (r=0,90), girth of a thorax (r=0,78), a shoulder (r=0,79), a forearm (r=0,87), buttocks (r=0,78) and mobility in shoulder joints (r=0,73). High degree of correlation is established between swimming speed on a site of "35–45 m» and indicators of length of a hand (r=0,80), length of a leg (r=0,96), length of a shin (r=0,83), width of shoulders (r=0,80), the index "width of shoulders/width of a pelvis" (r=0,85). Swimming speed on a finishing piece has high degree of interrelation with length of a leg (r=0,99), length of a hand (r=0,85), width of shoulders (r=0,85), and also the test "inclination forward from a standing position" (r=0,74).

High degree of interrelation between a mobility indicator in shoulder joints and rate of rowing movements on sites is recorded: "coming up – 15 m" (r=0,90), "15–25 m" (r=0,91), "25–35 m" (r=0,79), "35–45 m" (r=0,71) and "45–50 m" (r=0,78). The indicator of length of a shin correlates with speed on pieces of "15–25 m" (r=0,88), "25–35 m" (r=0,93) and "35–45 m" (r=0,86). Between indicators of girth of a shin and frequency of movements on all sites of a distance high degree of correlation is noted: "coming up – 15 m" (r=0,92), "15–25 m" (r=0,99), "25–35 m" (r=0,93), "35–45 m" (r=0,89) and "45–50 m" (r=0,89). The indicator of excursion of a thorax is interconnected with speed on pieces: "coming up – 15 m" (r=0,92), "15–25 m" (r=0,77), "25–35 m" (r=0,66), "35–45 m" (r=0,70) and "45–50 m" (r=0,98). The "width of shoulders/ width of a pelvis" index correlates with speed on sites of "15–25 m" (r=0,70), "25–35 m" (r=0,86) and "35–45 m" (r=0,90).

The return correlation interrelation is established between indicators of the index "width of shoulders/body length " and frequency of rowing movements on sites: "coming up –15 m" (r=–0,94), "15–25 m" (r=–0,91), "25–35 m" (r=–0,84), "35–45 m" (r=–0,86) and "45–50 m" (r=–0,99). Also the index "width of a pelvis/length body" is connected with speed on pieces: "15–25 m" (r=–0,84), "25–35 m" (r=–0,94), "35–45 m" (r=–0,98) and "45–50 m" (r=–0,70). The index "length of a hand/ body length" correlates with rate of rowing movements on sites: "15–25 m" (r=–0,76), "25–35 m" (r=–0,90) and "35–45 m" (r=–0,94). The girth of a waist has the average level of interrelation with rate of rowing movements on sites: "25–35 m" (r=–0,70), "35–45 m" (r=–0,81) and "45–50 m" (r=–0,73).

In turn, the size of "step" of a cycle of rowing movements on a piece "coming up –15 m" correlate with indicators: length of a leg (r=0,90), length of a hand (r=0,85) and width of shoulders (r=0,85). Indicators of LVC and girth of a waist are interconnected with a length of a stroke on sites of "25–35 m" (r=0,86 and 0,85) and "35–45 m" (r=0,72 and 0,84 respectively). Indicators of the "body length / length of hand "and "girth of a thorax/ body length" index correlate with "step" of a cycle of fungal movements on pieces of "25–35 m" (r=0,99 and 0,95) and "35–45 m" (r=0,88 and 0,75 respectively). Length of rowing movements on a piece of "35–45 m" (r=0,95) and "45–50 m" (r=0,90) has close interrelation with an indicator of the index "width of shoulders/ body length". Besides, sizes the girth sizes of a body of a knee, shin and anklebone have the return degree of interrelation with length of a stroke on various sites of a distance.

Conclusions

1. Model characteristics of technical and tactical and morphofunctional indicators of the swimmers sprinters of high qualification, specializing in a distance of 50 m butterfly were developed and the most significant factors influencing sports result were allocated during the research.

2. Identification and assessment of the level of development of the most significant for successful sports improvement of a circle of indicators will allow making the conclusion about correctness of creation of the training process, about degree of compliance of readiness of the sportsman to requirements of swimming specialization.

Prospects of further researches are connected with the development of model technical and tactical and morphofunctional characteristics of highly skilled swimmers, representatives of other swimming specializations.

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References

1. Bulgakova, N. Zh. 1986, *Otbor i podgotovka yunykh plovtsov* [Selection and preparation of young swimmers], Moscow: Fizkultura i sport, 191 p. (in Russ.)
2. Zakolodnaya, Ye. Ye. 1997, [Type constitution as a factor of specialization and high sports achievements in swimming], *Uchenyye zapiski* [Scientific notes], Minsk: Chetyre chetverti, Vol. 1, pp. 117–126. (in Russ.)
3. Kleshnev, V. V. 2005, [Speed ratio analysis method, tempo and pitch when the locomotion in water], *Plavaniye* [Swimming], SPb.: Plavin, T. 3, pp. 74–78. (in Russ.)
4. Komotskiy, V. M. *Vzaimosvyaz struktury sorevnovatelnoy deyatelnosti i podgotovlennosti vysokokvalifitsirovannykh plovtsov-sprinterov*: avtoref. dis. na soiskaniye nauch. stepeni kand. ped. nauk [The relationship structure of competitive activity and readiness of highly skilled swimmers-sprinters: PhD thesis], Kyiv: KGIFK, 1986, 24 p. (in Russ.)
5. Platonov, V. N. 2011, *Sportivnoye plavaniye: put k uspekhu* [Sport swimming: the path to success], Kiyev: Olimpiyskaya literatura, pp. 452–467. (in Russ.)
6. Politko, Ye. V. 2014, [Modelling of competitive activity as the basis of individualization preparation of sportsmen-swimmers], *Fizichna kultura, sport ta zdorov'ya : materiali XIV Mizhnarodnoi naukovo-praktichnoi konferentsii «Fizichna kultura, sport ta zdorov'ya», (Kharkiv, 10–12 grudnya 2014 r.)* [Physical education, sports and health materials XIV International Scientific Conference ["Physical education, sport and health"] (Kharkiv, 10–12 December 2014)], Kharkiv: KhDAFK, 127–130 p. (in Russ.)
7. Politko, Ye. V. 2013, [Modern trends in the model of morpho-functional characteristics of elite athletes-swimmers], *Visnik Chernigivskogo natsionalnogo pedagogichnogo universitetu im. T. G. Shevchenka* [Bulletin of the Chernihiv National Pedagogical University Taras Shevchenko], Chernigiv: ChNPU, No 112, T. 4, pp. 84–188. (in Russ.)
8. Popov, O. & Partyka, L. 2001, [The evolution of technology training, morphological profile of the strongest swimmers and world records in sports swimming during the XX century], *Nauka v olimpiyskom sporte* [Science in the Olympic sport], Kyiv: Olimpiyskaya literatura, No 1, pp. 43–48. (in Russ.)
9. Sanosyan, Kh. A. 2009, [On the question of improvement of methodology of technical and tactical training swimmer], *Plavaniye* [Swimming], SPb.: Plavin, T. 5, pp. 43–46. (in Russ.)

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Olena Politko: *PhD (Physical Education and Sport); Kharkov State Academy of Physical Culture: Klochkivska str. 99, Kharkov, 61058, Ukraine.*
ORCID.ORG/0000-0001-6481-196X
E-mail: elena.politko@gmail.com

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Organizational foundations of preparation and selection of athletes

Oksana Shynkaruk

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

Purpose: *to determine organizational conditions for the preparation and selection of a remote reserve in modern conditions of development of sports.*

Material & Methods: *method of research – analysis of scientific-methodical literature, documentary t regulatory documents and Internet data, systematization and generalization, observation.*

Results: *the article considers the problem of selection, orientation and training of athletes in the course of many years improvement, the location of the system children and youth and reserve sports in the process. Identifies three levels of training, selection and orientation of athletes: distant and the nearest reserve of national teams on sports.*

Conclusions: *the efficiency of preparation of sportsmen depend on creating organizational conditions that are based on a rational distribution of material and technical, financial, personnel, scientific-methodical and medical support at all levels of training athletes.*

Keywords: *training, selection, orientation, levels, children, youth and reserve sports, organizational conditions.*

Introduction

The comprehensive analysis of these long scientific researches and references allows to claim that bases of long-term preparation for the highest achievements in the development of difficult system of children's sports schools, specialized classes, and specialized nurseries sports and schools of the highest sports skill, boarding schools of sports profile, schools of the Olympic reserve and physical culture, experimental groups of the Olympic preparation, strong points of the Olympic preparation, the centers of the Olympic preparation, national teams of sports of the country, departments and so forth were formed within several decades in Ukraine [5; 7; 9].

In general the system of preparation of the remote reserve was rather stable and effective, though not always economic of positions of scale of training of children for the system of the Olympic sport. The development of science in the branches of sports preparation and results of the last performances of athletes on the international scene confirm need, taking into account modern conditions of transformation of the Ukrainian sport, to improve the process of training of athletes by the realization of reasonable system of selection of the remote and next reserve, and also athletes-contenders for getting to the national team of Ukraine.

The system of children and youth and reserve sport is basis for the subsequent purposeful preparation for the main competitions in elite sport [1; 8; 10]. Centralized preparation in children's and youth sports schools and sports schools of the Olympic reserve create prerequisites for a young athlete to get to the specialized schools of the Olympic reserve, the centers of the Olympic preparation and national teams of Ukraine which are the most important components of the structure of purposeful system of the Olympic preparation [3; 4; 6].

Training of a athlete is carried out through the basic structural elements: children's and youth sports schools, schools of sports profile, school of physical culture, centers of the Olympic preparation where athletes train and full-fledged conditions for their preparation and study, opportunity to effectively combine preparation and participation in competitions in structures of national teams to full preparation on places are created [7].

The existence of such centers allows creating necessary conditions for perspective sports reserve by involvement of the most talented athletes from sports schools and boarding schools (schools, lyceums) before the centralized preparation. The basic in this case is subordination of all activity of the centers and the structures interacting with them for children and youth sport, tasks of multi-phase selection of perspective athletes and organization of their full preparation for competitions.

Communication of the research with scientific programs, plans, subjects

The work is performed according to the thematic plan of MES of Ukraine by the subject 2.34. "Technique of selection and orientation of athletes-beginners in different types of sport" No. of the state registration is 0114U001483.

Purpose of the research

To define organizational conditions of preparation and selection of the remote reserve in modern conditions of development of sport.

Material and Methods of the research

Methods of the research – are analysis of scientifically methodical literature, documentary and normative documents and data, the Internet, systematization and generalization,

supervision.

Results of the research and their discussion

The optimization of the organizational structure (national teams, centers of the Olympic preparation, SHSS, specialized schools, CYSS and SCYSOR, and so forth), ensuring compliance with number of basic provisions is important when forming organizational bases of rational system of long-term preparation at its different levels – in national teams, the next and remote reserve. It is necessary for realization of successful preparation and long-term selection of athletes that all organizational structures, all stages of long-term improvement had equally necessary material, financial, personnel, scientifically methodical and medical support [7; 9]. Concentration of attention on the main structures of national teams and neglect to work with the next and remote reserve is inefficient way, which will inevitably negatively be reflected in efficiency of the subsequent preparation.

Providing optimum ratio of number of children who play sports, at different stages of long-term improvement and continuous elimination of those athletes, who are insufficiently perspective from the point of view of the subsequent preparation, and replenishment by perspective children is important. The implementation of this provision demands attraction of the maximum number of children in the system of testing, namely to state of their health, features of constitution, physical capacities and short-term initial study.

Levels of long-term preparation, selection, and orientation which display the aimed orientation of all long-term preparation are proved by us for practical realization of the system of selection of athletes and orientation of their preparation in the course of long-term improvement:

– preparation, selection and orientation of the remote reserve;
– preparation, selection and orientation of the next reserve;
– preparation, selection of athletes for national teams to teams of sports and their orientation.

Each of these levels of the system of long-term preparation has to be rigidly connected with stages of long-term training of athletes. Respectively and activity of different structural cells of system of sport has to be organically connected both with stages of long-term preparation, and with levels [9].

Preparation, selection and orientation of the remote reserve, begin directly after mass study to sport bases.

The period of mass study to bases of sport lasts 2–3 months in volume of 20–30 trainings and precedes the first level. The existence of such approach allows to fill up CYSS with perspective children and to resolve issue of preparation of full-fledged sports reserve.

Selection and orientation of athletes as the important component of this process is not considered now. It calls into question efficiency and rationality of long-term preparation in a number of sports. The set of children for sports activities is carried out to sports groups irregularly. Annually 20–22 thousand perspective children, who were selected as a result of 2–3-month-old mass study to bases of sports, have to be attracted in the system of CYSS for preparation at the first biennial stage of long-term improvement.

The advanced practice and sports science allow claiming that from 10–15 children who learned the course of initial study in CYSS, on average only one child who has an obvious soft corner in the heart for trainings by this sport can draw to himself attention of experts. Thus, it is necessary to attract not less than 220–250 thousand children in the system of mass study, to attract 20–22 thousand children in CYSS annually. This ratio can be changed only sideways increases in number of the children involved in mass study that will appear by guarantee of increase of prospects of children who are admitted to children's sports schools [2; 9].

The need of implementation of the wide program of mass study of children to bases of different types of sport demands reorganization of system of physical training of school students towards the increase of role of sports specialization, close to interconnection of activity of comprehensive schools and CYSS. The considerable part of school students who learned one or several courses of mass study, but have not got to CYSS is capable to active participation in the system of mass sport not only at school, but also in the subsequent life. Thus, wide prerequisites are created for improvement of the system of school physical training in the most perspective and attractive direction to children – sports, with formation of system of intra-school and out-of-school competitions.

The gradual elimination of not enough perspective children is at the stage of the initial preparation, and 10–12 thousand children start till the second year of preparation.

The most part of children is deducted from CYSS and transferred to the system of mass school sport upon the termination of biennial stage of the initial preparation. Only every fourth child, who found obviously expressed abilities to effective trainings by this sport, can be transferred to the second stage of long-term improvement – the stage of the previous basic preparation. Thus, only 2500 most perspective children have to be at the beginning of the third year of study in CYSS, and in the end of the year – 2000 children who are translated to the fourth year of study.

The special place belongs to preparation, selection and orientation of the next reserve. This level covers four years and answers on time to the stage of specialized basic preparation and preparation for the highest achievements. Selection has an accurately directed character. It is connected with training of athletes in concrete disciplines and need of orientation of preparation for the greatest possible manifestation of abilities of athletes.

