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## APPLICATION OF YOGA FOR FLEXIBILITY QUALIFIED DANCERS

**Abstract. Purpose:** *to assess the flexibility of dancers they were trained by the experimental procedure, formed on the basis of yoga movements. Material and methods:* *the study involved 20 highly skilled dancers aged 18–23 years. Methods were used: analysis of literary sources, pedagogical experiment, methods of mathematical statistics. Results:* *the exercise of the yoga system in addition to the main problem – training flexibility, allows a minimum time to restore one’s body after physical exertion involved. Conclusions:* *the use of a pilot program in training dancers provided positive dynamics of flexibility in all test exercises that can characterize this methodology as an effective and recommend it for implementation in the practice of sports and training ballroom dancers.*

**Keywords:** *ballroom dancing, yoga exercises in the system, static exercises, training of dancer’s flexibility.*

**Introduction.** In a theory and methods of physical culture a flexibility is examined as a multifunction of property of man’s locomotorium, qualificatory the limits of motions of body’s links.

There are active and passive flexibility. Active flexibility shows up in motions, passive in keeping of poses, positions. There is a great number of methods, taking into account different factors, influencing on development of flexibility: type of motor actions, features of morfofunctional features, account of ambient temperature, etc. [1; 4]. Each of methods has the features, advantages and defects. The analysis of literature allowed us among all methods [4; 9; 10] to distinguish methods, constructed on the basis of exercises of yoga, those are considered below furthermore in detail.

The analysis of video data of technique of motions performing in sportive ballroom dances, shows that a presence for the sportsman of sufficient level of flexibility allows him successfully to execute a number of technical actions in different dances under the competition program: steps, positions, peak motions et cetera. But, taking into account the lack of time, which a sportsman can spare in the training sessions to develop flexibility, a necessity arose for devising of experimental methods, which would allow, keeping a sportsman on his training activity, to render the effective impact on his building-up flexibility.

**Research purpose:**

1. To analyze modern approaches on the use of static exercises for development of flexibility.
2. To work out methods on building-up of flexibility, used with exercises by the system of yoga and to define its efficiency.

**Material and research methods.** Research was being conducted during a month on the base of department of theory and methods of dancing sport of SCOLIPE. 20 dancers of high qualification took part in research at the age of 18–23. For the estimation of level of flexibility of dancers, the following test exercises were selected: forward lean, «bridge», split with R/L leg in front, lean, wide straddle stand, arms circling.

In process of research the following methods were used: analysis of literary sources, pedagogical experiment, methods of mathematical statistics.

**Research results and their discussion.** One of the methods of development of flexibility when performing exercises on a stretching is a static method. The method of static stretch is based on dependence of size of stretch and its duration. At first, it is necessary to relax, and then to execute exercise, retaining eventual position from 10–15 seconds to a few minutes [5; 6]. Mostly it is reflected in the exercises (positions) of yoga. Analysis of exercises of yoga, allowed to mark following features, presenting particular interest for sportsmen-dancers.

1. Exercises of yoga are executed without superfluous muscular tension.
2. Exercise of yoga assists to the warming-up of muscles.
3. Time of keeping positions is determined by individual possibilities and according to the set tasks.
4. Exercises of yoga are performed according to individual possibilities of trainees.

Such bodily condition is to be achieved due to ability to alternate tension and relaxation of muscles. And ability to relax the muscles – one of basic conditions at development of flexibility [1; 10]. Taking into account all above-stated features of yoga, a complex can be introduced into a limbering-up and its basic task will be a warming-up of muscles. In dancing sport a limbering-up is specific and, as a rule, is constructed from dancing motions, therefore exercises by yoga system are better to use at the end of training, in order to solve such tasks as building-up flexibility (as performing exercises for a stretch with warmed muscles far more effective), regeneration of organism (as performing of complex requires skill to alternate tension and relaxation of muscles, corresponds to the quiet breathing, etc.).

For experimental methods asanas (poses), performed in three initial positions, were chosen: standing upright, sitting, lying [8; 9]. Sequence and method of performance of exercises is given below.

**Exercises, performed in upright position:**

**1. "Dog, looking downwards" (adakho mukkha svanasana).**

I.P.: basic stand.

Performance of exercise: gradual "twist of spine" down the touch of the hands on floor, in the distance of half-pace from feet, with sequent boarding of this position; at that heels stick to the floor and palms fully touch the floor.

*Exercise is directed to the stretch of back surface of thigh, buttock muscles, muscles of back, shoulder girdle.*

**2. "Triangle" (trikosana).**

I.P.: straddle stand, hands on hips, deep lean to the right (left). Foot right (left) narrow straddle stand.

Performance of exercise: deep lean to the right is performed to the touch of R\L hand on floor. Look at "overhead" hand.

*Exercise is directed to the stretch of lateral muscles of trunk, gastrocnemius muscles, back surface of thigh.*

**3. "Unfolded triangle" (parivrita trikonasana)**

I.P.: straddle stand, hands on hips.

Execution of exercise: trunk amplitude lean forward. R\L hand to L\R. leg. An opposite arm taken upwards at most. Look at the "overhead" hand.

*Exercise is directed to the stretch of back surface of thigh, intrapatellar folds, muscles of back.*

**4. "Amplitude lunge" (andzhaneyasana).**

I.P.: amplitude leg lunge. Hands up.

*Execution is directed to the stretch of muscles and ligaments of thigh and knee.*

**5. "High lunge" (tadasana).**

I.P.: R\L leg lunge.

Execution of exercise: bodyweight on a front leg, arms directed downward to touch a floor (without support on the floor), back – hind leg – one line.

*Exercise is directed to the stretch of muscles and folds of groin, muscles of thigh.*

**6. "Hands behind a back" (parshvottanasana).**

I.P.: basic stand, R\L ahead. Palms united behind (behind back).

Execution of exercise: performance of lean forward to the front leg. Palms together. A back is at most upright.

*Exercise is directed to the stretch of shoulder girdle, muscles of spine and ligaments.*

**7. "Forward lean" (uttanasana).**

I.P.: basic stand.

Execution of exercise: performance of forward lean. Grasp of legs by arms. A back is at most upright.

*Exercise is directed to the stretch of spine, muscles of back, back surface of thigh, gastrocnemius muscles.*

**Exercises, executed in sitting position:**

**8. "Piked seat" (pashchimottasana).**

I.P.: basic seat position.

Execution of exercise: maximum forward bent "fold". Hands touch the floor behind feet, feet on oneself, back is at most upright.

*Exercise is directed to the stretch of muscles of back, surface of thigh, intrapatellar folds, muscles of shoulder, muscles of back.*

**9. "Lean to leg" (dzhanu shirshasana).**

I.P.: piked seat, R\L leg bent.

Execution of exercise: lean to L\R leg. Grasp of the heel of front leg by arms.

*Exercise is directed to the stretch of tendons, muscles of back surface of thigh, muscles of back.*

**10. "Half split" (ekapada radzhakapotasana).**

I.P.: "half split" of R\L leg.

Execution of exercise: bend a shin of L\R leg. The toe of arched leg is upward, do not tear off a thigh from floor.

*Exercise is directed to the stretch of muscles of thigh.*

**11. "Bending legs astride" (upavishtkha konasana).**

I.P. sit legs straddle.

Execution of exercise: maximum bent forward, lay arms (elbows) on floor. Feet on oneself. Not to bend knees.

*Exercise is directed to the stretch of groin, tendons, muscles of internal surface of thigh.*

**12. "Lean to one leg" (parivritta dzhanu shirshasana).**

I.P.: sit legs straddle, R\L is arched.

Execution of exercise: lean to L\R leg sideways. A grasp of foot by L\R hand from above. Foot on oneself. L\R side lies on L\R. leg.

*Exercise is directed to the stretch of groin, muscles of back surface of thigh, muscles of shoulder.*

**13. "Frog" (baddkha konasana).**

I.P.: sit bent legs straddle.

Execution of exercise: hold feet by hands, to pin knees against floor.

*Exercise is directed to the stretch of muscles and groin ligaments.*

**14. "Hands in a lock" (gomukhasana).**

I.P.: sit legs astride, hands in a "lock" on a back.

Execution of exercise: keep position "lock" on a back. Elbows are at most backward.

*Exercise is directed to the stretch of muscles of back, muscles and ligaments of shoulder, muscles of thigh side surface.*

**Exercises, executed in lying position:**

**15. "Pose of dog" (urdva mukha shvanasana).**

I.P.: front leaning support on straight arms.

Executing of exercise: keep position, shoulders downward, thighs lie on the floor.

*Exercise is directed to the stretch of muscles of breast and abdominal press.*



**16. "Pose of camel" (ushtrasana).**

I.P.: sit on knees, arms downward along a trunk.