The considerable part of children (75%) pass into CYSS (level of preparation of the remote reserve) for the fifth year of study and the following stage of long-term improvement – three-year stage of specialized basic preparation after the termination of the fourth year of study. Most of children at this stage of long-term preparation differ in the expressed tendency to the achievement of good results in this sport, strong health, and obviously expressed motivation. Therefore the percent of children who are deducted from CYSS at this stage sharply decreases: from 1500 children who didn't start implementation of the curriculum of the fifth year of study in CYSS, about 80% of children – 1200 persons remain in the end of the year, and upon the termination of the program of the sixth year, –

1000 (83,3%) who start the development of the curriculum of final year of this stage of long-term preparation [9].

The third level – preparation, selection for national teams to teams on kinds of sports and orientation, – covers the period in four years and more, includes stage of the maximum realization of individual opportunities, stage of preservation of achievements and stage of gradual decrease in achievements. Selection is made on condition of transition to the third level, when forming national team of Ukraine.

Conclusions

The system of knowledge of long-term preparation, selection and sports orientation as the only whole, is based on need of long preparation for the achievement of high sports result and requires special attention to athletes, who are in the system of for children and young people and reserve sport, elite sport; the accounting of regularities of sports selection and the directions of orientation of training process for the increase of its efficiency as for the benefit of the preparation, and physical training in the system of preschool and school education; providing optimum ratio of number of athletes at different stages of long-term improvement which provides continuous selection of perspective children; creation of organizational and methodical conditions for effective ontogeny of found is sports exceptional children and effective realization of opportunities of the competitive sports activity focused on the maximum achievements.

Prospects of the subsequent researches. The defined organizational conditions of preparation and selection of the remote reserve in modern conditions of development of sport will allow proving and introducing the technique of selection and preparation of beginners in different types of sport.

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References

1. Balsevich, V. K. 2010, [Principles of long-term sports training in the context of the implementation of the duality principle], *XIV Mezhdunar. nauch. kongr. «Olimpiyskiy sport i sport dlya vsekh», 5–8 okt. 2010 g.* [XIV Intern. scientific. Congr. "Olympic Sport and Sport for All", October 5-8. 2010], Kyiv, p. 41. (in Russ.)
2. Bulgakova, N. Zh. 2010, [Theoretical and methodological bases of preparation of sports reserve (for example, swimming)], *Sovrem. olimp. sport i sport dlya vsekh: XIV Mezhdunar. nauch. kongr* [Modern Olympic Sport and Sport for All: XIV Intern. scientific Congr.], Kyiv: Olimp. lit., pp. 161. (in Russ.)
3. Guba, V. p. 2003, *Osnovy raspoznaniya rannego sportivnogo talanta* [Fundamentals recognize sporting talent early], Moscow: Terra-sport, 208 p. (in Russ.)
4. Davydov, V. Yu. 2002, *Teoreticheskiye osnovy sportivnogo otbora i spetsializatsii v olimpiyskikh vodnykh vidakh sporta distantsionnogo kharaktera* : avtoref. doktora biol. nauk [Theoretical Foundations of sports selection and specialization in the Olympic aquatic species remote nature of sport : doct. of sci. thesis], Moscow, 40 p. (in Russ.)
5. Nesterova, A. & Shinkaruk, O. 2008, [Preconditions of formation of an effective system of cooperation of educational and youth sports schools in Ukraine], *XII Mezhdunar. nauch. kongr. «Olimpiyskiy sport i sport dlya vsekh»* [Modern Olympic Sport and Sport for All: XII Intern. scientific Congr.], T.III,. pp. 144–145. (in Russ.)
6. Nikitushkin, V. G. 2010, *Teoriya i metodika yunosheskogo sporta* [Theory and methods of youth sports], Moscow: Fiz. kultura i sport, 203 p. (in Russ.)
7. Platonov, V. N., Shinkaruk, O. A. & Dragunov L. A. 2005, [Some features of the modern system of youth sport in Ukraine], *Nauka v olimp. sporte* [Science in Olympic sport], No 1, pp. 129–132. (in Russ.)
8. Semenov, L. A. 2005, *Opredeleniye sportivnoy prigodnosti detey i podrostkov: biologicheskiye i psikhologo-pedagogicheskiye aspekty* [Definition of sports fitness of children and adolescents: biological, psychological and pedagogical aspects], Moscow: Sov. Sport, 142 p. (in Russ.)
9. Shinkaruk, O. A. 2009, [The modern system of youth and reserve sport in Ukraine], *Materialy Mezhdunar. nauch.-prakt. konf. «Aktualnyye problemy podgotovki rezerva v sporte vysshikh dostizheniy»* [Materials Intern. scientific-practical. Conf. "Actual problems of training provision in the sphere of sports"], Minsk, pp. 64–67. (in Russ.)
10. Brown, J. 2001, *Sport talent*. Champaign, Ili Human Kinetics, 300 p.

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Oksana Shynkaruk: *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/0000-0002-1164-9054
E-mail: shi-oksana@yandex.ua

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Features of 30-40 years old tourists-skiers' technical training in the preparation period

Alexander Toporkov

Kharkov State Academy of Physical Culture,
Kharkov, Ukraine

Purpose: *compare the test results of the level of tourists' technical readiness of 30-40 years old skiers in winter period of preparation. Determine the effectiveness of developed programs to improve the technical readiness of 30-40 years old tourists-skiers.*

Material & Methods: *14 people aged 30 to 40 years old who have a different experience in water, hiking and mountain as well as ski-sport hiking took part in research. Analysis of scientific and methodical literature, pedagogical observations, pedagogical experiment, methods of mathematical statistics is used.*

Results: *the test results of 30-40 years old tourists skiers which are the participants in the experimental group received in winter period of preparation and preparatory period and the results after passing ski sports hiking of the third category of complexity are processed. Their comparative analysis is held.*

Conclusions: *It was found that the developed training program can effectively influence the increase of the level of tourists' and skiers' technical skills and preparedness, which contributes to the successful passage of ski sports categorized hiking.*

Keywords: *ski trip, technique, ski hiking, tourists-skiers*.

Introduction

The structure of the preparation of the tourist-skier to ski sports hike consists of many species that are closely related and complement each other, but due to the characteristics of movement in the hike (skiing), technical training is one of the main.

According to the travelers [2; 5], the development of a rational technique of walk (correct formulation of the feet, reliance on the alpenstock, lanyard through the alpenstock or ice-ax) on steep trails, slopes, in overcoming low obstacles is paid a great attention while preparing for hiking and mountain hikes, so the main in the pre preparation period of the tourist-skiers is the mastering and consolidation of the ski technique, which includes the ways of passing the climbing, descents, turns, braking, and just before a hike with the same method done with a backpack.

At the ski hike movement is mainly done on the virgin snow, therefore, 0 additional element in the technology in the ski tourism will be tracking trails, often with a backpack. Not only a backpack, but also special clothes which is often necessary because of the strong wind and the cold (and sometimes both at the same time), restrict movement, complicate the use of certain techniques. Theoretical preparation includes the study of: the various elements of technology in different reliefs on different tracks, the basic elements of skiing technology and ski technique, the fitting and preparing ski and tourist equipment, as well as the types and characteristics of the original cartographic material in ski hikes [9; 12].

When choosing a ski route you should take into account not only the areas of this route, but also the regulatory length in days and kilometers, which is impossible without the proper technique of movement in extreme winter conditions.

The level of technical training of tourist must always correspond to the complexity and length of the route. The head of a hike must be sure in advance that each participant is able to pass the planned route with a certain margin of safety in case of an emergency, if the group is out of the schedule, and have to cover the distance over the daily task.

Considering that many ski hiking routes are carried out in a mountainous area with varied by nature and complexity of the relief, it is compulsory for tourists now to possess of special technique receptions [2; 5; 9; 14].

The basis of the technical preparation of the tourist-skier is classical technique of ski steps [1; 3; 6; 7; 11]:

- alternating two steps' walk (used in flat areas, climbs);
- alternating four steps' walk (used on deep snow on the track with uneven natural obstacles);
- simultaneous one step's walk (used on sloping downhill, plains);
- simultaneous two steps' walk (used in the plain, sloping uphill);
- simultaneous without steps' walk (used in the plain, up to sloping mountain);

ski technics:

- kinds of stands from downhill;
- turning with plow;
- cutting (carving) turn;
- sliding turns;
- ways of braking.

Connection with academic programs, plans, themes

Studies carried out in accordance with the thematic plan of research of the Department of winter sports, cycling and tourism of Kharkov State Academy of Physical Culture (KSAPC) of the Ministry of Education and Science of Ukraine for 2013-17 years on the topic «Fundamentals of sport tourism in the recreational activities of different aged groups in Ukraine» (State registration number 0114U000366).

Purpose of research

Develop the program to improve the technical training of 30-40 years old tourists-skiers and determine its effectiveness.

Tasks of research: 1. Develop the program of technical preparation of 30-40 years old tourists-skiers for the successful passage of the ski-sports hiking of II-IV categories of complexity. 2. Experimentally check the effectiveness of the proposed program of technical preparation of 30-40 years old tourists-skiers.

Material and Methods of the research

Methods of research: analysis of scientific and methodical literature, pedagogical observations, pedagogical experiment, methods of mathematical statistics.

The research was held from December to January, 2013–2014. The experimental group consisted of 14 people at the age of 30 to 40, having different experience of water, hiking and mountain hiking. Over the years, all members of the group went in for different kinds of sports; many of them have sports categories. By the beginning of the experiment, all members of the group had had different experience of ski sports hikes. Winter period was 42 days preparation period.

Results of the research and their discussion

After the autumn preparation stage, where is widely used simulation exercises, as well as the development of ski technique moves while moving on roller skis, which gave good results [12], the group started to winter training of preparation period.

With the advent of the snow cover we used the main means of ski preparation – movement on skis. In our studies, ski training included the period from December 15 to January 25, 2014. Training took place in Kharkov on the ski base «Temp» and ski complex «Ekstrimstil» on the slopes with artificial and natural snow cover.

Our studies [13] confirm that 80% of injuries and accidents are connected with unpreparedness of tourists-skiers, especially with the lack of physical and technical preparedness, so passing «thread» of the route in ski hike is impossible without special preparation training.

In this connection, the relevant question is the construction of a rational program of special training in preparation period of 30–40 years old tourists-skiers to the most massive in complexity ski hike that is the hike of III category of complexity.

The content of the preparation program of tourists-skiers training included seven kinds of training: theoretical (11 hours), organizational (12 hours), physical (263 hours), technical (28 hours), tactical (13 hours), topographic (11 hours) psychological (19 h), medical (17), and tourist hiking (72 h) and tourist competitions (10 h) [13].

Throughout the spring and the autumn stage of preparation, hours allocated for technical training increased gradually [12] and reached its peak in December and January with snowfall [13]. It was during this period honing technique of classical skiing moves and skiing skills was held.

To determine the level of technical readiness of 30–40 years old tourists-skiers while skiing the level of technology movement by classical passages and ski technique was taken into account. Evaluation was carried out on a 10-point scale of evaluation criteria of ski moves technique (Table 1) [8].

Proper technique of movement on skis is a system of movements that allows the skier achieves maximum effectiveness of his/her actions.

Technique of tourist-skier movement is complex and diverse. The effectiveness of a particular method of movement depends on specific conditions of ski hike, and in particular on the terrain.

To better understand the variety of movements of the skier-tourist in the extreme conditions of a tourist hike, we have evaluated the moves on the whole movement on skiing. One of the main ways of the ski moves, the most frequently used by tourists-skiers, is alternating two steps' walk which consists of single sliding steps.

During the period of snow preparation (December 15 – January 25) technique of movement by classical style changed, so the assessing of alternating two steps' walk increased in 1,9 points ($t=2,17$; $p<0,05$), alternating four steps' walk in 1,9 points ($t=2,57$; $p<0,05$), simultaneous one step's walk in 1,9 points ($t=2,20$; $p<0,05$), simultaneous two step's walk 2,1 points ($t=2,61$; $p<0,05$), Ways of passage ups in 2,0 points ($t=2,28$; $p<0,05$) (table 2) [13].

In the modern ski technique the cutting slip defines the basic style and technical characteristics of skiing downs from the mountains. Skis in wide parallel position in arc carving-turn provides more even distribution of axle loading of embedded skis in all phases turn, thereby achieving minimum side skidding (which occurs during short-term discharge, inevitably leading to slippage cross-braking) [4; 10]. In the estimation of the ski technique we took into account the following: the rotation of the lock, turn with slipping and step-turn, turn on parallel skiing, synchronization of the knees work, shoulders turning.

During the same period of time ski technique when going downs improved by 1.7 points ($t=2.39$; $p<0,05$), in certain ways of braking by 2.4 points ($t=2,48$; $p<0,05$).

Conclusions

It was found that the designed program of the preparation period of 30-40 years old tourists-skiers allows better mastering technique of skiing to participate in ski sports hikes of II–IV categories of complexity. 2. Proven in practice (ski sports hiking of III category of complexity) the effectiveness of the developed and the proposed program of technical training of 30–40 years old tourists-skiers to the ski sport hikes of II-IV categories of complexity.

Further research will focus on the development of physical training programs in preparation period in for water and mountaineering.