Execution of exercise: performance of arching back, heels grasped by hands, look at upward.

*Exercise is directed to the stretch of muscles of breast, abdominal press, front surface of thigh.*

**17. "Pose of monkey" (khanumanasana).**

I.P.: split with L\R leg in front, straight arms upward.

Execution of exercise: keep of pose, thighs lie on the floor.

*Exercise is directed to the stretch of muscles of thigh and area of groin.*

**18. "Neckstand" (salamba sarvangasana)**

I.P.: shoulder stand, arms downward, lie on the floor, stretch toes upwards.

Execution of exercise: keep of position.

*Exercise is directed to the stretch of shoulder girdle, masculus platysma, spine.*

**19. "Pose of plough" (khalasana).**

I.P.: shoulder stand, legs downward behind the head, toes touch the floor.

Execution of exercise: keep of position.

*Exercise directed on stretching of muscles of rear surface of thigh, buttock muscles, muscles of spine.*

**20. Small "basket" (dkhanurasana).**

I.P.: small "basket" handclasp of feet, shoulders are at most taken behind, shins arched, toes "look" upward.

Execution of exercise: keep of position.

*Exercise is directed to the stretch of muscles of breast, abdominal press, front surface of thigh.*

**21. "Bridge" (urdkhva dkhanurasana).**

I.P.: "Bridge".

Execution of exercise: keep of position.

*Exercise is directed to the stretch of muscles of breast and back.*

**22. "Pose lying on back" (savasana).**

I.P.: lying on a back. Arms, feet spreaded, muscles relaxed.

Execution of exercise: keeping position.

*Exercise on relaxation of all muscles.*

The complex of exercises on building-up of flexibility consists of the 22th poses, and taking to account that some exercises are executed from both legs, all being 32 poses. Every position is kept from 45 seconds to 1 minute, everyone is executed fluently, without jerks, on relaxation. Exemplary time for execution of complex, consisting of exercises of yoga, – 30–50 minutes.

Pursuit hours on experimental methods were conducted during a month 3 times per week, after training on endurance. At the beginning and at the end of research the estimation of level of flexibility was conducted by means of test exercises (table).

**Dynamics of indexes of flexibility of highly skilled dancers before and after realization of sportive trainings (cm)**

Exercises Examinee	Split with right leg.	Split with left leg.	Bending, legs astride	Bending downward	Circling of hands	Bridge
<b>Girls (N=10)</b>						
<b>Initial</b>	7,6±4,6	8,0±6,0	15,3±7,1	24,0±9,1	73,0±7,3	69,0±14,1
<b>Eventual</b>	3,0±1,2	5,0±3,8	9,0±5,1	29,0±8,5	71,0±8,0	66,0±14,3
<b>Difference</b>	<b>4,6±3,4</b>	<b>1±2,2</b>	<b>6±2,0</b>	<b>5±0,6</b>	<b>2±0,7</b>	<b>3±0,2</b>
<b>P</b>	<0,05	>0,05	<0,05	<0,05	>0,05	>0,05
<b>Youths (N=10)</b>						
<b>Initial</b>	14,0±9,8	19,5±14,8	27,0±4,2	8,5±6,3	100,5±12, 1	69,0±26,6
<b>Eventual</b>	9,0±7,0	19,0±10,2	23,5±3,6	11,0±3,6	98,0±8,0	66,3±10,4
<b>Difference</b>	<b>5±2,8</b>	<b>0,0,5±4,6</b>	<b>4,5±0,6</b>	<b>3,5±2,7</b>	<b>2±4,1</b>	<b>2,7±16,2</b>
<b>P</b>	<0,05	>0,05	<0,05	>0,05	>0,05	>0,05

As obvious from the table in some test exercises a maximum result was attained: a few girls on completion of research sat down on right and left split, on what is possible to judge by indexes: right split – 7,6±4,6 cm; left split – 8,0±6,0 cm. In respect of difference in the indexes of test exercises before and after sporting training sessions, the highest possible value 6 cm was got for girls at execution of exercise – bending legs astride. For youths the value of difference between indexes before and after research at the execution of body bending legs astride was changed by 4 cm, that is also highest possible among all other increases. A minimum difference in indexes is got both for girls and for youths at the estimation of execution of split with left leg in front: girls – 1 cm, youths – 0,5 cm.

The results of the conducted research testify that application of experimental methods brought to the improvement of indexes of flexibility in all test exercises. However, the substantial change of indexes is not observed in all test exercises, that it can be explained by short duration in time of the use of these methods in the training process of sportsmen-dancers.

**Conclusions:**

1. The implementation of the experimental program in the training process of dancers provided the positive dynamics of indexes of flexibility in all test exercises, that can characterize these methods as effective and recommend them for introduction into sportive – training practice for dancers taking up sports ballroom dances.

2. Insignificant shifts in the values of some indexes can testify to insufficient time of application of these methods and necessity to increase of time of their use for achievement of better results.

**Prospects of subsequent researches in this direction.** In future the introduction of methods is planned in building-up flexibility on the basis of the yoga exercises in the training process of top skilled dancers on all stages and periods of preparation.

Taking into account of individual features of dancers at the construction of the

methods in building-up flexibility on the basis of yoga will allow to work out an individual complex and create possibility to correct time of implementation with due regard for the individual tasks in the training process.

**References:**

1. Alter M. Dzh., Gncharenko G., Radziyevskiy A. Nauka o gibkosti [Science of flexibility], Kyiv, 2001, 423 p. (rus)
2. Ivanitskiy M. F., Ivanitskiy M. F., Nikityuka B. A., Gladyshevoy A. A., Sudzilovskogo F. V. Anatomiya cheloveka [Human Anatomy], Moscow, 2003, 623 p. (rus)
3. Ellsuort A. Anatomiya yogi [Anatomy of yoga], Moscow, 2012, 159 p. (rus)
4. Lyakh V. I. Fizicheskaya kultura v shkole [Physical culture in school], 1999, N 1, pp. 4–10. (rus)
5. Matveyev L. P., Melnikov S. B. Metodika fizicheskogo vospitaniya s osnovami teorii [Technique of physical training with the basic theory], Moscow, 1991, 191 p. (rus)
6. Matveyev L. P. Obshchaya teoriya sporta i yeye prikladnyye aspekty [The general theory of sport and its applications], Moscow, 2001, 323 p. (rus)
7. Platonov V. N. Obshchaya teoriya podgotovki sportsmenov v olimpiyskom sporte [The general theory of training athletes in Olympic sports], Kyiv, Olimp. lit., 1997, 583 p. (rus)
8. Sosnovskiy I. Ramacharaka. Khatkha-yoga [Ramacharaka. Hatha-Yoga], Moscow, 1997, 174 p. (rus)
9. Alter J. Strength & strengthen / Alter J. – Boston: Houghton Mifflin, 1986. – 97 p.
10. Alter M. Sport stretch / Alter M. – Champaign, IL: Leisure Press, 1990. – 86 p.

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## COMPLEX PROGRAM OF PHYSICAL REHABILITATION OF THE MID-AGE MEN AFTER BENNET-ROLAND DISLOCATION FRACTURE IN POST-IMMOBILIZATION PERIOD AT THE POLICLINIC STAGE.

**Abstract. Purpose:** to give scientific ground of the problem of physical rehabilitation of the mid-age men after the Bennet-Roland dislocation fracture in post-immobilization period at the conditions of polyclinic stage and estimate its efficiency. **Material and methods** 21 men of mid-age participated in research after injury of hand; clinical and instrumental methods – goniometry of joints of hand are applied. **Results:** efficiency is estimated of the used means of physical rehabilitation on the basis of analysis of indexes of functional state of injured hand of the mid-age men after the Bennet-Roland dislocation fracture. **Conclusions:** rationally and efficiently is proved the complex program of physical rehabilitation for men of able-bodied age after injury of hand being in post-immobilization period at the polyclinic conditions.

**Keywords:** injures of hand, post-traumatic complications, program of physical rehabilitation.

**Statement of problem.** Among the traumas of locomotorium the damage of bones of hand is presented close to 30% [5]. Considerable distribution of traumas of hand, long duration of uncapacity and high level of disability results in severe economic losses, both in family of suffering man and in society [3]. The loss of professional skills negatively influences not only on labour activity but also on the psyche of working man capability, reduces his general and labour activity, dissociates him from a collective, complicates life in family. Next to physical and psychic disorders there are different economic and social problems [7]. With the purpose of removal of post-traumatic complications, a continuity has importance of realization of rehabilitation measures in the conditions of in-patient establishment and polyclinic taking into account age of victim and periods of illness after the trauma of hand.

**Connection of work is with the scientific programs, themes.** Work is carried out according to the general plan of research work in the field of physical culture and sport on 2011–2015. of the ministry of education and science, the youth and sport of Ukraine within the limits of theme 4.1. "Traditional and untraditional methods of physical rehabilitation of the diseases of the different systems of organism and damages of locomotorium of the persons of various degree of training. State registration number 0111U000194.

**Analysis of the last researches and publications.** Among the traumas of hand, character of which is very various, both for the heaviness and localization, mostly there are fractures of phalanxes of hand and carpal bones, and among the last the special attention is attracted the intra-articular breaks of the 1st carpal bone. A hand, as an organ of labour, has an important meaning in the vital functions of man, especially in labour activity of persons which execute by hand various sophisticated differentiated and the coordinated functions of movement. After the conducted operative or conservative treatment of fractures of hands the complex of means of physical rehabilitation is administered straight away, the arsenal of which is considerably broadened at the polyclinic stage [3].

Most researchers [5; 6; 9] underline the importance of the use of restoration treatment for patients after the traumas of hand of three basic groups of rehabilitation measures, which are directed to the prophylaxis of disability and restoration the broken functions: the first group includes the use of medical and physical means of rehabilitation, which are directed to the prophylaxis of post-traumatic complications and restoration of health, the second group is directed to normalization of the broken functions and skills of self-service, the third group – the use of facilities which help to renew the working capacity. All groups of rehabilitation measures must be used, provided taking into account a character and localization of trauma of hand, period of duration of illness, functional state of organism of victim and terms of restoration treatment. In literature accessible to us the presented problem is described not enough as to prescribed and application of complex of facilities of physical rehabilitation for persons after the Bennet-Roland dislocation fracture on taking into account the age of the victim, professional status and stage of physical rehabilitation [1; 6], that is what became the purpose of our work.

**Purpose of work:** to give the scientific grounds to the complex program of physical rehabilitation of men of middle age after the Bennet-Roland dislocation fracture in the post-immobilized period of restoration treatment in the conditions of polyclinic and to estimate its efficiency.

**Task of research:**

1. To learn etipatogenesis, clinical signs of intra-articular fractures of carpal bones and to analyze the modern approaches to physical rehabilitation of the Bennet – Roland dislocation fracture at the polyclinic stage of restoration treatment.
2. To describe changes which arise in the functional state of organism of victim after the Bennet-Roland dislocation fracture, that needs a rehabilitation measures.
3. To work out the program of physical rehabilitation for injured men in the post-immobilized period of restoration treatment in the conditions of polyclinic with the application of facilities of medical physical culture, massotherapy, physiotherapy and psychotherapy.

**Methods used in-research process:** analysis of medical maps; clinical methods of examination of the history, external review of the damaged and healthy hand, palpation, percussion, auscultation); pulsometry, arterial tonometry,

goniometry of carpal-phalangeal articulation of the 1st carpal bone and radiocarpal articulation; the hand dynamometry; measuring of volume of cylindrical grip by the fingers of hand; medical-pedagogical supervisions during taking up LPC; methods of mathematical statistics. All researches were conducted after the generally accepted methods [8].

Findings were treated by the method of variable statistics after S. Lapach, A. V. Chubenko, P. P. Babich (2000) with the calculation of average – arithmetic –  $\bar{X}$ , errors –  $m$ , standard deviation –  $\delta$ , the criterion of authenticity of Student – (the formula of Student), degree of authenticity –  $p$  (due to tables of D. D. Donskoy).

**Exposition of basic material.** Under our supervision under conditions of polyclinic there were 21 men of the middle age of (35–44) in the post-immobilized period of course of illness after the trauma of hand of intra-articular fracture of articulation of the 1st carpal bone, namely the Bennet dislocation fracture in 15 men – (71,4%) cases and the Roland dislocation fracture of 6 men – (28,6%).

A primary examination was conducted at the beginning of the post-immobilized period of course of illness at the first visit of victim in cabinet of medical physical culture, repeated one – at the end of this period (from data of x-ray photography research). Suffering men were divided by arbitrarily into two groups: control one – 10 patients (KG) and basic group – 11 patients (OG). Majority of them (71,5%) had working profession: joiners, locksmiths, sanitary technicians and the like, which had got the trauma of hand on a production sites, and only six of them (28,5%) worked as engineers, doctors, designers and programmers, which suffered from the intra-articular fracture of the 1st carpal bone during falling or playing basketball, volley-ball.

At a primary inspection the patients of both groups claimed complaints about pain during motions by the first finger of the damaged hand and impossibility of implementation of the differentiated and coordinated ordinary domestic habits and abilities by the damaged hand. Besides, at the investigated contingent of patients the concomitant somatic pathology was revealed: the initial stages of an arterial high blood pressure – 18,5% cases; chronic bronchitis – 19,1%; chronic gastritis – 14,3%. At comparison of values of functional state of patients of control and basic groups, it was not revealed the reliable differences on all parameters of function of the damaged hand. For all men of the investigated group the considerable decline of indexes of volume of active motions (bending, unbending, abduction and contraction) in the radiocarpal articulation of the damaged hand and reliable decline of volume of the active bending was marked in the carpal –phalanx joint of the 1st finger as compared to the proper indexes (by V. A. Epifanov, 2010; Ye. T. Sklyarenko, 2005) in these joints of hand, and also reliable diminishing of volume of cylindrical dactylar hold by the damaged hand (table). The indexes of the hand dynamometry testified the considerable decline of strength of muscles of the damaged hand as compared to the parameters of healthy hand for the injured men of both groups.

**An estimation of indexes of the functional state of the damaged raceme of control and basic groups is at a primary and repeated inspection (in comparing to the proper indexes after V. A. Yepifanov, 2010; E. Sklyrenko, 2005)**

Indexes	Inspection	KG (n=10)	BG (n=11)	t	p
		X±m	X±m		
<b>Goniometry of radiocarpal joint, degrees</b>					
Active bending: the damaged joint	I	50,20±1,88	54,70±2,56	1,41	>0,05
	II	66,00±3,70	79,00±2,54	2,89	<0,05
proper index		80–90	80-90		
Active unbending: the damaged joint	I	42,80±1,91	43,09±1,73	0,10	>0,5
	II	59,40±3,04	66,36±0,03	2,19	<0,05
proper index		60–70	60-70		
Active coersion: the damaged joint	I	18,40±0,83	19,09±0,81	0,44	>0,05
	II	22,40±0,72	24,90±1,02	2,10	<0,05
proper index		30–40	30-40		
Active taking: the damaged joint	I	33,80±0,51	34,70±0,65	1,09	>0,5
	II	42,20±0,95	48,30±0,50	5,70	<0,001
proper index		50–60	50-60		
<b>Goniometry of metacarpal-phalanx joint of st of finger, degrees</b>					
Active bending: the damaged joint		38,00±0,90	38,20±0,84	0,76	>0,05
	II	50,00±1,21	58,40±0,52	6,41	<0,0001
proper index		60	60		
<b>Volume of cylindrical dactylar capture, mm (from 10 to 100 mm)</b>					
by the damaged brush		78,00±4,66	80,00±5,40	0,28	>0,05
		27,00±3,48	14,50±2,00	3,11	<0,005
by a healthy brush		10	10		
<b>Spray dynamometry, kg</b>					
by the damaged brush		11,20±0,78	10,70±0,94	0,40	>0,05
		25,80±1,22	30,70±1,02	3,08	<0,005
by a healthy brush		49,50±1,80	50,90±3,36	0,26	>0,05
		51,50±2,24	53,63±3,05	0,56	>0,05

Thus, data of clinical and instrumental research of indexes of the functional state of locomotorium of the injured men testified to the presence for the patients of both groups at the beginning of the second, post-immobilized period of analgesic fixed contracture in the carpal – phalanx articulation of the - st finger and radiocarpal joint of the damaged hand, that, in our view, was predefined hypokinesia in the first period of illness.

With the purpose of removal of post-traumatic complications in the side of the functional state of the damaged hand we worked out the complex program of physical rehabilitation for the men of middle age of basic group, which included a medical gymnastics by the methods modified by us in combination with a massotherapy by the methods of P.B. Yefimenko [2] and by classic, for this period, method of physiotherapy – paraffin applications on the damaged hand and radiocarpal joint [1].

The features of the methods of medical gymnastics offered by us are prescribing in in most cases of training of MG of hydro-kinesis therapy and mechanotherapy with the use of the special mechanic-therapeutic adaptation, which

was conducted in local bath for hands with warm mineral chloride-sodium water of 37–38°C, and also a correction of fingers of hand by the special position in a bath. For renewal of dactylar cylindrical and nip grip, and strengthening of muscles of hand the special, specific, depending on labour activity of patient, objects and parts of different form, volume, weight and size were used.