Table 1

Criteria for assessing the technique of ski moves

Points	Criteria for assessing
10	The move was done without mistakes, with the emphasis on each movement element
9	The move was done without mistakes, but one of the elements is not clearly identified
8	The move was done without any mistakes, but some elements are not clearly identified
7	The move was done correctly, but there is a mistake that does not influence the structure of the movement
6	The move was done basically correctly, but there are few small mistakes which distort movement structure
5	The move was done correctly in general, but there is a glaring mistake, distorting the structure of movements
4	The move was mainly done, however, with a failure in the performing of a cycle stopping the movement and then continue
3	The move was done with stops, giving meaning of the mistakes and then going on
2	The move structure was broken, only some elements of technique were done, in one of the cycles
1	The person cannot done the ski move

Table 2

Expert assessment of technique movement indicators on skis (according to a 10-point system) and theoretical training (according to a 100-point system) of 30-40 years old tourists-skiers during the preparation period (n=14)

Types of movement technique	Ski step	$\bar{X}_1 \pm m_1$	$\bar{X}_2 \pm m_2$	t	p
Technique of movement with classical style, points	alternating two steps' walk	7,3±0,69	9,2±0,50	2,17	<0,05
	alternating four steps' walk	7,4±0,69	9,3±0,51	2,57	<0,05
	simultaneous one step's walk	7,8±0,63	9,7±0,52	2,20	<0,05
	simultaneous two step's walk	7,2±0,75	9,3±0,44	2,61	<0,05
	ways of passage ups	7,5±0,36	9,5±0,61	2,28	<0,05
Mountaineering technique, points	ways of downs	7,5±0,39	9,2±0,62	2,39	<0,05
	ways of braking	7,3±0,88	9,7±0,54	2,48	<0,05

Note: $\bar{X}_1$ – *December;* $\bar{X}_2$ – *January.*

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References

1. Berezin, G. V. & Butin, I. M. 2003, *Lyzhnyy sport* [Skiing], Moscow, 256 p. (in Russ.)
2. Bulashev, A. Ya. & Shalkov, Yu. L. 2007, [Features sports tourism as a sport by the example of ski sports trips], *Pedagogika, psikhologiya ta mediko-biologichni problemi fizichnogo vikhovannya i sportu* [Pedagogy, psychology and medical-biological problems of physical education and sports], Kharkiv, vol. 6, pp. 3–47. (in Russ.)
3. Butin, I. M. 2000, *Lyzhnyy spor*t [Skiing], Moscow, 237 p. (in Russ.)
4. Galkina, I. S. 2003, *Gornyye lyzhi* [Skiing], Moscow, 384 p. (in Russ.)
5. Lukoyanov, p. I. 1988, *Zimniye sportivnyye pokhody* [Winter sport camping], Moscow, 150 p. (in Russ.)
6. Manzhosov, V. N., Ogoltsov, I. G. & Smirnov, G. A. 2004, *Lyzhnyy sport* [Skiing]. Moscow, 213 p. (in Russ.)
7. Maslennikov, I. B. & Kaplanskiy, Ye. 2002, *Lyzhnyy sport* [Skiing]. Moscow, 217 p. (in Russ.)
8. Mulik, V. V. 2002, *Sistema mnogoletnego sportivnogo sovershenstvovaniya v uslozhnennykh usloviyakh sopryazheniya osnovnykh storon podgotovlennosti sportsmenov (na materiale lyzhnogo sporta)* : avtopef. dis. … doktora fiz. vos. nauk [The system of longterm sports perfection in the difficult conditions of conjugation main parties of athletes (based on cross-country skiing) : doct. of sci. thesis], Kyiv, 41 p. (in Russ.)
9. Mulik, K. V. 2015, *Sportyvno-ozdorovchiy turizm v systemi phizychnogo vyhovannya shkolyariv i studentiv* [Sports and health tourism in the system of physical education pupils and students: monograph], Kharkiv, 418 p. (in Ukr.)
10. Rostovtsev, D. Ye. 1997, *Podgotovka gornolyzhnika* [Preparation skier]. Moscow, 176 p. (in Russ.)
11. Smirov, p. G. & Kovyazin, V. M. 2000, *Lyzhnyye gonki* [Ski race], Tyumen, 178 p. (in Russ.)
12. Toporkov, A. N. 2015, [Features of 30–40 years old tourists-skiers' technical training in spring and autumn], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 6 (50), pp. 178–181, dx.doi. org/10.15391 / snsv.2015-6.033 (in Russ.)
13. Toporkov, O. M. 2014, *Spetsial'na peredpohidna pidgotovka turystiv-lyzhnykiv 30–40 rokiv dlya znyzhennya travmatyzmu pid chas pohodu* : avtoref. kand. nauk fiz. vikhovannya ta sportu [Special forehiking preparedness of 30 – 40 years old tourists-skiers to reduce injuries during the hike: PhD thesis], Kharkiv, 20 p. (in Ukr.)
14. Kharin, S. Ya. 1992, *Lyzhnyy turizm* [Ski tourism], Moscow, 145 p. (in Russ.)

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Alexander Toporkov: *Kharkov State Academy of Physical Culture: Klochkovska Street 99, Kharkov, 61058, Ukraine.*
ORCID: 0000-0002-8949-9893
E-mail: a.toporkov@meta.ua

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Model characteristics of sensory-motor reactions and perceptions of specific wrestlers of different styles of confrontation

[1]Yuriy Tropin
[1]Vyacheslav Romanenko
[2]Viktor Ponomaryov

[1]Kharkiv State Academy of Physical Culture, Kharkiv, Ukraine
[2]Judicial training institute for the SBU, Kharkiv, Ukraine

Purpose: *to develop model characteristics of sensory-motor reactions and perceptions of specific wrestlers of different styles of conducting fight.*

Material & Methods: *theoretical analysis and generalization of scientific and methodological literature, modern competitive activity, generalization of best practices, psycho-physiological research methods, methods of mathematical statistics. The investigations, which were attended by 46 athletes engaged in different kinds of wrestling (freestyle, Greco-Roman wrestling, judo, sambo) with expertise from 1 to discharge the master of sports of international class, different ages (from 18 to 35 years).*

Results: *based on the test results determined pedagogical level of psychomotor reactions and perceptions of specific wrestlers basic styles of conducting fight.*

Conclusions: *it determined that the level of development of those or other psychomotor reactions and specific perceptions of athletes has a certain relationship with the typical style of the match.*

Keywords: *wrestlers, models, individual characteristics, styles of confrontation.*

Introduction

One of the most pressing problems of modern sports science is the search of effective ways of achievement of good results on condition of the harmonious development of sportsmen and preservation of their health. The successful solution of this problem significantly is at a loss in connection with intensive professionalizing of sports activity, noticeable tendency of increase in volumes and intensity of loading [3; 6; 8; 12; 15].

Modern elite sport places great demands on all parties of readiness of a sportsman, besides the main problem of elite sport – is impossibility of infinite increase of volume and intensity of training loads which results in need of the further search of new pedagogical means and methods for system of training of sportsmen of high qualification [4; 9; 10; 14]. One of ways of achievement of good results in sport is accurate management, planning and purposeful use in the educational-training process of the advanced technique of training of both domestic, and foreign experts taking into account specific features of sportsmen [1; 11; 13; 16].

The problem of individualization has a special value in single combats, the high sports result can be achieved in various ways of maintaining a fight. Experts mark out three main styles of maintaining a fight: game, power and tempo [1; 4; 5; 16].

Psycho-physiological functions of a person depend on features of the highest nervous system, characterizing the process of formations and improvement of special movement skills in the conditions of sports activity [2; 7].

Objective criteria of the current functional state of CNS are indicators of sensomotor reactions of various degree of complexity [7].

Time of sensomotor reactions is one of the simplest, available and at the same time enough exact neurophysiological indicators, reflecting the dynamics of speed of the nervous processes and their switching, motor coordination, general working capacity and activity of CNS during various periods of sports preparation [2; 7].

Training and competitive activity in single combats promotes the formation of the whole complex of specific reactions and impressions at sportsmen. The threshold of impression of the irritations coming to various touch systems is the cornerstone of them. The main role is played at the same time by levels of musculomotive, visual, vestibular and acoustical feelings. The level of sports skill of a sportsman is higher, the level of value of psycho-physiological functions for achievement of competitive result is higher [2; 7].

Purpose of the research

To develop model characteristics of sensomotor reactions and specific impressions of wrestlers of various styles of maintaining a fight.

Problems of the research:

1. To reveal specific features of wrestlers of standard styles of an antagonism on the basis of the analysis of methodical lit-

erature, modern competitive activity and synthesis of the best practical experience.

2. To define model indicators of sensomotor reactions and specific impressions of wrestlers of various styles of maintaining a fight.

Material and Methods of the research

46 sportsmen who are engaged in different types of wrestling (free-style wrestling, Greek-Roman, judo, sambo), having qualification from the 1 category to the master of sports of international class (MSIC), various age (from 18 to 35 years old) took part in the researches.

Research methods: theoretical analysis and generalization of scientific and methodical literature, psycho-physiological methods of research, methods of mathematical statistics.

Results of the research and their discussion

Features of each style of fighting against were established on the basis of the analysis of data of scientific and methodical literature [1; 4; 5; 16] about modern competitive activity and syntheses of the best practical experience:

1. "Weightlifter" has a rather low height, short extremities, an extended trunk, a wider foot. Physical qualities: a high level of development of force, both maximum, and explosive, thus special endurance is more often poorly developed. He carries out fights mainly on average speed at a near distance. Attacking incidentally, single techniques with preliminary preparation.

2. "Temper" has a height above an average, he has a long trunk, long hands and legs. Special endurance is most developed from physical qualities. The most weakness in physical fitness – is coordination. Tactics of a fight is directed to the rival's "hassling" due to pressure and a large number of sham and real attacks, mainly from an average and long range.

3. "Player" has an average height or above an average; trunk, hands and legs are of average sizes. Coordination abilities are most developed, special force is developed most poorly, as a rule, from physical qualities. Sportsmen of this type apply a wide range of technical and tactical actions, creatively, originally resolve problem situations in a fight.
Belonging of this or that sportsman to a certain style of maintaining a fight is defined on the basis of poll of sportsmen and conversations with trainers.

The assessment of sensomotor reactions and specific impressions is carried out by complex of the tests developed for tablet personal computers [3].

Tests were divided into three groups:

– assessment of simple sensomotor reactions;
– assessment of difficult sensomotor reactions;
– assessment of specific impressions.

Model characteristics of sensomotor reactions and specific impressions of wrestlers of various styles of maintaining a fight are developed On the basis of the received results of testing (table 1).

It is established that indicators of "player" are better than indicators of "weightlifter" and "temper" practically in all tests, comparing indicators of sensomotor reactions and specific impressions of examinees. The greatest differences from re-

Table 1

Model indicators of sensomotor reactions and specific impressions of wrestlers of standard styles of an antagonism (n=46), X±δ

№	Indicators of sensomotor reactions and specific impressions	Player (n=16)	Weightlifter (n=18)	Temper (n=12)
Simple reactions				
1	Simple motility, number of pressing for 10 s	28,15±1,32	26,15±1,84	25,7±1,47
2	Resistance to the forcing-down factors, %	82,61±3,84	82,06±4,78	79,83±5,37
3	Simple visual and motor reaction, ms	219,98±10,54	231,34±16,24	235,16±18,13
4	Simple hearing-motor reaction, m	213,21±11,48	213,39±16,8	219,54±14,12
Difficult reaction				
5	Reaction of the choice from static objects, ms	550,83±37,65	648,48±64,49	652,53±66,31
6	Reaction to the moving object, ms	16,55±3,85	19,34±4,95	20,69±6,6
7	Reaction of distinction, ms	267,69±23,73	288,73±15,11	288,62±24,19
8	Reaction of the choice from dynamic objects, ms	327,21±21,14	355,46±22,25	376,34±48,33
Specific impressions				
9	Assessment of feeling of speed (80 bpm^{-1}), ms	29,63±8,79	36,31±13,84	41,39±18,02
10	Assessment of reproduction of accuracy of the set line, mm	0,38±0,1	0,4±0,07	0,49±0,15
11	Speed of reproduction of the set line, mm s^{-1}	73,26±23,0	69,19±20,75	87,63±21,11
12	Assessment of impression of change of the extent of object, ms	742,94±48,72	858,22±51,9	1027,92±52,96

sults of an assessment of level of sensomotor reactions and specific impressions of "player" are noted at "temper" at an assessment of specific impressions (31,7%) and at an assessment of difficult reactions (16,6%). The smallest differences are recorded in estimates of simple sensomotor reactions, they made 3,3% – at "weightlifter" and 5,5% – at "temper" (pic. 1).

All aforesaid demonstrates that both "weightlifters", and "tempers" compensate shortcomings of the level of development of coordination abilities for the account of the most of strengths, "weightlifter" at the expense of the level of development of high-speed and power abilities, "tempers" at the expense of the level of development of special endurance for successful maintaining a sports fight that the results of researches confirm, which were conducted by V. G. Olenik, N. N. Kargin, P. A. Rozhkov (1985) about psychomotor features of wrestlers of standard styles of confrontation.

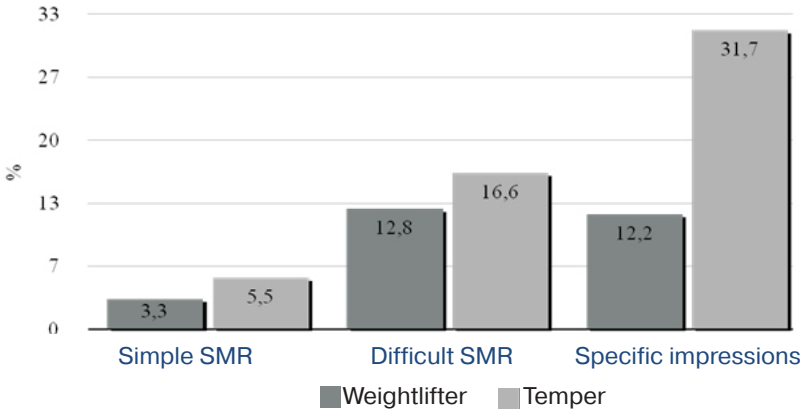
Conclusions

1. It was defined that the problem of individualization has a special value in wrestling, the high sports result can be achieved in various ways of maintaining a fight on the basis of the analysis of methodical literature, modern competitive activity and synthesis of the best practical experience.

2. Specific features of wrestlers of standard styles of confrontation are revealed. It is established that it is necessary to consider style of maintaining a fight of each sportsman when training wrestlers.

3. Model characteristics of sensomotor reactions and specific impressions of wrestlers of standard styles of maintaining a fight are developed.

Further researches will be directed to identifications of mechanisms of determination of styles of maintaining a fight that will allow planning and carrying out the training process of wrestlers more effectively.