Under the repeated inspection, conducted after the course of restoration treatment of patients of both groups by the authors, the substantial positive dynamics of indexes of the functional state of the victims' hands was revealed for the men of the basic group as compared to the indexes of control group (see table.). It should be noted that such parameters, as amplitude of the active bending in the carpal-phalanx joint of the damaged finger and volume of active motions (bending, unbending, abduction, coersion) in a radiocarpal articulation, and also volume of cylindrical dactylar grip by the damaged hands for the injured men of basic group practically approach to the proper indexes of hand [3]. At the same time for the patients of control group a tendency was determined only to normalization of these parameters. From data of x-ray photography, the acceleration of formation of secondary callus is marked in area of fracture for the patients of basic group, that allowed to accelerate renewal of the damaged motor function of hand up to  $48,20 \pm 1,20$  twenty-four hours after a trauma, while in the control group a renewal of the functions of hand took place only on the  $56,10 \pm 1,30$  twenty-four hours ( $p < 0,05$ ).

#### **Conclusions:**

1. Limitation of volume of motions in radiocarpal and carpal-phalanx joints of the st carpal bone relates to the number of the most early post-traumatic complications of the damaged hand. Absence of complete volume of motions comes up to impossibility of realization of the refined, differentiated and coordinated motions of the fingers of hand, especially in persons, labour activity of those depends on hand as a primary organ of labour. Therefore, for a prophylaxis and liquidation of these post-traumatic complications is an importance of the use of complex of the physical rehabilitation facilities since the first days after the trauma.

2. The complex program worked out and applied by us in physical rehabilitation for men, who suffered from the trauma of hand – the Bennet-Roland dislocation fracture, and were under our supervision in the post-immobilized period in the conditions of polyclinic, was effective, rational, considerably decreasing of the displays of post-traumatic complications and accelerate renewal of labour professional skills and abilities. Thus, it can be recommended as the restoration treatment of that contingent of patients.

**Perspective is the development** and scientific grounds of the program of physical rehabilitation for men, suffered from the trauma of hand – the Bennet-Roland dislocation fracture, for the application on a sanatoria stage of the restoration treatment.

#### **References:**

1. Ananyeva T. G., Belousova L. G. Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkv, 2012, vol. 3, pp. 111–114.



2. Yefmenko P. B. Tekhnka ta metodika klasichnogo masazhu [Technology and technique of classical massage], Kharkv, 2007, 216 p.
3. Epifanov V. A., Yepifanov A. V. Reabilitatsiya v travmatologii [Rehabilitation in Traumatology], Moscow, 2010, 336 p.
4. Kotelnikov G. P., Miroschnichenko V. F. Zakrytyye travmy konechnostey [Closed injured limbs], Moscow, 2009, 496 p.
5. Milyukova I. V., Yevdokimova T. A. Lechebnaya fizkultura. Noveyshiy spravochnik [Therapeutic exercises. newest Directory], Moscow, 2003, pp. 515–516.
6. Mukhn V. M. Fzichna reabltatsya [Physical Rehabilitation], Kyiv, 2005, pp. 112–219.
7. Misuli . R., Vakulenko L. O. Medichna ta sotsalna reabltatsya [Medical and social rehabilitation], Ternopl, 2005, pp. 297–303.
8. Damsker I. S. Otsenka effektivnosti zanyatyy lechebnoy fizicheskoy kultury [Evaluating the effectiveness of therapeutic physical culture classes], Leningrad, 1986, p. 36–40.
9. Popov S. N. Fizicheskaya reabilitatsiya [physical rehabilitation], Rostov na Donu, 2005, pp. 157–160.

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## **ANALYSIS OF THE STATE PHYSICAL PREPAREDNESS STUDENTS WHEN DOING RHYTHMIC GYMNASTICS**

**Abstract. Goal:** *to definition of influence training of rhythmic gymnastics level of physical fitness of students with various techniques carrying out. **The materials and methods:** teacher testing using the state tests and standards for assessments of physical readiness of the population of Ukraine. **Results:** comparing baseline level of physical preparedness of students estimated regulatory state tests showed that the girls in terms of significant differences were found. After the experiment, analysis of the results has revealed positive changes in indicators of physical preparedness in all studied groups. **Conclusions:** as a result of the experiment found that the most effective method of training rhythmic gymnastics is the method of which is predominantly aimed at the development of power abilities.*

**Keywords:** *rhythmic gymnastics, level of physical preparedness, female students.*

**Introduction.** Most researchers consider the possibility of increasing the efficiency of the educational process through rational planning of methods of physical training of various kinds. At the same time, some authors believe that focuses on the lessons of physical education should be paid primarily to development of power-speed qualities, while others believe that the means of physical education should be correlated with the dynamics of physical performance during the school year [1; 3; 10]. In the literature, very few data on the physical preparedness of female students engaged in groups of rhythmic gymnastics. Several publications are devoted to this issue that highlight certain aspects that do not give the overall picture of changes in the level of physical preparedness of female students under the influence of rhythmic gymnastics classes [6; 7; 8]. Most researchers in the analysis of physical preparedness of female students noted that the majority of girls have low values of general endurance, power-speed quality, speed and flexibility. Conducted research showed that the level of physical preparedness of female students does not meet the requirements of modern society, with the exception of the flexibility all the physical qualities are not developed enough. Several authors point to a decrease in the level of physical preparedness of female students exactly while studying in secondary and higher educational institutions [2; 3; 9]. Some researchers suggest the use of complex exercises to increase physical preparedness of female students, that is a combination of rhythmic gymnastics and swimming or rhythmic gymnastics and work at the gym in a certain ratio [5].

From the above it follows that the development of physical preparedness of female students is very important, we need work to intensify physical perfection, the search for new effective tools and methods of physical education, new forms of learning, as well as the interest of most of female students in their physical perfection, to create sustainable motivation to classes.

**Goal of the research:** determine the impact on rhythmic gymnastics classes for level of physical preparedness of female students with different methodologies for conducting.

**Materials and methods of the research.** The research involved first-year female students in an amount of 45 persons who due to health related to the main medical group.

Physical preparedness was determined by the results of educational testing, which ascertains the level of expressing the main motor characteristics: strength, endurance, and flexibility. The battery of tests included 4 control exercises that are included in state tests and standards of physical preparedness assessment of students, which are the main component of control measures and attestation in the discipline "Physical Education". The research included the following tests: bending and straightening the arms in lying support (number of times); lifting body into sitting position for 1 min (number of times); body bent forward from a sitting position (cm); squatting on two legs to fatigue; lifting body from a prone position (number of times).

**Results of the research and its' discussion.** During the experiment, female students were divided into three groups – 15 women in each group. **The first group** mostly used types of aerobic with power orientation (body shaping, body styling, body-conditioned aerobics, program for the muscles of abdomen, back and legs, target-toning system). In these types are widely used dumbbells, rubber tube, expanders of various designs. **In the second group** used the so-called "low-striking aerobics" – these are a kind of dance aerobics (jazz-aerobics, funk-aerobics, hip-hop, Latin-jazz, afro-aerobics, tango-aerobics, city-jam). Typical of dance aerobics is the use of different dance moves to music that match a particular dance. In the third group used "high-striking aerobics" – these are exercises with including jumps.

The process of aerobics classes is divided into phases. Each of them provides a range of motions and exertions. The table below presents the time distribution of training on different types of physical exertions.

**Time distribution on rhythmic gymnastics classes**

Group	Kind of training						
	Warming-up	Jumping exercises	Weightlifting exercises	Dance exercises	Coordination exercises	Flexibility developing exercises	Cooling down
*	17%(10min)	-	67%(41min)	-	-	9%(5min)	7%(4min)
**	17%(10min)	-	29%(18min)	14%(9min)	24%(14min)	9%(5min)	7%(4min)
***	17%(10min)	30%(18min)	25%(15min)	-	12%(7min)	9%(5min)	7%(4min)

*Note.* \* – «weightlifting» group; \*\* – «dance» group; \*\*\* – «jumping» group. The total duration of sessions 60 min (100%).

Comparison of output indicators level of physical preparedness of female students in all three groups with regulatory assessment of the state tests showed that girls in indicators have no significant differences. Thus, the standard that characterizes flexibility (body bent forward from a sitting position), female students performed average on 4 points; standard that characterizes the strength of the abdominal muscles (lifting body into sitting position 1 minute) girls perform average on 3 points; standard, which characterizes the strength of hands (bending and straightening arms in lying support) performed no more than on 2 points. This indicates a low level of physical preparedness.

In order to identify the impact of proposed by us methods for rhythmic gymnastics classes at the end of the school year in all groups re-examination of physical preparedness was carried out. Comparison of the results showed that in all indicators of physical preparedness positive changes are observed. So standard that characterizes flexibility (body bent forward from a sitting position), all groups of female students performed on 5 points (maximum point); standard that characterizes the strength of the abdominal muscles (lifting body into sitting position 1 minute) – average on 4 points; standard, which characterizes the strength of hands (bending and straightening arms in lying support) – the first group of students performed average on 4 points, and female students of other groups – on 3 points. These data indicate that between groups of female students were found significant differences on such indicators of physical qualities such as flexibility, strength of abdominal muscles and strength of hands.

Comparison of the physical preparedness of female students of experimental groups by test scores "lifting into sitting position", "squatting", "bending and straightening hands" shows that after the experiment there are significant differences between groups I and II and groups I and III ( $p < 0.05$ ), while between groups II and III in these indicators were found no significant differences. The analysis of the indicators of physical preparedness in groups showed that in I group at the end of the experiment there is a significant improvement in these indicators of physical preparedness, "body bent forward from sitting position" ( $p < 0.01$ ), "lifting body into sitting position 1 minute" ( $p < 0.001$ ), "bending and straightening arms in lying position" ( $p < 0.05$ ), "lifting body from prone position" ( $p < 0.05$ ), squatting on two legs to fatigue ( $p < 0.001$ ). With this, increasing of results average was in indicators of "lifting body from prone position" – 14 times, "lifting body into sitting position" – 9 times, "body bent forward from sitting position" – 4.6 cm, "squatting" – 16 times, "bending and straightening arms in lying support" – 7 times. Thus, in I group, there was improvement in most indicators of physical preparedness. Data analysis also shows that in II and III groups was significant improvement in results for the indicators of squatting (respectively  $p < 0.01$  and  $p < 0.001$ ) and bending forward ( $p < 0.05$ ). With this, increasing of results average was in indicators of "squatting" in II group – 8 times, in indicators of "bending forward" in II group – 3 cm, in III group – 3.7 cm; in III group – 13 times. For the other indicators in these groups is no significant improvement of results. Thus, the results of the experiment allow to conclude that from three comparative methods of conducting classes of rhythmic

gymnastics for girls, better than most indicators of physical preparedness is a method that was used in the first group – aerobics with the use of weightlifting training.

**Conclusions.** Test results of physical preparedness of female students before the experiment, can characterize the level of physical preparedness as lower than the average for all groups who participated in the experiment. Conducted research showed that using the proposed complex of rhythmic gymnastics on classes of physical education in higher educational institutions has a positive effect on the physical preparedness of female students. As a result of the research it was determined that the most effective method of conducting classes on rhythmic gymnastics is a technique that is mainly aimed on the development of power quality.

**Prospects for further research** are expected to be held in the direction of studying the effect of rhythmic gymnastics classes with different orientations and content of the physical condition of female students.

**References:**

1. Vilenskiy M. Ya., Gorshkov A. G. Fizicheskaya kultura i zdorovyy obraz zhizni studenta [Physical culture and healthy lifestyles student], Moskow, 2013, 240 p. (rus)
2. Drachuk A., Dub ., Galaydyuk M., Moloda sportivna nauka Ukraini [Priority areas of physical pidhotovanosti student youth], vol. 6. iss. 10, P. 225–229. (ukr)
3. Ermolayev V. M. Teoriya i praktika fizicheskoy kultury [Theory and Practice of Physical Culture], 2009, vol. 10, P. 52–53. (rus)
4. Kolomiytseva O. E. Slobozhanskiy naukovo-sportivniy vsnik [Slobozhanskyi scientific sports herald], 2001, Vol. 4, P. 28–30. (rus)
5. Romanenko V. V. Moloda sportivna nauka Ukraini [Young sports science Ukraine], Lviv, 2002, Vol. 6, iss. 1, P. 374–378. (ukr)
6. Romashova T. M., Kapustna O. V., Khalapurdna T. O. Moloda sportivna nauka Ukraini [Young sports science Ukraine], Lviv, 2002, Vol. 6, iss. 1, P. 264–266. (ukr)
7. Romashova T. N., Serdechnyy V. V. Aktualn problemi fzichnogo vikhovannya u vuz [Actual problems of physical education in high school], 2001, P. 135–136. (rus)
8. Smirnova O. L. Otsnka ayerobnoi produktivnost studentv u protses zanyat fzichnoyu kulturoyu [Evaluation of aerobic performance of students in the physical education], Dnepropetrovsk, 1998, 16 p. (ukr)
9. Filinkov V. I. Aktualn problemi vishchoi shkoli (pdsektsiya po kafedr fzichnogo vikhovannya sportu) [Actual problems of higher education], Kyiv, 1998, Vol. 2, P. 68–71. (rus)
10. Yavorskaya G. Kh. Praktika povysheniya effektivnosti uchebno-vospitatelnogo protsessa v vysshey shkole [Practice of improving the efficiency of the educational process in higher education], Odessa, 1995, 100 p. (rus)

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## TEST CONTROL FACTOR AS A SYSTEM OF PHYSICAL EDUCATION OF STUDENTS OF SPECIAL MEDICAL GROUPS OF HIGHER EDUCATIONAL INSTITUTIONS

**Abstract. Purpose:** to carry out the analytical analysis of substantial essence and value of test control in physical training of students of special medical groups of higher educational institutions. **Material and methods:** data of scientifically methodical and special literature on noted question are analysed. By means of use of general scientific methods of theoretical level it is displayed and systematized its theoretical and basic aspects. **Results:** the question of test control in system of physical training of students of special medical groups of higher educational universities is considered. The knowledge in the sphere of theoretical bases of test control of students with deviations in a state of health is added and concretized. **Conclusions:** the direction of new approaches to realization of test control is certain which will give the chance to increase significantly its quality and efficiency.

**Keywords:** tests, monitoring, testing, student, health, physical fitness.

**Introduction.** In the last decade a problem of a state of health of students of higher educational institutions of Ukraine is carried to a circle of the global. The solution of this task in higher educational institutions is important because at this time the foundation of health of young people is laid [1; 15]. Results of many researches [2; 3; 7; 8; 16], convincingly prove that physical training in crisis conditions of the development of society gains the prime value in the general complex of conditions which define the level of health of modern student body. The system of physical training of students of special medical groups is considered as a component of their physical rehabilitation what is directed on the creation of optimum conditions for the achievement of maximum results in the course of deprivation of available deviations in a state of health.

Scientists of the branch [3; 8; 10; 15] note that the real system of physical training of students that developed for today in the state is ineffective. Data of numerous researches testify that today physical training in the special medical groups (SMG) of higher educational institutions doesn't provide sufficiently psychophysiological and professional readiness of graduates of the higher school for the production activity and needs the improvement. Certain researchers specify that during the study there are no essential positive changes in physical readiness of the majority of students of special medical groups in higher educational institutions [1; 8; 15]. Within this perspective of special updating the direction gets which is connected with the efficiency of physical training of students, carried on a state of health to the

special medical group.

According to the statement of scientists of the branch, ensuring of the realization of improving function of physical training of students of special medical groups, first of all demands the existence of the reliable, informative monitoring system [3; 7; 8; 19] The researches of the last years were finished by the expediency and need of application for physical training of students which on a state of health belong to the special medical groups of high-quality monitoring system which has the features [1; 7; 8; 16]. Test control in a context of physical development and physical readiness of students with deviations in a state of health is considered by specialists of the branch as a methodological basis of management of the system of physical training of these students in special medical groups [2].

The scientifically methodical literature on features of the work with special medical groups of higher educational institutions testifies that till nowadays there are very little scientifically reasonable recommendations concerning the testing process in physical training of students with fouls in a state of health [3; 8; 9; 16; 21]. Existing approaches to scientifically methodical justification of test techniques which are used for today in practice of physical training of students of special medical groups of higher educational institutions raise doubts concerning the satisfaction of requirements in practice [1; 2]. Usually in practical work the number of questions which point to the absence of the accurate concept concerning their appendix in the course of occupations rises. The relevance of our research is predetermined by the crucial importance for effective physical training of students of special medical groups of the formation of the complex monitoring system on the one hand and the insufficiency of its scientific justification – on the second hand.

According to the scientific works, questions of test control of physical readiness of students are one of the most topical issues of the theory and a technique of physical training [1; 3; 7; 13; 16]. In modern publications the thoughts concerning the efficiency of use of tests in physical training of students of special medical groups are rather inadequate. A number of scientists consider that tests besides which have no appropriate scientific justification, can't be used for students with deviations in a state of health at all [6; 17]. Others consider that their use in special medical groups plays an appropriate role in the solution of improving tasks of physical training to HEI [7; 8]. At the same time, at the obvious theoretical and practical importance of a significant problem – now it is one of almost not investigated one. The relevance and the importance of the questions posed and the insufficiency of their practical development caused a choice of the direction and a subject of the research.