Pic. 1. Differences of results of an assessment of level of sensomotor reactions and specific impressions of "weightlifters" and "tempers" from results of "players"

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References

1. Ananchenko, K. V. 2008, [Determining individual driving style tactical judo bout in high quality], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 4, pp. 53–57. (in Ukr.)
2. Ashanin, V. S. & Romanenko, V. V. 2015, [The use of computer technology to assess sensorimotor reactions in martial arts], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 4, pp. 15–18. (in Russ.)
3. Boychenko, N. V., Tropin, Yu. M. & Panov, p. P. 2013, [Technique and tactics in wrestling], *Fizicheskoye vospitaniye i sport v vysshikh uchebnykh zavedeniyakh: Sbornik statey IKh mezhdunarodnoy nauchnoy konferentsii, 23–24 aprelya 2013 goda* [Physical education and sport in higher education: Collection of articles IX International Scientific Conference, 23–24 April 2013], Belgorod – Kharkov – Krasnoyarsk – Moskva: BGTU im. Shukhova, pp. 52–56. (in Ukr.)
4. Yermakov, S. S., Tropin, Yu. N. & Ponomarev, V. A. 2015, [Ways to improve the technical and tactical skill of Greco-Roman style different manner of conducting a duel], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: KSAPC, No 5, pp. 46–51. (in Russ.)
5. Olenik, V. G., Kargin, N. N. & Rozhkov, p. A. 1985, [Specificity skill fighters different manner of conducting a duel], *Sportivnaya borba* [Wrestling], Moscow: Fizkultura i sport, pp. 43–47. (in Russ.)
6. Panov, P. P., Tropin, Yu. N., Ponomarev, V. A. & Biletskiy, S. V. 2015, [Survey results presentation teams in wrestling at the European Nations Cup 2015], *Slobozans`kij naukovo-sportivnij visnik,* Kharkiv: KSAPC, No 6, pp. 120–124. (in Russ.)
7. Rovnyy, A. S. & Romanenko, V. V. 2016, [Model characteristics of sensorimotor reactions and perceptions of specific qualifications combat sports], *Problemy i perspektivy razvitiya sportivnykh igr i yedinoborstv v vysshikh uchebnykh zavedeniyakh : Sbornik statey KhII mezhdunarodnoy nauchnoy konferentsii, 5 fevralya 2016 goda* [Problems and prospects of development of sports and martial arts in higher education: Collection of papers HII international scientific conference, February 5, 2016], Kharkov: KhGAFK, pp. 54–57. (in Russ.)
8. Tropin, Yu. N. & Boychenko, N. V. 2014, [Analysis of technical and tactical readiness of Greco-Roman style after the change in competition

rules], *Slobozans`kij naukovo-sportivnij visnik,* Kharkiv: KSAPC, No 2, pp. 117–120. (in Russ.)
9. Bromber, K., Krawietz, B. & Pttrov p. 2014, Wrestling in Multifarious Modernity. *The International Journal of the History of Sport*, vol. 31, no. 4, pp. 391–404. doi:10. 1080/09523367. 2013. 869217.
10. Bardamov, G. B. 2008, [Improving individual combinational style of conducting fights fighters], *Uchenye zapiski universiteta im. P. F. Lesgafta* [Scientists notes Lesgaft], vol. 2, no. 36, pp. 22–24.
11. Gonzalez, D. E. L. 2014, Technical-Tactical Performance in Greco-Roman Wrestling : Analysis of 2013 Senior World Championships Through Multivariate Analysis. *International Journal of Wrestling Science*; Vol. 4 Issue 1, 94–99.
12. Kruszewski, A. & Branka, S. 2005, Analysis of the structure of a wrestling bout at the junior European championships, Wrocław 2005, 5th International Conference. *Movement And Health*, 394–399.
13. Ryan, T. & Samson, J. 2006, *Elite Wrestling*. New York: McGraw-Hill, 224 p.
14. Tropin, Y. M. 2013, [Comparative analysis of technical and tactical preparedness Greco-Roman style wrestler at the Olympic Games – 2008 and the Olympic Games – 2012], *Fiziceskoe vospitanie studentov* [Physical education students], T. 4.
15. Tropin, Y. M. 2013, [Analysis of technical tactical training of highly skilled fighters of Greco-Roman wrestling], *Fiziceskoe vospitanie studentov* [Physical education students], T. 2.
16. Tropin, Y. N. & Pashkov, I. N. 2015, Features of competitive activity of highly qualified Greco-Roman style wrestler of different manner of conducting a duel. *Pedagogics, psychology, medical-biological problems of physical training and sports*, No 3, S. 64–68.

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Yura Tropin: *Kharkiv State Academy of Physical Culture: Klochkovskaya st., 99, Kharkov, 61058, Ukraine.*
ORCID.ORG/0000-0002-6691-2470
E-mail: tropin.yurij.82@mail.ru

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

Viktor Ponomaryov: *Judicial training institute for the SBU; Mironositskaya 71, Kharkiv, 61023, Ukraine.*
ORCID.ORG/0000-0003-1261-4053
E-mail: vap5@ua.fm

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Sports selection system in triathlon

Vladimir Vodlozerov

Kharkov State Academy of Physical Culture, Kharkov, Ukraine

Purpose: *to analyze the contents of the main stages of sports selection of triathletes.*

Material & Methods: *study and generalization of special literature on the issue of sports selection in continuous triathlon, analysis of triathletes selection based on normative documents.*

Results: *there were reviewed the particularities of sports selection of triathletes on each of its main stages and the role of heredity as a necessary condition for practicing sports for endurance, and also there was shown the procedure of calculation of rating points.*

Conclusions: *sports selection plays a key role in the admission of pupils to the departments of triathlon in sports schools as well as in the formation of picked teams of all levels for participation in competitions on continuous triathlon.*

Keywords: *continuous triathlon, heredity, sports selection, triathlete, rating points.*

Introduction

Sports selection represents the system of actions for the identification of sportsmen whose individual opportunities in the maximum degree correspond to specifics of the chosen specialization.

As triathlon is one of the most difficult individual cyclic sports, the process of preparation for competitions and participation in them demands from a triathlete of huge expenses of time and forces. To begin to be engaged in continuous triathlon heavy physically, it is necessary the powerful incentive premise for a sportsman who has earlier tested himself in swimming, cycling, run or other types. The most widespread internal motives of classes by a new sport on endurance are natural desires of a sportsman to test themselves, to try forces with rivals, to overcome a classical distance of super-marathon and to become an «iron man», to estimate a limit of the psychophysical opportunities at this temporary stage, to define further ways for self-improvement of physical qualities, etc., at last, to ego-trip as the strong personality. It is impossible to be engaged in triathlon, without being a purposeful person possessing high moral and strong-willed qualities [1; 2].

However now specialists of sport schools select potential triathletes at younger school age when the specified qualities at them only begin to be formed [8]. Therefore the external motivation prevails at a child at the entrance in sports section because the initiative of classes by this sport belongs most often to adults – parents, teachers, coaches (to occupy leisure, to provide supervision, to improve physical development, to open and realize the put inclinations by the nature etc.). In this regard primary internal motives of children – satisfaction of need for the movement and entertainment – under the leadership of experts in the field of physical culture and sport gain the purposeful intelligent character. Further they (motives) change and reconstructed under the influence of systematic trainings in the course of the general development of the personality, accumulation of knowledge, abilities, skills, experience. The emotional pleasure for the sporting achievements is one of the major factors strengthening positive motivation to further classes by continuous triathlon [2; 4; 5; 9].

The end result of familiarizing of the younger generation with a new sport on endurance, besides strengthening of health and physical improvement, also he will have the formation of new vital philosophy active and a healthy lifestyle.

The purpose of the research

To analyze the maintenance of the main stages of sports selection of triathletes.

Research tasks:

1. To unveil features of sports selection of triathletes on each of its main stages.
2. To consider the role of heredity as necessary condition for classes by sports on endurance.
3. To show the procedure of calculation of the rating points which are necessary for participation of triathletes in the international competitions.
4. To show specifics of selection of triathletes for participation in the Olympic Games.

Material and Methods of the research

1) the studying and synthesis of data of literary and Internet sources for an assessment of degree of study of a problem and allocation of the key provisions which are the cornerstone of sports selection in triathlon;

2) the analysis of stages of selection of triathletes on the basis of normative documents of the Federation of Triathlon of Ukraine (FTU).

Results of the research and their discussion

Now the minimum age of pupils, who are enlisted in groups and departments on triathlon of children's and youth sports

schools, makes 8 years old in the domestic system of preparation of young triathletes, according to the Enclosure 1 to the order of the Ministry of Ukraine for family, youth and sport from 5/18/2009 No. 1624 [8; 13].

The primary selection is made for the purpose of determination of abilities (natural inclinations) of children to classes this sport by experts of CYSS. Its main task – the assessment of an opportunity and expediency of classes of a child by continuous triathlon, which is based on application of pedagogical methods (testing of results of performance of a number of the offered special exercises), medico-biological (including morphofunctional) and psychological (supervision, natural stating experiment, conversation) [13].

Because at this stage of selection one of the main criteria are a state of health, physical development, level of functioning of the main systems of an organism of children, the important role in receiving adequate representation about health and morphofunctional state being admitted to sports school plays the qualified medical control. It assumes studying of the anamnesis according to the out-patient card of a child, determination of predisposition to hereditary diseases (on the basis of the analysis of incidence of parents), and also diagnostics and predictive assessment of a condition of his physical and mental health.

At selection the important role is played by comparison of the informative signs, which are revealed at a child in the course of complex inspection causing productivity in the chosen sport to reference indicators of a sportsman of this specialization. The generalized similar data of triathletes who achieved considerable results in continuous triathlon in different years undertake as model standard signs – morphological, physiological, metabolic, psychological [13].
The special attention should be paid to those revealed signs which authentically influence indicators in sports on endurance, and their improvement to the level of reference indicators not to dependently training influences since they are put in the genetic program of a child. So, the heredity role in manifestation of constitutional signs (growth, length of the top and lower extremities, constitution type, etc.) is rather big. Besides, genetic predisposition of physiological indicators (aerobic productivity, maximum HR, MOC) and features of the muscular device (a ratio of slow and fast tissues in structure of muscles) are also established by scientific researches, therefore the knowledge of morphological characteristics and physical capacities of his parents is of great importance in forecasting of the development of a child [2; 6].

Also it is necessary to consider that the genetic information on the signs which is put in a child, influencing the productivity, is realized only on condition of optimum training influence in each age period.

Because continuous triathlon provides training of a child by three diverse types of physical activity, imposing various requirements to the engaged, the most acceptable type of a constitution of future a triathlete is mesomorphic (classification of somatotype by Sheldon) that is considered at the selection.

The conditional duration of the primary selection is about three months. The most intensive elimination of children on the basis of medical and biological factors is observed at this stage.

The second stage of the selection falls on the period of initial sports specialization and the main objective has forecasting of endowments in the chosen type of the program of triathlon at this or that distance. The leading evaluation criteria – is dynamics of growth of the required physical qualities and aerobic productivity, and also the extent of adaptation of an organism to the raising loadings in process of trainings.

The duration of this period reaches two years depending on the chosen specialization, the time of its beginning and age of a young sportsman [2; 9].

The main tasks of the following **third stage of selection** are: 1) final choice of a distance of a type of the program of triathlon (specialization); 2) identification of the most gifted triathletes; 3) completing of team collectives by the most perspective young sportsmen [3; 14].

At selection at 2–3 stages it is necessary to consider manifestation of genetic (hereditary) factors, and also rates of a gain of functionality and development of motive qualities from juvenile (initial) indicators to definitive (reached at this or that stage of sports improvement). At the systematic supervision for engaged at different stages of sports improvement by means of creation of the schedule-physiogramm, it is possible to trace the dynamics of growth of indicators of any sign, and also on its juvenile values to predict definitive by the end of the observed period. It gives the chance to reveal the most talented pupils who are capable to achieve further high sports results, owing to carrying out with them individual training work.

Problems of the subsequent stages – selection of the best representatives of FCS, CYSS, SCYSOR, SHSS, HSPC, sports clubs on different age groups for completing of national teams of the cities, areas, areas, the Autonomous Republic of the Crimea. The system of selection in the national team of Ukraine on triathlon imposes more strict requirements to sportsmen according to “The provision on a regular national team on team of Ukraine on sports” [10; 11; 13; 14].

FTU created a special system of selection for the purpose of definition of the strongest sportsmen for inclusion them in a national team of the country (candidates for the main structure and reserve) [7]. Its main aims consist in completing of the strongest team’s line-up for participation in the European championships and the world, the championships of Europe and the world, draws of European Cups and the world, the Olympic Games, and also in drawing up a rating of sportsmen [12; 14].

Triathletes who will show the corresponding results at the making triathlon distances can become candidates for a national team of Ukraine (the main structure): Men have 1500 m of swimming – 17:20 min, at women – 19:10 min, men have 10 km of run – 32:30 min, women have 37:30 min (table 1).

Among sportsmen of the age group “teenagers” only winners and prize-winners of junior national championship can apply for membership in the national team.

The results of participation in All-Ukrainian competitions and the international starts are taken into account by drawing up a national team of Ukraine on triathlon, candidate structure and reserve (40 persons, from them 25 sportsmen and 15

sportswomen) [7; 11]. Also the positive dynamics of growth of personal sports results, the implementation of the established standards in the disciplines making continuous triathlon (see tab. 1), psychological firmness, and motivation on the achievement of good results, ability to carry out tactical installations of a coach, a rating of triathlete are considered.

The structure of a regular national team of Ukraine is formed by coach's council for results of selection and approved by Presidium of FTU after payment by sportsmen of annual membership dues of Federation, providing the individual plan of preparation the next year, medical examination passing (the triathletes belonging to the category "elite" and preparing for the World Cup, are exempted by the decision of Presidium of FTU from the participation in selection) [15; 12].

The combined team players, being in a team's line-up, are obliged to adhere to requirements "Regulations on a regular national team to team of Ukraine on sports".

The member of a national team can be brought from its structure on representation of the head coach (the final decision is made by Presidium of FTU) [12].

FTU takes his initial rating making 1/3 from a rating of last year as a basis at calculation of a rating of a triathlete. Further the performance in All-Ukrainian competitions according to the table 2 "Three best indicators on swimming in a year in individual competition on open water (taking into account coefficient of competitions)" approved by the Ministry of Ukraine for family, youth and sport is considered. The charge of rating points to the sportsmen, who haven't won first place, is made only on condition of difference of the winner no more than 5% at men over time and women have 8%.

The European Federation of Triathlon (EFT) makes to sportsmen also the rating (on condition of entry into the first 100 at men and 50 at women) by results of participation in the international competitions.

The general rating of a sportsman consists of the sum of ratings of EFT and FTU [14].

Penal points are counted to triathletes at a descent from a distance of the combined race: at All-Ukrainian competitions – 20, on international – 40. In some cases at emergence of unforeseen circumstances (trauma of a sportsman, breakage of the bicycle, etc.) the question of charge of penal points is considered by coach's council [15].

There are following conditions ***for participation of the combined team players of Ukraine (men and women) in the international competitions in triathlon:***

1) the first among the Ukrainian sportsmen at a stage of the European Cup and 1–2 sportsmen according to the decision of coach's council, taking into account their rating and implementation of standards for swimming and run by them according to table 3 pass on the European championship among adults (individual competitions), taking into account ETU quotas;

2) winners of the next summer sports of youth of Ukraine and 2–3 sportsmen according to the decision of coach's council, taking into account performance in the championship of Ukraine, their rating and implementation of standards for swimming and run by them according to table 3 pass on the European championship among youth (individual competitions), taking into account ETU quotas;

3) winners of the championship of Ukraine among juniors and 1–2 sportsmen according to the decision of coach's council, taking into account their rating and implementation of standards for swimming and run by them according to table 3 pass on the European championship among juniors (individual competitions), taking into account ETU quotas;

4) sportsmen by results of performances in the current year, at the same time their participation in a series of the World Cup and the World Cup stages is considered, pass on the World Cup among adults (individual competitions), taking into account ITU quotas;

5) sportsmen by results of performances in the European championship among youth take place on the World Cup among youth (individual competitions), taking into account ITU quota;

6) sportsmen by results of participation in the European championship among juniors pass on the World Cup among juniors (individual competitions), taking into account ITU quota [14].