**The aim of the research:** to carry out the analytical analysis of the substantial essence and the value of test control in physical training of students of special medical groups of higher educational institutions.

**The material and methods of the research.** For the solution of the put tasks the following methods of the research were used, namely: the analysis and synthesis of data of scientifically methodical and special literature for the purpose of the detection of features of test control; and general scientific methods of theoretical level: analogy, analysis, synthesis, system approach. The chosen methods give the

chance to allocate those aspects of rather noted question which are among the most essential. According to the system approach the test control in physical training consider as a complex of elements which influence at each other with the defined determination. Methodological specifics of the system approach are defined by that it is oriented on the disclosure of integrity of the object.

**Results of the research and their discussion.** On the basis of the study of numerous references, it is certain that the control is a integral element of management of educational and improving process of physical training of students of special medical groups [1; 3–16]. The progress of this process is considerably caused by timeliness and systematicity of the control, objective estimates of quantitative and quality indicators, completeness of accounting of results of the work for a certain period of the time, and the vast majority of scientists of the branch agree with it [4–8; 10–16].

According to the scientific investigations, one of the main conditions of ensuring system effectiveness of control in physical training of students of the special medical groups of HEI consists in providing it the purposeful complex character on the basis of the closest combination of pedagogical testing and profound diagnostics of difficult long-term shifts which occur both in an organism, and in pathologically changed body in the course of occupations [1; 8; 19]. The whole set of procedures of control provides information, whether that the comparative analysis of dynamics of influences which have been carried out during a course, or its certain stage, and dynamics of resultant indicators of total efficiency of these influences, on a state of health of students allows to carry out. It is as B. H. Landa (2004), L. A. Semenov (2011), V. M. Koryagin note (2013) the major integrative and analytical aspect of control without which the control from the pedagogical point of view can't be considered rather full and complete. At the same time, in the course of control a number of differentiated aspects is provided which are allocated concerning its features in sequence which answers the logic of expansion of the process of physical training.

Numerous researches note that the effective management of the process of physical training of students allows the possession of information on dynamics of indicators of the level of physical readiness which turns out in the course of test control [7; 8; 11]. Studying and integration of opinions of the researchers and synthesis of own pedagogical experience specify that testing is defined as a methodological basis of the implementation of the monitoring system in special medical groups [1; 6; 19].

The modern monitoring system of students with deviations in a state of health is the process of testing which includes at itself a complex of standardized methods of the measurement of parameters on which value referee about the level of their physical fitness and compliance to standards in the branch of physical training [8]. Irrespective of the control purposes, for the judgment about a condition of a student measurement or probation are used – tests. Processing of the received results in the course of test control provides the use of mathematical methods and modern technologies of the study of results of testing [4; 5; 13]. Test control is an element



and the main method of lapped control in the system of physical training of students which is the process of definition of its level [8; 10]. First of all we will be defined by that it is necessary to understand as a term "test control". Such type of a control in physical training represents the procedure which consists of the system of the standardized tests, a certain way of carrying out and the technology of processing and the analysis of the received results [4; 5].

Testing gives the chance to find the most informative indicators of a functional condition of an organism at a certain stage of classes on physical training or is wider – a model of opportunities which defines the target tasks of educational and improving process of physical training and actually its prospects. Ensuring scientific justification and organizationally methodical conditions of test control of students with deviations in a state of health cause its efficiency in the system of physical training of special medical groups. The construction and choice of tests have to meet the certain requirements, what theories of tests stated in fundamental works [4; 5; 13]. After testing is held, its results are estimated. The analysis of different ways of an assessment is considered respectively in the theory of estimates. As a whole all basic provisions of the theory of tests and estimates make theoretic metrological bases of test control [12]. In our opinion, the analysis of the theoretic metrological principles of test control in physical training of students of special medical groups can be carried out on the basis of studying of its structure.

A number of scientists focuses attention that the testing isn't a separate administrative function of control [2; 3; 8; 19]. It acts more likely as a compound component of such administrative functions as the analysis and control, representing the system of measurement of dynamics of qualitatively quantitative changes of the object. The monitoring of received results is a necessary condition of focus of any test process. The objective analysis of the received results of tests gives to specialists of the branch concrete data for the expeditious influence on the use of different means and methods for the purpose of the management of the process of physical training of students of SMG.

On the basis of study of data of scientifically methodical literature, it is certain that the possession of test techniques of measurement, calculation and an assessment of the received indicators, at their regular and systematic use provides tracking in monitoring of the major indicators of physical development and physical fitness and provides the information on methodical efficiency of a course of classes at a certain stage [4; 5; 10; 13]. The testing in physical training is defined as activities for collecting, systematization, the analysis and storage of information on functioning of the process of physical training [7; 11]. It is carried out according to the established requirements and expressed in a certain system. The testing allows to find strong and weaknesses of readiness, depending on a certain type of sports activity and gives the initial information for the formation of individual educational and improving programs [12; 13].

As a whole, the detailed methodological analysis of existing today thoughts about it, allows to define that the test control, mainly, is treated as a supportive application of planning educational and improving to the process of a course of

physical training of SMG. Respectively, an objective basis of any plans by means of which the made decisions are realized, there is the information received as a result of the control. The same information is considered the methodological basis of management of the system of physical training of students with deviations in a state of health.

According to this approach in a context of our research the tests have the control and the estimated value: behind their performance or non-performance it is possible to referee how the put tasks of the process of physical training are realized; about the efficiency of applied means and methods, about as far as it was succeeded to affect (thanks to their appendix) dynamics of physical development and physical fitness of students. As a whole, it is possible to tell that the expediency of testing consists in obtaining the reliable complex information of an objektivny assessment at all stages of classes of a course of physical training of HEI.

Together with it, according to scientists, there is no only approach to this process on the basis of results of tests [3–8; 13; 16]. The essence of testing consists in the search of "a weak link" that it was possible to define this link as the purpose of the subsequent classes. Scientists note that the test control has to be planned so that it displayed requirements which are defined by specifics of sports activity of students of special medical groups, providing the return connection that, in turn, gives the chance to coordinate this development [7; 8; 15]. Objective and exact methods of measurement and estimation in physical training are considered as one of driving forces of the progress of this process [3; 9].

On the basis of the generalization of analytical material on this matter, it is possible to claim that the role of the test control in the system of physical training of students of special medical groups consists in the following:

1. Obtaining the initial information for the formation of individual training programs which are concentrated on found "weak links".
2. Providing "the return connection": the possibility of an assessment of the efficiency of the existing program of sports classes of a course of physical training.
3. Forecasting of functionality of an organism which allows to solve the tasks of the selection, the admission to improving classes, planning of volume of the motive loading and self-checking in the course of physical improvement.

The purpose of the test control, according to V. M. Zatsiorsky (1979), it is necessary to consider as the stage-by-stage solution of specific tasks. It consists in obtaining information on signs of the object. It is measured not itself the object, and only properties or excellent signs of the object. In sports control the quality of results of the measurement is tried to define (in our time – the measurement of the level of physical fitness). It should be noted that all test requirements are directed on the achievement of the only common goal: the test has to give the exact information on the studied phenomenon [4–7; 13]. According to modern representations if testing organically fits into the educational and improving process of physical training, tests not only allow to receive the information on dynamics of physical fitness of students, but it is effective means of the increase of functionality of organism damaged by an illness, and the improvement of their psychological state [2; 8; 15].

The aforesaid gives the chance to draw a conclusion: the tests combine in themselves a double function. On the one hand they carry out the direct purpose of the management as physical preparation in the course of physical training, on the second hand, being an organic part of physical exercises, carry out the training influence on an organism of students. The management of physical preparation is impossible without the research of their internal sphere, to the analysis of its current state and the acceptance on this basis of operational correcting decisions. As consider L. P. Sergiyenko (2001), B. H. Landa (2004), S. I. Izaak (2005) a good tool in this case can serve the successfully picked up test program. The existence of the constant information, the processing and the analysis of data of the students' physical state, will give the chance to plan the effectively educational process and to make the qualitative educational and training programs.

Actually the test is a tool which consists of the qualimetric verified system of the test tasks, the standardized procedure of carrying out, and previously the designed technology of processing, the estimation and the analysis of results [4; 5; 13]. At the heart of operating tests which are used in practice of physical training of special medical groups of higher educational institutions, the motive tasks lie [1]. V. M. Zatsiorsky (1979), M. A. Godik (1988) especially focus their attention to that these tasks have to meet accurately the main requirements – the use of loadings which can be most exact and objective are dosed and estimated. The tests only then have sense when the tests correctly carry out and expediently interpret, that is they respond metrological requirements.