The selection of triathletes for participation in the Olympic Games

This sport is presented in the summer Olympic Games only by one combined distance of 51,5 km (1,5 km of swimming + 40,0 km of cycle driving + 10,0 km of run). Only 110 sportsmen (55 men and 55 women) are allowed for participation in competitions in triathlon on a quota of the Olympic Games [3].

The best 8 countries according to a rating in the world have the right for the three representatives (quota) in games, the others – to one or two (depending on a rating).

The rating selection begins in two years prior to the forthcoming Olympic Games (since June) for obtaining the Olympic license. 16 starts (the European Championships and the world, World Cups) include offset. The selection comes to the end in the Olympic year (in June).

Triathletes, having the highest rating, taking into account a country quota, are allocated with the honorable right to represent the state at the summer Olympic Games [12; 14; 15].

Conclusions

It is possible to draw the following conclusions on the basis of the conducted research:

1. Sports selection plays a key role at taking in of pupils in departments of triathlon in sports schools, and also when forming national teams of all levels for participation in competitions in continuous triathlon.

2. Genetically put morphological and physiological features of an organism of a child substantially influence productivity in the chosen sport and are of great importance for forecasting of the development and further sports improvement.

Table 1

Standards for swimming and run for sportsmen of a regular national team of Ukraine, candidate structure and reserve on triathlon

Distance (m)		Unit	Sex	Main staff	Candidate staff	Reserve of national team
swimming	400	min:s	M	–	–	04:44
		min:s	W	–	–	05:12
	800	min:s	M	09:11	09:20	09:51
		min:s	W	09:45	10:00	10:40
	1500	min:s	M	17:20	17:45	–
		min:s	W	19:10	19:30	–
run	2000	min:s	M	–	–	06:00
		min:s	W	–	–	07:10
	5000	min:s	M	15:45	16:00	16:30
		min:s	W	18:00	19:00	20:00
	10000	min:s	M	32:30	33:00	–
		min:s	W	37:30	39:00	–

Table 2

Three best indicators on swimming in a year in individual competition on open water (taking into account coefficient of competitions)

№	All-Ukrainian competition	Coefficient
1	Championship of Ukraine on Olympic distances	2
2	Summer sports games of youth of Ukraine	1,5
3	Cup of Ukraine at the Olympic distance	2
4	Championship of Ukraine at a sprint distance	1
5	Cup of Ukraine at a sprint distance	0,7
6	Championship of Ukraine at a super-sprint distance	0,5

Table 3

Standards for swimming and run for participation of triathletes (1–2 people) in the European championship according to the decision of coach's council

Distance (m)		Unit	Sex	Adult (24 years old and older)	Youth (20–23 years old)	Juniors (18–19 years old)
swimming	800	min:s	M	09:11	09:11	09:30
		min:s	W	09:45	09:45	10:20
	1500	min:s	M	17:30	17:40	–
		min:s	W	19:30	19:40	–
run	5000	min:s	M	15:45	15:45	16:00
		min:s	W	18:00	18:00	18:30
	10000	min:s	M	32:30	32:30	–
		min:s	W	37:30	38:00	–

3. The rating of a triathlete is counted taking into account the initial rating of a sportsman, results of his performances in All-Ukrainian competitions and the international starts.

4. A triathlete needs to receive the highest rating by results of participation in 16 test international competitions in two years preceding the Olympic Games for participation in the Olympic Games.

Prospects of further researches. The subsequent researches will be directed to studying of the factors, defining specifics of planning of long-term preparation in sport triathlon.

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References

1. Bernkhard, G. & Adelfinskiy, A. 2009, *13-nedelnyy plan podgotovki k «zheleznoy» distantsii* [13-week training plan to "iron" distance], Available at: http://triathlonmasters.ru/training_13to13.htm. (in Russ.)

2. Vodlozerov, V. Ye. 2012, *Triatlon* [Triathlon]. Kharkov: NATA, 212 p. (in Russ.)
3. Vodlozerov, V. Ye. 2012, [Distances in sport triathlon], *Slobozans`kij naukovo-sportivnij visnik*, Kharkiv: HDAFK, No 4, pp. 33–37. (in Russ.)
4. Dagard, M. & Panov Ye. 2007, *Triatlon – nachinam podgotovku* [Triathlon – start preparation]. Available at: http://triathlonmasters.ru/training_GettingStarted.htm. (in Russ.)
5. Dryukov, V. A. 2002, *Sistema postroyeniya chetyrekhletnikh tsiklov podgotovki sportsmenov vysokogo klassa k Olimpiyskim igram (na materiale sovremennogo pyatiborya)*: *dis. d-ra nauk po fiz. vospitaniyu i sportu* [System building of four-year cycle of preparation of high-class athletes for the Olympic Games (based on the modern pentathlon: doct. of sci. diss.], K., 410 p. (in Russ.)
6. Zimkin, N. V. 1984, [Physiological characteristic features of adaptation of locomotor system to different types of activities], *Fiziologicheskiye problemy adaptatsii* [Physiological adaptation problems], Tartu, pp. 73–76. (in Russ.)
7. Nakaz Ministerstva Ukraini u spravakh sim'i, molodi i sportu № 1088 vid 07.04.2006 roku. *Polozhennya pro Edinu sportivnu klasifikatsiyu* 2006 [Order of the Ministry of Ukraine for Family, Youth and Sports № 1088 from 07.04.2006 year. Regulations on the Unified Sports Classification], Kyiv, pp. 121–122. (in Ukr.)
8. Nakaz Ministerstva Ukraini u spravakh simi, molodi i sportu № 1624 vid 18.05.2009 roku. *Polozhennya № 1* [Order of the Ministry of Ukraine for Family, Youth and Sports № 1624 from 07.04.2006 year. Regulations No 1], Kyiv, 2009, 5 p. (in Ukr.)
9. Platonov, V. N. 1984, *Teoriya i metodika sportivnoy trenirovki* [Theory and methods of sports training], Kyiv: Vishcha shkola, 352 p. (in Russ.)
10. *Pravila sorevnovaniy po triatlonu* [Rules for triathlon competitions], Available at: http://triathlonmasters.ru/rules.htm. (in Russ.)
11. Federatsiya triatlonu Ukraini. *Polozhennya pro Vseukrainski zmagannya z triatlonu na 2016 rik* [Triathlon Federation of Ukraine. The provisions of nationwide competitions on triathlon in 2016], Available at: http://triathlon.org.ua. (in Ukr.)
12. FTU. *Prezidiya Federatsii triatlonu Ukraini* [FTU. The Bureau Federation Triathlon Ukraine], Available at: http://triathlon.org.ua. (in Ukr.)
13. FTU. *Regionalni viddilennya* [FTU. Regional offices], Available at: http://triathlon.org.ua. (in Ukr.)
14. FTU. *Sistema vidboru do zbirnoï komandi Ukraini z triatlonu u 2010 rotsi* [FTU. The system of selection to the national team of Ukraine triathlon in 2010], Available at: http://triathlon.org.ua. (in Ukr.)
15. FTU. *Trenerska rada 2016 roku* [FTU. Coaching Council 2016], Available at: http://triathlon.org.ua. (in Ukr.)
16. Domanski Ivo. 1987, *Triatlon pro kaћdйho*, Praha, 19 s.
17. Fitzgerald, M. 2003, *Complete triathlon book*.

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Volodymyr 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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The analysis of efficiency of tactics of personal defense in basketball

Yevheniya Yaroshenko

Kharkiv State Academy of Physical Culture, Kharkiv Ukraine

Purpose: *to define the efficiency of a game of the men's basketball team of high qualification with the use of personal defense.*

Material & Methods: *games of the men's team of the Superleague "Khimik" of Yuzhnyi are considered. 3 seasons were researched: 2013/2014, 2014/2015, 2015/2016. Methods were used: analysis and synthesis of data of scientific and methodical literature, pedagogical supervision, comparative analysis, methods of mathematical statistics.*

Results: *the comparison of average indicators of number of technical and tactical actions in defense of the team "Khimik"(rebound, steal) in three seasons is carried out. The analysis of turn overs in offense by teams – competitors of the team "Khimik" is carried out. The analysis of data of accuracy of shots against personal defense of the team "Khimik" is carried out.*

Conclusions: *the defensive play of the team "Khimik" helps them to achieve the high purposes in the championship of Ukraine and the Cup of Ukraine, and also to show their skill on the European arena.*

Keywords: *basketball, zone defense, rebounds, steals, shots.*

Introduction

Tactical preparation of teams, which take part in competitions of high level, has to be adapted in the team line-up, features of its working capacity and tasks, which the team will solve in these competitions. Various options of tactical actions in attack and defense have to be in the inventory at such teams.

Active defense has to become the main means of fight for initiative in a game. According to many experts [1; 2; 3; 4], active defense – is the base of the progress of basketball. The emphasis of a coach on a play in defense helps even a team of middle class to play well. Mistakes in personal defense define by unsuccessful actions of specific players who can be replaced with bench-warmers. Much attention is paid to different options of defense in tactical preparation in teams of high level.

Communication of the research with scientific programs, plans, subjects

The research was conducted according to the plan of RW of KhSAPC 2.8 "Definition of influence of different exercise stresses on the accuracy of performance of movements" (the state registration number is 0111U003127).

Purpose of the research

To define the efficiency of use of personal defense in the game of the basketball men's teams of high qualification.

Material and Methods of the research

The game of the men's team of the Superleague "Khimik" of Yuzhnyi is considered. 3 seasons were researched: 2013/2014, 2014/2015, 2015/2016. Methods were used: analysis and synthesis of data of scientifically methodical literature, pedagogical supervision, comparative analysis, methods of mathematical statistics.

Results of the research and their discussion

The comparative analysis of efficiency of technical and tactical actions in defense

The analysis of tactical actions of the team "Khimik" showed that the team uses personal defense in defense. Such tactical actions as rebounds in defense, which recoiled after not miss shot of the player of competitors, and steals, which can take place at performance by the rival of dribble or pass, are indicators of active and effective defense of the team? All these actions can happen during the performance of team counteractions in personal defense.

The analysis of videos of games showed that the team used only personal defense unlike season 2013/2014 in seasons 2014/2015 and 2015/2016, for this reason the received statistics of season 2013/2014 for bigger reliability are listed for 40 minutes of playing time according to expression:

$$k_i = \frac{40p_i}{\Delta t_i},$$

where k_i – indicator of quantity corresponding technical and tactical actions during 40 min, p_i – the number of the corresponding technical and tactical actions, Δt_i – period during which the relevant system of defense was used.

Indicators of technical and tactical actions in defense of players of the team "Khimik" 2013/2014 are displayed in tab. 1. Respectively indicators in the season 2014/2015 are displayed in tab. 2, and in tab. 3 – the season 2015/2016.

The analysis of indicators of TTA for three seasons, which are given in the tables 1–3, showed that the greatest number of rebounds of the team "Khimik" made in season 2013/2014 against the team "Dnipro Azot" – 40 rebounds. The smallest quantity of rebounds – 18 – was made in the season 2014/2015 twice in games with the teams BC "Kyiv" and "Budivelnyk".

Analyzing indicators of games with different competitors, we will note that the team "Khimik" made the maximum number of steals in the season 2014/2015 against the team "Dnipro" – 15 times. The minimum quantity of steals was recorded in the game with the team "Zaporizhzha" – 4 times.

The comparative analysis of indicators of technical and tactical actions for three seasons (tab. 4) shows what the greatest average indicator of quantity of rebounds was reached by the team "Khimik" in the season 2013/2014 – 32,62±1,01 times, it 7,62 times more, than in the season 2014/2015, and 5,5 times more, than in the season 2015/2016. The difference of indicators of quantity of rebounds between the seasons 2013/2014 and 2014/2015 and between the seasons 2013/2014 and 2015/2016 can be considered reliable unlike difference between the seasons 2014/2015 and 2015/2016.

The difference of indicators of number of steals was reliable only between the seasons 2013/2014 and 2014/2015, it made 3,88 times. The greatest average indicator of steals was established in the season 2014/2015, it equaled 10,50±1,08 times for the game that is 2 times more, than in the season 2015/2016, but this difference, as well as difference, between the seasons 2013/2014 and 2015/2016 which made 1,88 times, is not reliable.

Analysis of technical and tactical actions of offense against personal defense of the team "Khimik"

Indicators of low productivity of passes from the game of the team-competitor, which encounters resistance in the form of personal or zone position defense, and turn overs, under pressure of the same kinds of defense can be the characteristic of effective defense also. We registered these indicators in pedagogical supervision for this reason. Each of offenses of competitors had to be carried out against position defense by means of which the team "Khimik" counteracted offenses to the basket. We registered in the protocol of supervision how attack in offense has come to the end: well-aimed or miss shot (two-or three-point), turn over under the pressure of defense or unconstrained turn over in offense as a result of uncoordinated actions of the players. After the data recording of each game, we counted percent of hits of teams of offense in close and middle shots (2-point shots), in shots from three-point shot (3-point throws), also separate results counted also in turn overs.

Receiving these results, in our opinion, has to give the evident picture of productivity of technical and tactical actions not only teams of offense which puts all efforts on overcoming of the system of defense of the competitor with the end of this game, positive for itself. We will be able to draw conclusions concerning productivity of the defensive play of the team "Khimik", through the data of accuracy and the number of turn overs of the team of offense against personal defense.

Indicators of technical and tactical actions of offense against personal defense of the team "Khimik" 2013/2014 displayed in tab. 5. Respectively indicators in the season 2014/2015 are displayed in tab. 6, and in tab. 7 – the season 2015/2016.

Having analyzed the percent of hits of 2-point shots of teams – competitors BC "Khimik" , we see that the team players of BC "Kyiv" in the season 2013/2014 which in 58,3% struck a ring of BC "Khimik", were the most well-aimed. Whereas the team "Dnipro Azot" has got only 30% of two-point shots in the season 2014/2015.

The most successful defense against 3-point shots of the team BC "Khimik" was in the play with the team "Kryvbas" in the season 2015/2016, opponents managed to realize only 12%, and the greatest percent 3-point hits against defense of the team BC "Khimik" was shown by the team "Budivelnyk", namely – 43,5 percent.

Analyzing each game separately, it was established that the greatest number of turn overs against the team "Khimik" is made the team "Lviv" – 28 times. The smallest number of turn overs was recorded in the game with the team "Zaporizhzha "– 7 times.

Comparison of indicators of technical and tactical actions of opposing teams against personal defense of the team "Khimik" (tab. 8) shows that average indicator of two-point hits in the season 2013/2014 made 49,57±1,61%, it is only 1,57% more, than in the season 2015/2016, but much more, than in the season 2014/2015 (3,5%), the difference between the seasons 2014/2015 and 2015/2016 made 1,93%. Any of these differences is not reliable.

Studying the accuracy of three-point shots, we can claim that teams –competitors of BC "Khimik" were the most well-aimed in the season 2013/2014, the percent of their hits made 27,85±1,59%, it is 1,13% more, than in the season 2014/2015, and the difference with the season 2015/2016 makes 0,85%, the difference between the seasons 2014/2015 and 2015/2016 made 0,28%. Any of these differences is not reliable.

Therefore the reliable difference between indicators of number of turn overs wasn't established. The greatest average indicator of number of turn overs of teams-competitors was reached in the season 2014/2015 – 18,62±1,70 times whereas in the season 2013/2014 this indicator made 15,5±1,21 times, it is 3,12 times less, than in the season 2013/2014, and 0,63 times more, than in the season 2015/2016, namely – 14,87±1,85 times.

Conclusions

1. Having made the analysis of defense team actions of the team "Khimik" we came to conclusion that the team gives considerable advantage to personal position defense.

2. The analysis of statistical data of the defensive play of the team "Khimik" showed that the greatest average indicator of quantity of rebounds was reached by the team "Khimik" in the season 2013/2014 – 32,62±1,01 times, it 7,62 times more, than in the season 2014/2015 and 5,5 times more, than in the season 2015/2016; difference of indicators of quantity of rebounds between the seasons 2013/2014 and 2014/2015 and between the seasons 2013/2014 and 2015/2016, it is possi-

Table 1

Indicators of technical and tactical actions of the team "Khimik" in the season 2013/2014 (quantity)

TTA	Teams- competitors in the season 2013/2014							
	Odesa	Dnipro -Azot	BC Kyiv	Budivelnyk	Hoverla	Lviv	Mykolayiv	Dnipro
Rebounds	36	40	27	32	34	35	34	33
Steals	4	9	4	7	8	8	7	6

Table 2

Indicator of technical and tactical actions of the team "Khimik" in the season 2014/2015 (quantity)

TTA	Teams- competitors in the season 2014/2015							
	Odesa	Dnipro -Azot	BC Kyiv	Budivelnyk	Hoverla	Lviv	Mykolayiv	Dnipro
Rebounds	27	30	18	18	22	26	31	28
Steals	11	13	8	8	8	13	8	15

Table 3

Indicator of technical and tactical actions of the team "Khimik" in the season 2015/2016 (quantity)

TTA	Teams-competitors in the season 2015/2016							
	Cherkaski Mavpy	OBC Bipa	Kryvbas	Zaporizhzha	Mykolayiv	Cherkaski Mavpy	Dynamo	Kryvbas
Rebounds	29	28	23	28	23	30	30	26
Steals	7	13	10	4	7	5	9	13

Table 4

Comparisons of quantitative indices of technical and tactical actions of the team "Khimik" in personal defense in three seasons

TTA	2013/2014	2014/2015	2015/2016	$t_{1,2}$	$t_{1,3}$	$t_{2,3}$
	$\bar{X}\pm m$					
Rebounds	32,62±1,01	25,00±1,92	27,12±1,07	3,43; p<0,05	3,56; p<0,05	0,96; p>0,05
Steals	6,62±0,69	10,50±1,08	8,5±1,27	3,00; p<0,05	1,29; p>0,05	0,96; p>0,05

Table 5

Indicators of technical and tactical actions of offense of teams – competitors of BC "Khimik" in the season 2013/2014

TTA	Odesa	Dnipro -Azot	BC Kyiv	Budivelnyk	Hoverla	Lviv	Mykolayiv	Dnipro
2-point shots, %	52,0	50,0	58,3	50,0	47,1	44,4	48,6	46,2
3- point shots, %	33,0	22,0	30,0	33,0	27,3	25,0	23,1	29,4
Turn overs	11	21	12	14	16	18	16	16

Table 6

Indicators of technical and tactical actions of offense of teams – competitors of BC "Khimik" in the season 2014/2015

TTA	Odesa	Dnipro -Azot	BC Kyiv	Budivelnyk	Hoverla	Lviv	Mykolayiv	Dnipro
2-point shots, %	39,5	30,0	46,5	70,0	56,1	42,9	36,4	47,2
3- point shots, %	35,7	15,0	35,0	43,5	14,3	26,1	19,2	25,0
Turn overs	19	21	13	17	18	28	15	18

Table 7

Indicators of technical and tactical actions of offense of teams – competitors of BC "Khimik" in the season 2015/2016

TTA	Cherkaski Mavpy	OBC Bipa	Kryvbas	Zaporizhzha	Mykolayiv	Cherkaski Mavpy	Dynamo	Kryvbas
2-point shots, %	43,0	45,0	58,0	46,0	49,0	46,0	47,0	50,0
3- point shots, %	26,0	25,0	12,0	29,0	33,0	39,0	33,0	19,0
Turn overs	17	19	21	7	11	10	17	17

Table 8

Comparisons of indicators of technical and tactical actions of opposing teams against personal defense of the team "Khimik" in three seasons

TTA	2013/2014	2014/2015 $\bar{X}\pm m$	2015/2016	$t_{1,2}$	$t_{1,3}$	$t_{2,3}$
2-point shots, %	49,57±1,61	46,07±4,69	48,0±1,73	0,71; p>0,05	0,66; p>0,05	0,38; p>0,05
3- point shots, %	27,85±1,59	26,72±3,99	27,0±3,23	0,26; p>0,05	0,24; p>0,05	0,05; p>0,05
Turn overs	15,5±1,21	18,62±1,70	14,87±1,85	1,50; p>0,05	0,28; p>0,05	1,49; p>0,05

ble to consider reliable unlike difference between the seasons 2014/2015 and 2015/2016.

3. The difference of indicators of number of steals was reliable only between the seasons 2013/2014 and 2014/2015, it made 3,88 times. The greatest average indicator of steals was established in the season 2014/2015, where it equaled 10,50±1,08 times for the game that is 2 times more, than in the season 2015/2016, but this difference, as well as difference, between the seasons 2013/2014 and 2015/2016 which made 1,88 times, is not reliable.

4. The average indicator of two-point hits in the season 2013/2014 made 49,57±1,61%, it is only 1,57% more, than in the season 2015/2016, but much more, than in the season 2014/2015 (3,5%), the difference between the seasons 2014/2015 and 2015/2016 made 1,93%. Any of these differences is not reliable.

5. The analysis of percent of hits of three-point shots of teams – competitors of BC «Khimik» showed that percent of their hits made 27,85±1,59%, in the season 2013/2014, it is 1,13% more, than in the season 2014/2015, and the difference with the season 2015/2016 makes 0,85%, the difference between the seasons 2014/2015 and 2015/2016 made 0,28%. Any of these differences is not reliable.

6. Summing up the results of researches, we can note that defensive play of the team "Khimik" helps them to achieve the highest aims in the Championship of Ukraine and the Cup of Ukraine, and also to show their skill on the European arena.

Prospects of the subsequent researches. The research of efficiency of tactics of other types of defense in basketball teams of the Superleague is planned.

Conflict of interests. *The author declares that there is no conflict of interests.*
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References

1. Khose Maria Buseta. 2000, *Basketbol dlya molodykh igrokov*: rukovodstvo dlya trenerov [Basketball for young players: a guide for trainers], FIBA, 360 p. (in Russ.)
2. Valtin, A. I. 2003, *Problemy sovremennogo basketbola* [Problems of modern basketball], Kiyev: Drukarnya kontsernu «In Yure», 150 p. (in Russ.)
3. Vuden, D. 1987, *Sovremennyy basketbol* [Modern basketball], Moscow: Fizkultura i sport, 256 p. (in Russ.)
4. Kouzi, B. & Pauyer, F. 1975, *Basketbol : kontseptsii i analiz* [Basketball: Concepts and Analysis], Moscow: Fizkultura i sport, 272 p. (in Russ.)
5. Dzherri V. Krauze, Don Meyer & Dzherri Meyer. 2006, *Basketbol – navyki i uprazhneniya* [Basketball – skills and exercise], Moscow: AST: Astrel, 211 p.
6. Nikolich, A. & Paranosich, V. 1984, *Otbor v basketbole* [Selection of basketball], Moscow: Fizkultura i sport, pp. 67–83. (in Russ.)
7. Platonov, V. N. *Obshchaya teoriya podgotovki sportsmenov v olimpiyskom sporte* [General theory of training of athletes in Olympic sports]. Kyiv: Olimpiyskaya literatura, 1997, 584 p. (in Russ.)
8. Pomeshchikova, I. P., Nazarevich, A. V. & Yevtushenko, I. M. 2013, [Analysis of the performances of the team of Ukraine girls at the European championship in basketball in 2012], *Fizicheskoye vospitaniye studentov* [Physical education students], Kharkiv, No 1, pp. 49–53. (in Russ.)
9. Pomeshchikova, I. p., Chucha, N. I., Pashchenko, N. O. & Strelnikova, Ye. Ya. 2015, [Research of efficiency of performance of male national team of Ukraine in the world championship in basketball in 2014], *Slobozans`kij naukovo-sportivnij visnik,* Kharkiv: KSAPC, No 2, pp. 154–160. (in Russ.)
10. Poplavskiy, L. Yu. 2004, *Basketbol* [Basketball], Kyiv: Olimpiyska literatura, 448 p. (in Russ.)
11. *Basketbolna Superliga Ukraini* [Basketball Superleague Ukraine], Available at: www.superleague.ua (date of the application 04.04.2015). (in Ukr.)
12. *Federatsiya basketbolu Ukraini* [Ukraine Basketball Federation], Available at: www.fbu.ua. (in Ukr.)

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Yevheniya Yaroshenko: *Kharkiv State Academy of Physical Culture: Klochkovskaya str. 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0002-2608-851X
E-mail: marocco_rabat@mail.ru

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The effectiveness of the individual approach in physical rehabilitation of men with metabolic syndrome to improve atherogenic lipid profile

Marina Yelnikova

Classic Private University

Purpose: *evaluation of the effectiveness of individual approach in physical rehabilitation of men with metabolic syndrome based on the dynamics of the atherogenic lipid profile.*

Materials and methods: *theoretical analysis and compilation of scientific and methodical literature and internet providers; biochemical methods; methods of mathematical statistics. To study involved 60 men with metabolic syndrome.*

Results: *Application of individual approach in the long-term form of rehabilitant-rehabilitation interaction at the outpatient rehabilitation stage of men with the metabolic syndrome improves lipid profile, significantly reduces total cholesterol, low-density lipoprotein, triglycerides and increases high-density lipoprotein.*

Keywords: *metabolic syndrome, rehabilitation, individual approach, interaction, lipoproteins, man.*

Introduction

Metabolic syndrome (MS) is characterized by a set of interrelated risk factors: obesity, insulin resistance, hypertension, hyperglycemia, hypertriglyceridemia, reduction high-density lipoprotein, the presence of proinflammatory and thrombogenic background [2; 4; 9]. Individual components of metabolic syndrome may be present or absent in each individual case, but each of them is a major risk factor for cardiovascular disease [1; 10].

Given that the disturbance of lipoprotein metabolic is a recognized factor risk for cardiovascular disease, it is an important rehabilitation's task in normalization of the lipid status by non-drug means.

The risk of cardiovascular complications significantly increased with increasing levels of triglyceride (TG), concentrations of low density lipoprotein (LDL) and decrease the concentration of high density lipoproteins (HDL). A characteristic feature of dyslipidemia in MS is to increase the number of small dense lipoproteins, which have great potential atherogenic [1; 4].

Today our country is recognized as a priority strategy for the prevention of vascular diseases and their complications, which involves the stratification of risk factors, combating and identification of barriers to implementation of modern standards. So MS within which combined multiple vascular high risk factors, can not attract the attention of healthcare professionals and specialists in physical rehabilitation.

In most patients, all of these manifestations of the metabolic syndrome are in a complex, requiring a multidisciplinary approach in rehabilitation involving physical rehabilitators, therapists, surgeons, cardiologists, sociologists, neurologists, psychologists, physiotherapists, occupational therapists.

This demonstrates the need for an individual approach in the rehabilitation of patients nosology on the one hand, and the difficulty of selecting the most appropriate methods of physical rehabilitation for the full recovery of the patient – on the other hand.

Convincing data of many randomized studies demonstrate the ability of influence dosed exercise on pathogenetic atherosclerosis links, reduce systemic inflammation, correct insulin resistance, make favorable effects on metabolic parameters [3, 5–8] that requires attention from the rehabilitation.

However, the theoretical analysis of scientific papers suggests that the problem of physical rehabilitation of patients with a metabolic syndrome is not almost solved, and existing programs of physical rehabilitation of this group do not include differentiation of modes of motor activity that requires development and scientific substantiation.

Relationship with the academic programs, plans, themes

The selected research direction corresponds to the research topic of Classic Private University "Personalization of physical rehabilitation for persons with special needs and athletes" (state registration 0113U000580).

Purpose: evaluation of the effectiveness of individual approach in physical rehabilitation of men with metabolic syndrome based on the dynamics of the atherogenic lipid profile.

Material and Methods of the research

To achieve this goal at different stages of scientific research has been used a number of methods: theoretical analysis and synthesis of scientific-methodical literature and global infor-

Table 1

The dynamics of biochemical parameters (M±m) in the main group of men (MG) with metabolic syndrome

Indicator	MG (n=30)		
	beginning	six months	year
Total cholesterol, mmol/L	7,46±0,19	7,12±0,22***	6,33±0,19•••
Triglycerides, mmol/L	2,78±0,14	2,53±0,16**	2,00±0,13•••
High-density lipoprotein, mmol/L	1,91±0,10	2,20±0,12***	2,43±0,12•••
Low-density lipoprotein, mmol/L	4,71±0,31	4,10±0,25***	3,38±0,12•••

Notes: *** – p<0.01; *** – p<0.001 compared with the data after 6 months; ••• – p <0.001 compared with the data after 12 months.*

Table 2

The dynamics of biochemical parameters (M±m) in the comparison group of men (CG) with metabolic syndrome

Indicator	CG (n=30)		
	beginning	six months	year
Total cholesterol, mmol/L	7,14±0,24	6,84±0,23	6,32±0,22••
Triglycerides, mmol/L	2,89±0,15	2,76±0,13*	2,72±0,12••
High-density lipoprotein, mmol/L	2,00±0,11	1,96±0,11	1,96±0,12
Low-density lipoprotein, mmol/L	4,83±0,35	5,74±0,38	5,78±0,40

Notes: ** – p<0.05 compared with the data after 6 months; •• – p <0.01 compared with the data after 12 months.*

mation on the Internet; biochemical methods; methods of mathematical statistics.