According to modern representations, the process of a choice and practical use of simple and informative tests which display dynamics of physical development of students with deviations in a state of health at different stages of physical training, are extremely significant. Specialists of the branch note that the test loadings have to respond certain requirements: to be simple, reliable, valid, reproduced in dynamics, specific, carried out under natural conditions, to have a complex character [1; 4–8; 10–14]. To define the level of physical fitness, and then during a course to establish the existence of changes, to find their character, the necessity of correcting actions and their implementation, the necessary rational selection of tests which have to respond the following requirements:

1. To display qualities and abilities objectively to which assessment they are applied.
2. To be clear for students.
3. It is natural to fit into the educational and improving process of physical training as their construction and control of efficiency interconnect and interdependent and any of them can't function without another.
4. To be available to students taking into account those functional features of an organism caused by the existence of an illness in an organism.
5. To fit organically into the educational process without the essential temporary expenses and foul of the quality of process of classes.

The definition of the purpose of testing – *the first requirement of the theory of tests* [4; 5; 13]. The correct definition of the purpose of testing promotes the correct selection of tests and determines the certain requirements to designing of tests. There are three types of control in physical training: lapped, current and quick and in each

of them – tens of variants of testing. The complex of tests has to include at itself indicators which characterize the motive qualities, the level, and also the structure of physical fitness, a ratio, interrelation between them, what corresponding to the direction of an improving course of physical training. According to L. P. Sergiyenko (2010), T. Y. Krutsevich (2011), the maintenance of test tasks has to be selected so that behind the received results it was possible to draw valid conclusions concerning dynamics of studied qualities and as a whole quality of an improving course of physical training.

***The second requirement of the theory of tests*** – it is necessary to develop the standardized technique of measurement of results in tests and testing procedure [4; 5; 13]. Scientists [1; 6; 21] focus attention that measurements of different parties of fitness of students have to be carried out systematically: it gives the chance to compare the value of indicators at different stages of an improving course of physical training and depending on dynamics of gains in tests to normalize the subsequent occupations. The efficiency of rationing depends on the accuracy of results of testing which in turn depends on the commonality of carrying out tests and measurement of results in them. Differences in results are inadmissible which appear in consequence of the standardization. It is possible to eliminate them, only having standardized a testing technique. According to the statement of authoritative scientists, the commonality of measuring procedures is the necessary condition of comparison of the received results [4–7; 10; 13].

***The third requirement of the theory of tests*** to the tests which are applied in practice of physical training, is that they have to be reliable and informative [4; 5; 13].

Ensuring the reliability of tests is, as a matter of fact, ensuring the reliability of an assessment of a physical condition of the student and his abilities. In an ideal the same test which is carried out by the same students, in the same conditions has to yield identical results. However, the scientists [4–7; 11] focus attention what even in the presence of severe standardization of tests and the exact equipment, results of testing always vary. The degree of reliability isn't an absolute measure which characterizes the test. It can change depending on the contingent of investigated, test conditions and other reasons. The control of the help of undependable tests leads to mistakes in an assessment of a condition of the student. On the basis of the generalization of thoughts on this matter [4–7; 10–16], we outline a method of the increase of reliability of tests – to eliminate the reasons which cause the increase in variability of measurements.

The informative test is called the test behind which results it is possible to referee about the property (qualities, abilities and so forth) which measure in a control course [4; 5; 13]. The degree of the informational content of the test can quantitatively be characterized – on the basis of the experimental data (the empirical informational content is so-called) and qualitatively – on the basis of the substantial analysis of a situation (substantial, or logical, informational content). At the practical use of indicators of the empirical informational content it must be kept in mind that they are reliable only concerning those students and conditions for which they are calculated [6; 10].

**The fourth requirement of the theory of tests** – has to be a developed system of estimates of results in tests. The pedagogical assessment of results of test measurements is the testing final stage [4–7; 13]. To estimate results of tests in physical training is meant to establish the level of the development of physical qualities. As a rule, experts of physical training of special medical groups use special tables of an assessment of results.

The conducted research doesn't apply for the exhaustive studying of all aspects of the modern system of test control of the level of physical fitness of students of the special medical groups of HEI. It only supplements and concretizes the knowledge in the sphere of theoretical bases of test control in physical training of students with deviations in a state of health. At present the defined quantity of literature on this problem has not always a practical embodiment, as makes the level of an insufficient fitness of the noted question. Except the knowledge of the theory of tests for the scientific organization of all process of testing in physical training of students with a deviation in a state of health as a whole it is necessary to care of the methodology which covers a question concerning the development of test tasks and methods of their appendix, right interpretation of the received results, and a number of other questions (differentiation of tests and so forth) which need the irresistible decision. Concerning the system of test control, in our opinion, the most important question is connected with the absence of the concept of testing in special medical groups of higher educational institutions. Certainly, there is the general concept of testing of students which allows the use of different methods. And on account of the tests are considered as one of constant methods of an assessment of the level of physical fitness [4; 5; 13], it is automatically assumed that the general concept adapted for the use with students of the main medical groups, it is enough. The noted certifies need of carrying out the corresponding researches for a certain direction.

**Conclusions.** The system of test control in physical training of students of special medical groups as testifies the carried-out analytical analysis of references, is a necessary component of expedient creation of the process of physical training of students and managements of its productivity. Consideration of theoretical and basic aspects of the operating system of test control in special medical groups of higher educational institutions allows more widely and more in details to realize it on the basis of integrated approach to physical training of students of these groups in the course of their physical training. On the basis of the conducted research it is possible to define the direction of new approaches of the realization of test control in the system of physical training of students of special medical groups who will give the chance to increase significantly its quality and to provide its efficiency.

**The subsequent researches** provide the search of ways of the improvement of scientific approaches in the system of test control of students of special medical groups of higher educational institutions.

#### **References:**

1. Blavt O. Z. Moloda sportivna nauka Ukraini [Young sports science Ukraine : Coll. sciences. Avenue of the industry Phys. education, sports and health], Lviv, 2013, vol. 13, iss. 3, P. 13–19. (ukr)
2. Blavt O. Z. Slobozhanskiy naukovo-sportivniy vsnik [Slobozhanskyi scientific sports Herald], 2013, № 3, P. 12–16. (ukr)

3. Volkov V. L. Osnovi teor ta metodiki fzichno pdgotovki studentsko molod [Basic theory and techniques of physical training students], Kyiv, 2008, 256 p. (ukr)
4. Godik M. A. Sportivnaya metrologiya [Sport metrology], Moscow, 1988, 192 p. (rus)
5. Zatsiorskiy V. M. Osnovy sportivnoy metrologii [Basics sports Metrology], 1979, 152 p. (rus)
6. Izaak S. I. Monitoring fizicheskogo razvitiya i fizicheskoy podgotovlennosti [Monitoring physical development and physical fitness], Moscow, 2005, 196 p. (rus)
7. Krutsevich T. Yu., Bezverkhnya G. V., Vorobyov M. . Kontrol u fzichnomu vikhovann dtey, pdltkv molod [Control of physical education of children, adolescents adolescents and young], Kyiv, 2011, 224 p. (ukr)
8. Koryagn V. M., Blavt O. Z. Fzichne vikhovannya studentv u spetsalnikh medichnikh grupakh [Physical education students in special medical groups], 2013, 488 p. (ukr)
9. Kuramshin Yu. F. Teoriya i metodika fizicheskoy kultury [Theory and Methodology of Physical Education], Moscow, 2010, 463 p. (rus)
10. Landa B. Kh. Metodika kompleksnoy otsenki fizicheskogo razvitiya i fizicheskoy podgotovlennosti [Technique comprehensive assessment of physical development and physical readiness], Moscow, 2004, 192 p. (rus)
11. Romanenko V. A. Diagnostika dvigatelnykh sposobnostey [Diagnostics motor abilities], Donetsk, 2005, 290 p. (rus)
12. Semenov L. A. Vvedeniye v nauchno-issledovatel'skuyu deyatel'nost v sfere fizicheskoy kultury i sporta [Introduction to research activities in the field of physical culture and sports], Moscow, 2011, 200 p. (rus)
13. Sergenko L. p. Testuvannya rukhovikh zdbnostey shkolyarv [Testing of motor abilities of students], Kyiv, 2001, 439 p. (ukr)
14. Sergenko L. p. Sportivna metrologiya: teoriya praktichn aspekti [Sports metrology : theory and practical aspects], Kyiv, 2010, 776 p. (ukr)
15. Prisyazhnyuk S. . Pedagogka, psikhologiya ta mediko-bologchn problemi fzichnogo vikhovannya sportu [Justification content model zdorov'yazberezhuvalnyh to students of special medical training department by means of physical education], 2013, № 1, P. 68–74. (ukr)
16. Bailey R. Physical education for learning / R. Bailey. – Continium International Publishing Group, 2010. – 259 p.
17. Brown T. Are learning style preferences of health science students predictive of their attitudes towards e-learning? / T. Brown, M. Zoghi, B. Williams, S. Jaberzadeh, and oth. // Australasian Journal of Educational Technology, 2009. – vol. 25(4). – P. 524–543.
18. Ghosh A. K. Service Strategies for Higher Educational Institutions Based on Student Segmentation / A. K. Ghosh, R. Javalgi, T. W. Whipple // Journal of Marketing for Higher Education, 2008. – vol. 2(17). – P. 238–255.
19. Kazatinova G. M. Physical performance of students engaged in physical training in a special section / G. M. Kazatinova, T. I. Vlasova // Theory and Practice of Physical Culture, 2012. – № 9 – P. 6–9.
20. Reiman M. P. Functional testing in human performance / M. P. Reiman, R. Manske // Champaign IL, Human Kinetics, 2009. – 308 p.
21. Stidder G. The really useful physical education book / G. Stidder. – Tatlor & Francis, 2010. – 216 p.