Organization of the research. The study was conducted at the cardiology department of Zaporizhzhya City hospital № 7. The study involved 60 men, that were randomly divided into groups (MG, n = 30) and the comparison group (CP, n = 30).

The criteria for inclusion in the experiment were age from 36 to 65 years (average age of participants was 41,53±1,29 years), the presence of the first and second stages of obesity, waist circumference over 94sm, blood pressure level ≥135/90, fasting hyperinsulinemia ≥5,6 mmol/L or impaired glucose tolerance ≥7,8 mmol/L, increase an initial triglyceride level ≥1,7 mmol/L, decrease in HDL < 1.0 mmol/L increase in LDL> 3.0 mmol/L.

Given that lifestyle significantly influences on the metabolic syndrome components, recommendations for lifestyle modification (diet, refusal of bad habits, increased physical activity) and medication were similar in both groups. Men of the main group additionally engaged by the authors rehabilitation program that included differentiation forms and amounts of physical activity, depending on the clinical manifestations of metabolic syndrome characteristics, functional status, level of cardiorespiratory system, compliance. The study of the dynamics of blood biochemical parameters was performed after 6 and 12 months of using physical rehabilitation.

Results of the research and their discussion

At the beginning of the study in most patients biochemical parameters observed elevated levels of triglycerides, total cholesterol and low density lipoprotein, which exceeded the recommended target values.

Using individual approach in physical rehabilitation of men with metabolic syndrome in the MG (Table 1) contributed to the possible decline total cholesterol by 0.34 mmol/L (p<0.001), triglycerides – by 0.25 mmol/L (p<0.01), low density lipoprotein – by 0.61 mmol/l (p<0.001) in six months of training; in a year – above indicators decreased from baseline to 1.13 mmol/L (p<0.001), 0.78 mmol/L (p<0.001), 1.33 mmol/L (p<0.001) respectively. Target level of LDL, which should be below 2.5 mmol/L, as a result of the measures failed to achieve.

In assessing the level of HDL in men of the main group it was found probable increasing by 0.29 mmol/L (p<0.001) after six months and by 0.52 mmol/L (p<0.001) – after year. Target values for HDL male were not found in comparison group. After six months of research 30% of patients of MG achieved target levels of total cholesterol (<4.5 mmol/L), 58% – high density lipoprotein cholesterol (>1.0 mmol/L), 35% – triglycerides (<1.7 mmol/l).

Men of comparison group was observed statistically significant positive changes of lipid metabolism, which in six months were pronounced by triglycerides and in twelve months – by total cholesterol and triglycerides (Table 2). In the comparison group, only 10% of patients achieved target levels of total cholesterol, 23% – triglycerides, 12% – low-density lipoprotein.

Analysis of the final results of biochemical parameters (in 12 months) showed statistically significant superiority by (p<0,05-<0,01) in the main group compared to the comparison group. In particular, the men of MG noted significantly better performance of triglycerides – by 0.72 mmol/L (p<0.001), HDL – by 0.47 mmol/L (p<0.01), LDL – by 2,4 mmol/L (p<0.01) compared to the CG.

Conclusions

At the beginning of the study the majority of patients, despite regular follow a cardiologist, had indices of lipid metabolism that exceed the recommended target values. The results of the pilot study found that the conditions of the individual approach in physical rehabilitation of men with metabolic syndrome can achieve significant changes in blood biochemical parameters.

Prospects for further research lies in determining the effectiveness of the proposed individual approach in physical rehabilitation of men with metabolic syndrome to improve anthropometric indicators.

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References

1. Balazh, M. S. 2012, [The effectiveness of the program of physical rehabilitation of patients with ischemic heart disease with metabolic syndrome biochemical indicators of blood] *Teoriya i metodika fizichnogo vikhovannya i sportu* [Theory and methods of physical education and sport]. No 3, pp. 33–37. (in Ukr.)
2. Kovalenko, V. N., Nesukay, Ye. G. & Yakovenko, A. Yu. 2006, [Problems of diagnosis and management of patients with the metabolic syndrome] *Ukrainskiy kardiologichniy zhurnal* [Ukrainian Journal of Cardiology]. No 4, pp. 98–104. (in Russ.)
3. Koziy, T. B. 2012, [The theoretical justification kinesitherapy hypertension depending on left ventricular hypertrophy] *Visnik Zaporizkogo natsionalnogo universitetu* [Journal of Zaporizhzhya National University]. No 2(8), pp. 137–145. (in Ukr.)
4. Mitchenko, O. I. 2011, [Diagnosis and treatment of metabolic syndrome, diabetes, preddiabetu and cardiovascular disease] *Sertsevo-sudinni zakhvoryuvannya: rekomendatsii: z diagnostiki i profilaktiki ta likuvannya* [Cardiovascular Disease: Recommendations: diagnosis and prevention and treatment]. Kyiv: Morion, pp. 68–79. (in Ukr.)
5. Tershak, N. M. 2006, [Rationale for a differentiated approach to the enlargement motor activity of patients with metabolic syndrome] *Slobozhanskii naukovo-sportyvnyi visnyk* [Slobozhanskyi science and sport bulletin]. Kharkiv: KSAPC, Vol. 6 No 2, pp. 147–152. (in Ukr.)
6. Grundy, S. M., Brewer, B. J. & Cleeman, J. I. et al. 2004, Definition of metabolic syndrome: Report of the National Heart, Lung, and Blood Institute. *American Heart Association conference on scientific issues related to definition, Circulation*, Vol. 109, p. 433–438.
7. Diehm, C., Darius, H. & Pittrow, D. 2007, Methabolic syndrome and peripheral arterial occlusive disease as indicators for increased cardiovascular risk. *Dstch. Med. Wschr*, V. 132, P. 15–20.
8. Manson, J. E. 2002, Walking compared with vigorous exercise for the prevention of cardiovascular events in women. *New Engl. J. Med*, Vol. 347, P. 716–725.
9. Reaven, G. M. 2002, Metabolic syndrome. Pathophysiology and implications for management of cardiovascular disease. *Circulation*, Vol. 106, No 3, P. 286–289.
10. Franco, O. H., Massaro, J. M. & Civil, J. et al. 2009, Trajectories of Entering the Metabolic Syndrome: The Framingham Heart Study. *Circulation*, No 120, R. 1943–1950.

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Marina Elnikova: *Senior Lecturer, Classic Private University: Zhukovsky str., 70 b, Zaporizhzhya, 69002, Ukraine.*
ORCID.ORG/0000-0003-1525-3628
E-mail: elnik1980@mail.ru

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The relationship between reproduction of the jump's rhythm and technical score of their execution by gymnasts at the stage of initial training

Oksana Zaplatynska

Lviv State University of Physical Culture, Lviv, Ukraine

Purpose: *to determine the interconnection between quality of performance of the jumps and reproduction of the rhythm of jumps by gymnasts at the stage of initial training.*

Material & Methods: *to determine the relationship between reproduction of rhythm and evaluation by the quality of technique of the jumps we used expert assessment, check the accuracy of the reproduction of rhythm with the help of computer program "rhythmic", methods of mathematical statistics.*

Results: *the study found the correlation between reproduction of rhythm and summing-up of quality the technique of jumps by the gymnasts at the stage of initial training.*

Conclusions: *the ability to reproduce a predetermined rhythm influences the level of technical readiness of gymnasts at the stage of initial training.*

Keywords: *rhythm, technique, jumps, gymnastics, art, stage of initial training.*

Introduction

The growth of requirements of competition rules of rhythmic gymnastics concerning the accuracy of performance of elements, the early specialization of gymnasts demand the search of new methods of training which will provide high-quality technical training of sportswomen from the stage of initial preparation [5; 11; 13].

Experts on cyclic and difficult-coordination kinds of sport claim that study of sports exercises with assimilation of rational rhythm of their performance considerably facilitates and accelerates the process of assimilation of sports technique, promotes fixing of motor skill [2; 3; 4; 7].

There is a problem of study of jumps at the stage of initial preparation in rhythmic gymnastics, in particular, as experts testify (O. Ye. Aftimchuk), running broad jumps and ascent for performance of jumps, which can be solved to applications of exercises, which promote assimilation of rhythm of jump [2]. However the statement of the author is not confirmed with the scientific data.

The reliable correlation interrelations are found in gymnasts at the stage of initial preparation between assessment of the general technical preparedess and ability to reconstruction of rhythm in the research of V. L. Botyayev [3].

However, the direct researches, concerning influence of assimilation of rational rhythm of jumps on quality of performance of their technique in rhythmic gymnastics, were not conducted.

The above attracts prerequisites to check of interrelation between the accuracy of reconstruction of rhythm of jumps and the quality of technique of their execution at gymnasts at the stage of initial preparation. As numerous researches showed, the optimum prerequisites of improvement of motive activity happen on the basis of assimilation of expedient rhythm of the movement [3; 4; 7].

Modern rhythmic gymnastics is characterized by high precision of the performance of motor actions which demands the performance of movements by spatial, power and time parameters from a gymnast [3].

The foundations of technique are laid at the stage of the initial preparation, which is the base for the subsequent improvement and complication [5; 8]. It is extremely important to acquire the correct bases of method of execution of exercises at this stage [8].

Feeling of rhythm, being basis for the development of coordination of movements, is the inalienable part of technical training of athletes [12].

Feeling of rhythm is important in sports with the difficult and previously determined structure. Small deviations from the set rhythm of movements negatively influence the quality of sports technique in these sports [9].

Each motor action, depending on the nature of motive activity, has the motive rhythm which an athlete needs to seize for the achievement of result in the chosen sport, which is confirmed by the results of the researches [3].

It is possible to form consciously motive rhythm of physical exercise and to regulate it according to motive task, knowing the rhythmical structure of the complete movement, [2; 3; 9].

Communication of the research with scientific programs, plans, subjects

The research is executed according to the subject 2.7 "Improvement of the system of physical training of athletes taking into account individual and technical profiles of their preparedness" of the Built plan of the research work in the sphere of physical culture and sport for 2011–2015.

Purpose of the research

To find the interrelation between indicators of accuracy of reconstruction of rhythm of jumps and assessment for quality of method of execution of jumps in gymnasts at the stage of the initial preparation.

Research task:

1. To analyze the references concerning the influence of assimilation and reconstruction of rhythm on technique of sports exercises.

2. To define the indicators of accuracy of reconstruction of rhythm of jumps and to estimate quality of technique of their execution at gymnasts at the stage of the initial preparation before and after application of the experimental program of improvement of rhythm.

3. To find the interrelation between indicators of reconstruction of rhythm of jumps and assessment by the technique of their execution in gymnasts of both groups before and after the experiment.

Material and Methods of the research

40 gymnasts of 6–7 years old took part in the research that answers the stage of the initial preparation in rhythmic gymnastics. Gymnasts of the second year of study took part in the research. Gymnasts reproduced the set reference rhythm of jumps by hands on the computer keyboard, separately in the room, in silence, on 3 times each rhythmical exercise. The average result of error of reconstruction of rhythm by means of the program "Excel" was calculated. Also gymnasts carried out jumps which were estimated by three experts according to the scale of estimation of quality of method of execution of jumps, which is developed on the basis of competition rules of rhythmic gymnastics. Application of the experimental program of improvement of rhythm lasted 3 months. The correlation analysis in the program "Excel" was carried out between assessment for quality of method of execution of jumps and results of reconstruction of rhythm of jumps. The correlation analysis was carried out before and after application of the experimental program.

Results of the research and their discussion

Indicators of accuracy of reconstruction of rhythm and assessment of quality of performance of jumps at gymnasts at the stage of the initial preparation for application of the experimental program for gymnasts of the control and experimental groups did not significantly differ (pic. 1, 2; tab. 1).

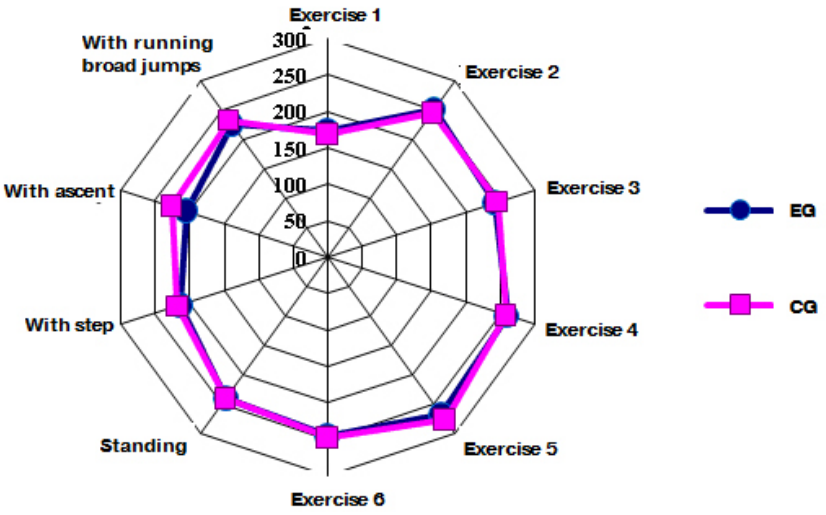
So, the rhythm reconstruction accuracy error indicator at the gymnasts of the experimental group fluctuated from 202,85±32,5 to 250,55±20,34 ms, at the gymnasts of the control group from 209,7±14,15 ms to 240,3±25,65 ms.

The assessment for quality of method of execution of jumps at gymnasts of the experimental group was from 3,95 to 3,15 points, gymnasts of the control group had from 3,92 to 3,1 points. The coherence of opinions of experts was high (W>0,6).

The recheck of accuracy of reconstruction of rhythm and estimation of the method of execution of jumps is carried out after the application of the experimental program [8] within three months, and the reliable improvement ($p<0,001$) is revealed in the studied indicators at gymnasts of the experimental group (tab. 1).

The correlation analysis with the determination of coefficients of the linear correlation of Pearson was used at the determination of dependences of the studied signs, where the threshold size of significance value was considered 0,05 (or 5%).

Strong correlation interrelations (tab. 1) are found at the gymnasts of the experimental group between the studied indicators before and after the application of the experimental program that confirms the position of authors [3; 4].



Pic. 1. Rhythm reconstruction error at the gymnasts of the control and the experimental groups before the experiment

Table 1

Correlation interrelations between results of reconstruction of rhythm and assessment for quality of method of execution of jumps at the gymnasts of the experimental group before and after the experiment

Type of jumps	Period	Expert assessment, p. (M±m)	Rhythm reconstruction accuracy error, ŋ, ms (M±m)	Correlation coefficient, r
Standing jumps	Before the exper.	3,95±0,21	238,6±21,25	0,52*
	After the exper.	6,243±0,22	94,15±9,235	–0,589*
	t-crit.	8,001	6,26	
	p	<0,001	<0,001	
Jumps with step	Before the exper.	4,031±0,2	202,85±32,5	–0,64*
	After the exper.	6,124±0,07	97,3±7,13	–0,454*
	t-crit.	13,65	4,73	
	p	<0,001	<0,001	
Jumps with ascent	Before the exper.	3,59±0,25	215,3±25,2	–0,65*
	After the exper.	6,142±0,26	103,05±10,16	–0,484*
	t-crit.	11,6	6,53	
	p	<0,001	<0,001	
Running broad jumps	Before the exper.	3,15±0,24	250,55±20,34	–0,48*
	After the exper.	5,9±0,21	110,4±10,26	–0,891*
	t-crit.	8,67	7,40	
	p	<0,001	<0,001	

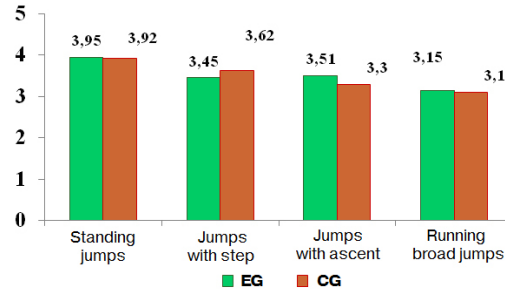
Note. ** – reliable correlation interrelation.*

Table 2

Correlation interrelations between results of reconstruction of rhythm and assessment for quality of method of execution of jumps at the gymnasts of the control group before and after the experiment

Type of jumps	Period	Expert assessment, p. (M±m)	Rhythm reconstruction accuracy error, ŋ, ms (M±m)	Correlation coefficient, r
Standing jumps	Before the exper.	3,9±0,29	240,3±25,65	0,34
	After the exper.	5,6±0,23	197,5±18,6	–0.487*
	t-crit.	0,99	1,35	
	p	>0,05	>0,05	
Jumps with step	Before the exper.	3,6±0,48	209,7±14,15	0,39*
	After the exper.	4,9±0,12	191.1±19,5	–0,578*
	t-crit.	0,84	1,96	
	p	>0,05	>0,05	
Jumps with ascent	Before the exper.	3,28±0,56	233,05±25,35	–0,52*
	After the exper.	4,5±0,28	195,4±9,67	–0,565*
	t-crit.	0,79	0,85	
	p	>0,05	>0,05	
Running broad jumps	Before the exper.	3,088±0,37	236,6±32,15	–0,46*
	After the exper.	4,4±0,24	214,7±11,75	–0,612*
	t-crit.	0,76	0,37	
	p	>0,05	>0,05	

Note. ** – reliable correlation interrelation.*



Pic. 2. Expert assessment for quality of method of execution of jumps at the gymnasts of the control and the experimental groups before carrying out the pedagogical experiment

The reliable correlation interrelations on different significance values are observed between the studied indicators at the gymnasts of the experimental group. The average statistical interrelation before and after the experiment is found in standing jumps, in jumps with step: before the experiment – average, after – weak interrelation, in jumps with ascent: before the experiment – average, after – weak interrelation, in running broad jumps: before the experiment – weak, after – strong statistical interrelation (see tab. 1).

The reliable improvement it was not observed at the gymnasts of the control group between results of reconstruction of rhythm and assessment of execution of jumps before and after the experiment of ($p>0,05$), however the existence of strong reliable correlation interrelations between the studied indicators (tab. 2) is also revealed.

The reliable correlation interrelations on different significance values are observed apparently from results of the carried-out correlation between indicators of reconstruction of rhythm of jumps and assessment for quality of technique of jumps, at the gymnasts of control group before and after carrying out the experiment. So, standing jumps are very weak at the gymnasts of the control group before the experiment, and after – weak correlation interrelation, jumps with step – before the experiment – weak, after – average statistical interrelation, jumps with ascent – average statistical interrelation before and after the experiment, running broad jumps – before the experiment – weak, after the experiment – average interrelation.

It should be noted that interrelations are also in the control group, where the accuracy of reconstruction of rhythm and assessment for quality of technique is lower (pic. 3, 4), than in thre experimental, in which the highest indicators of accuracy of reconstruction of rhythm and style mark of execution of jumps.

The obtained data confirm numerous researches of experts concerning the interrelation between reconstruction of rhythm and technique of exercises, and, therefore, put forward development of ability to rhythm reconstruction as one of the prerequisites of assimilation of technique of sports exercises.

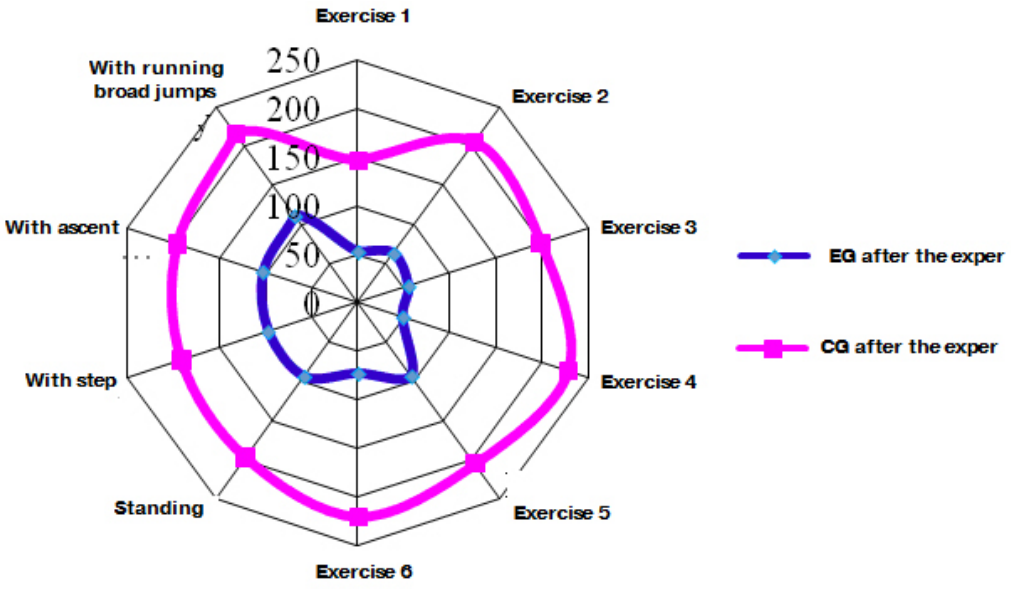
Conclusions

The reliable improvements of indicators of accuracy of reconstruction of reference rhythm of jumps and assessment for quality of technique of their execution are observed ($p<0,001$), as a result of application of the developed program of study of jumps for the gymnasts of the experimental group in which the emphasis on the development of feeling of rhythm and assimilation of rhythm of jumps is placed during their studying.

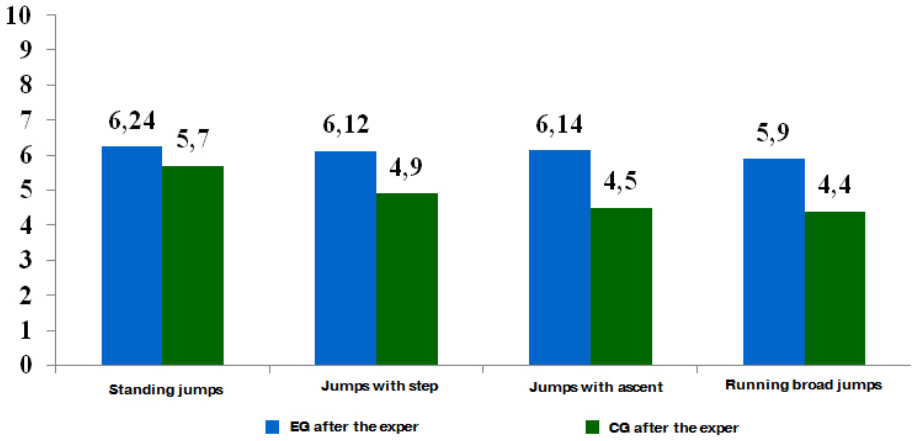
The studied correlation analysis between indicators is carried out before and after the application of the experimental program found high interrelations between reconstruction of rhythm and assessment of execution of jumps at the gymnasts of the experimental group.

The reliable improvement of indicators have reconstructions of rhythm and assessment of execution of jumps was not observed at the gymnasts of the control group ($p>0,05$), however strong correlation interrelations between the studied indicators are also found. It confirms calculation data of experts on interrelation of reconstruction of rhythm and technical preparedness of athletes.

Prospects of the subsequent researches. The testing of interrelation between indicators of reconstruction of rhythm and assessment for performance of competitive exercises without a subject at gymnasts at different stages of long-term preparation is planned.



Pic. 3. Results of accuracy of reconstruction of rhythm at the gymnasts of the experimental and the control groups after the pedagogical experiment



Pic. 4. Expert assessment for quality of method of execution of jumps at gymnasts of the experimental group and the control group after the experiment

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References

1. Andryeyeva, R. 2008, [Value coordination abilities in training gymnasts-artists], *Moloda sportivna nauka* [Young sports science], Lviv, T. I, pp. 6–9. (in Ukr.)
2. Aftimichuk, O. Ye. & Kuznetsova, Z. M. 2015, [The significance of rhythm in the system of vocational educational and athletic training], *Pedagogiko-psikhologicheskiye i mediko-biologicheskiye problemy fizicheskoy kultury i sporta* [Pedagogical-psychological and medical-biological problems of physical training and sports], No 2(35), pp. 28–38. (in Russ.)
3. Bakatov, V., Antonets, V. & Chernobay, T. 2006, [Optimization rhythmic patterns of movement hammer throwers junior level three rotations], *Teoriya ta metodika fizichnogo vikhovannya* [Theory and methods of physical education], No 3(23), pp. 18–24. (in Ukr.)
4. Botyayev, V. L. 2015, *Nauchno-metodicheskoye obespecheniye otbora v sporte na osnove otsenki koordinatsionnykh sposibnostey*: *dis. ... doktora ped. nauk: 13. 00. 04* [Scientific and methodological support of selection in sports based on an assessment of coordination sposibnostey : doct. of sci. thesis]. Surgut, pp. 201–216. (in Russ.)
5. Viner-Usmanova, I. A., Kryuchek, Ye. S., Medvedeva, Ye. Ye. & Terekhina, R. N. 2014, *Khudozhestvennaya gimnastika: istoriya, sostoyaniye i perspektivy razvitiya* [Rhythmic Gymnastics: history, state and development prospects], Moscow: Chelovek, 200 p. (in Russ.)
6. Gorskaya, I. Yu., Lebedeva, L. V. & Konovalova, T. N. 1993, *Koordinatsionnyye sposobnosti devochek, otobrannykh dlya zanyatiy khudozhestvennoy gimnastikoy* [Coordination abilities of girls selected for rhythmic gymnastics]. Novosibirsk, pp. 31–32. (in Russ.)
7. Yevzhenko, N. 2013, [The significance of rhythm in the system of teaching motor actions of young water polo players], *Moloda sportivna nauka Ukraini* [Young sports science of Ukraine], T. 1, pp. 62–66. (in Russ.)
8. Zaplatinska O. B. 2015, [Basic training program jumps in rhythmic gymnastics at the stage of initial training], *Slobozans`kij naukovo-sportivnij visnik,* Kharkiv: KSAPC, No 4(48), pp. 46–49, dx.doi.org/10. 15391/snsv. 2015-4.008. (in Ukr.)
9. Platonov, V. N. 2004, *Obshchaya teoriya podgotovki sportsmenov v olimpiyskom sporte* [The general theory of training of athletes in Olympic sports], Kyiv: Olimpiyskaya literatura, 584 p. (in Russ.)
10. Karpenko, L. A. 2000, *Osnovy sportivnoy podgotovki v khudozhestvennoy gimnastike* [Fundamentals of sports training in rhythmic gymnastics], SPb: SPbGAFK, 40 p. (in Russ.)
11. Kaurtseva, S. G. 1998, *Osnovy formirovaniya dvigatelnogo navyka pri vypolnenii slozhnykh gimnasticheskikh uprazhneniy u detey grupp nachalnoy pidgotovki*: avtoref. dis. na soiskaniye uch. stepeni kand. ped. nauk : spets. 13. 00. 04 «Teoriya i metodika fizicheskogo vospitaniya, sportivnoy trenirovki, ozdorovitelnoy i adaptivnoy fizicheskoy kultury» [Bases of formation of motor skills when performing complex gymnastic exercises at children of groups of initial preparation : PhD thesis], Moscow: RGAFK, 23 p. (in Russ.)
12. Mullagildina, A. Ya., Deyneko, A. Kh. & Krasova, I. V. 2012, [The development of coordination abilities of girls 7-8 years old, engaged in artistic gymnastics], *Pedagogika, psikhologiya ta ta mediko-biologichni problemi fizichnogo vikhovannya i sportu* [Pedagogy, psychology, and medical-biological problems of physical education and sport], No 2, p. 78–82. (in Russ.)
13. Nesterova, T. V. [Improving the system of long-term preparation of athletes in rhythmic gymnastics], *Nauka v olimpiyskom sporte* [Science in the Olympic sport], Kyiv: NUFVSU, 2007, No 1, p. 66–73. (in Russ.)
14. Pavlova, Ye. V. *Sovershenstvovaniye sistemy sportivnogo otbora v khudozhestvennoy gimnastike na osnove pokazateley razvitiya koordinatsionnykh sposobnostey*: dis.. ... kand. ped. nauk: 13.00.04 [Improving the system of selection of sports in calisthenics-based indicators of development of coordination abilities: PhD diss.]. Surgut, 2008, 145 p.: il. (in Russ.)

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Oksana Zaplatynska: *Lviv State University of Physical Culture Street. Kosciuszko, 11, Lviv, 79000, Ukraine.*
ORCID.ORG/0000-0003-0253-6653
E-mail: oksana.zaplatinska.89@mail.ru

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The reliability of the presented results correspond to authors

Publication of Kharkiv State Academy of Physical Culture
Klochkivska Str. 99, Kharkiv, 61058, Ukraine
+38 (0572) 705-21-02
sport-kharkov@mail.ru