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## **IMPROVEMENT OF TECHNIQUES FOR WORKING WITH THE SUBJECT IN CHEERLEADING AT THE STAGE OF SPECIALIZED BASIC TRAINING**

**Abstract. Goal:** *to develop and prove experimentally special program motor tasks to improve techniques for working with the subject (with pompons) in cheerleading. Material and methods:* *a questionnaire survey of 20 coaches cheerleading. Applied pedagogical, sociological research methods, methods of mathematical statistics. Results:* *the basic tools, methods, techniques, and requirements for the exercises, which were the contents of the experimental program to improve the techniques for working with pompons that contribute to the effectiveness of training and competitive activity cheerleader. Analyzed the practical experience of leading coaches cheerleading and existing teaching methods and improving the work of the subject. Conclusions:* *the use of the author's program to improve the techniques for working with cheerleading pompons to provide a higher rate of growth of technical and physical fitness of athletes.*

**Keywords:** technical training, work with the subject (with pompons), cheerleading.

**Introduction.** Cheerleading at the modern stage of its development is characterized by its high demands to different sides of the sportsmen training. Many specialists [2; 3; 9; 10] believe that the ability of mastering technically difficult combinations, performed at high-quality level, mostly depends on the level of the sportsman's special physical quality, cheerleaders' psychological and theoretical training, the level of those influence the result of sportsmen's performance during competitions.

The increasing popularity of cheerleading at the international stage and the competition between foreign competitors makes Ukrainian trainers find new ways and forces for the improvement of their cheerleader's mastership. Specialists pay careful attention to the technique training of sportsmen [3; 7; 10]. The ability of accurate performing of precise movements helps cheerleaders to achieve high sport results and eventually significantly increases the reliability of the technical activities realization during exercises performance. Sportsmen have more self-confidence, and the Cheerleading, as a kind of sport, is getting more and more directed, entertaining and technically varied in such conditions.

The program of competitions in cheerleading includes minimum 50% of exercises with accessories (pompons), therefore, it is very important to pay much attention to exercises with accessories, i.e. teaching and improving the pompons

usage technique [6].

Swings, figure eight exercises with accessories that are performed by cheerleader with their fixed contact with the accessory and depend on the movements of sportsmen themselves, are relatively easy exercises according to the performance technique. Throwing, handing and catching of pompons are technically more difficult structural group that is confirmed by watching results of their performance during the competitions.

Cheerleading competitive exercises include various motion of the accessory itself (throwing, handing, and catching, strike, clamping, swings, sibilations, handoffs etc.) and their combinations with the elements of the program: twists, jumps, swings, splits, acrobatics and half acrobatics [1; 8; 13].

Technical improvements, during which sportsmen gain motor skills, are closely connected to the process of cheerleading training. Most researches, devoted to studying of the cheerleading competitive activity, emphasize the lack of rational and effective methods of the organization and improvement of training with pompons procedure [5; 8; 15].

Therefore, the improvement of training with pompons technique is one of the most important questions, as handoffs, throwing and handing are elements of entertaining part of the program.

#### **The connection of the research with scientific agenda, plans and topics.**

The research is conducted according to the topic of the Composite plan of the research project in the sphere of physical culture and sport of the Ministry of Education and Science of Ukraine for the period of 2011–2015 within the topic 2.2.4. The improvement of the sportsmen`s motor activity control.

**Purpose of the Research:** to develop and prove experimentally special program motor tasks to improve techniques for working with the subject (with pompons) in cheerleading.

#### **Objectives of the Research:**

1. To study practical experience of the leading cheerleading trainers, the existent methods of teaching and improving of the procedure.
2. To estimate the dynamic of cheerleaders` proficiency.

**Materials and Methods.** A questionnaire survey of 20 coaches cheerleading was conducted to achieve the objectives. A complex of the scientific methods of the research, such as pedagogical research methods (compilation and analysis of methodological literature, pedagogical supervision, pedagogical testing), sociological research methods (questionnaire), methods of mathematical statistics, was applied.

The Research was conducted on the basis of the National University "Yaroslav the Wise Law Academy of Ukraine". 30 sportsmen (aged 16–18), the candidates and members of the National Law Academy cheerleading team, took part in the experiment.

Two groups of the cheerleaders, control group (15 people) and main groups (15 people), took part in the experiment that had been conducting for the period of one year. The control group trained according to the standard program directed by confirmed work schedule. The main group trained according to the program the scope



and intensity of which is equal to the program of the control group, but it includes special exercises and techniques that intentionally let improve the work with accessory (with pompons) procedure.

The following control exercises are chosen to estimate the level of dynamic of the technical competence: 1) basic motions (joining/combination of the movements in cheer dance) with pompons (scores); 2) the throwing of the pompon, rotation and catching of the pompon (scores); 3) the pompon is squeezed under the knee, full twist, the free leg is bent, the toe is near the knee (scores); 4) the throwing of the pompon, two forward rolls and catching of the pompon; 5) throwing of the pompon and catching without visual control (times). Test tasks for the estimation of the technical competence are chosen and developed on the base of the sport literature and features of cheerleading [4; 11; 12].

The estimation of the physical fitness of cheerleaders was conducted according to the results of some common tests that are used in sport: 1) 100 m race (sec.); 2) 500 m race (sec.); 3) dip up (times); 4) bent suspension (sec.); 5) angled position from the sedentary position (sm); 6) standing long jump (sm); 7) “shuttle run” (4x9 m); 8) turning leap (scores); 9) “flamingo” (sec.); 10) combination of hand, body, leg motions (scores).

Test data of general physical technical training varied according to the nature and length; therefore, it was reorganized into corresponding ten-point scale for identification of the research statistics [14]. The reorganization of the test data was conducted with the help of caliber lines.

**Results of the Research and their Discussions.** We have carried out the questionnaire among cheerleading trainers to study practical experience of the leading trainers, the existent teaching methods and improvement of work with accessories, their efficiency and further influence on the dynamic of competitive activities and sportsmen training results. High level of professional qualifications and their ability to critical analysis of the past stages and cheerleading development prospective was taken into account while searching the experts. 20 specialists answered 10 questions during the evaluation.

It is extremely important to know what resources, methods, techniques and demands are the most important in the process of the improvement of the work with accessories (with pompons) technique for the organization of the rational sportsmen training.

The interpretation of the answers about the classification of the degree of complexity of different components of the work with accessories (with pompons) technique demonstrates that 64, 8% of the respondents considers handing, throwing and catching to be the most difficult work with an accessory in cheerleading, as well as the most entertaining and valuable components for competitive results. Performing these very exercises during competitions sportsmen make mistakes more often. The concurrence of the respondents in this question is  $W=0,834$  ( $P<0,01$ ).

The specialists were asked what is the most important for them in the estimation of the work with an accessory. The following results were performed after the answers analysis. 56,2% of the respondents think that referees while assessing

must take into consideration the following criteria: the amplitude of strokes, accessories catching, non-fixed position of strokes, psychological frustration of the sportsman. The psychological frustration is on the last place according to the respondents that demonstrates their attention to the technical training criteria. Concordance coefficient ( $W$ ) of the answers experts is equal to  $0,691$  ( $P < 0,01$ ).

In response to a question about how much time needs to be given to the training process to improve the techniques for working with the subject of 48.5% of the experts say that the best time is from 20 to 30 minutes. Consistency of expert opinion was  $W=0,603$  (with reliability  $P < 0,01$ ).

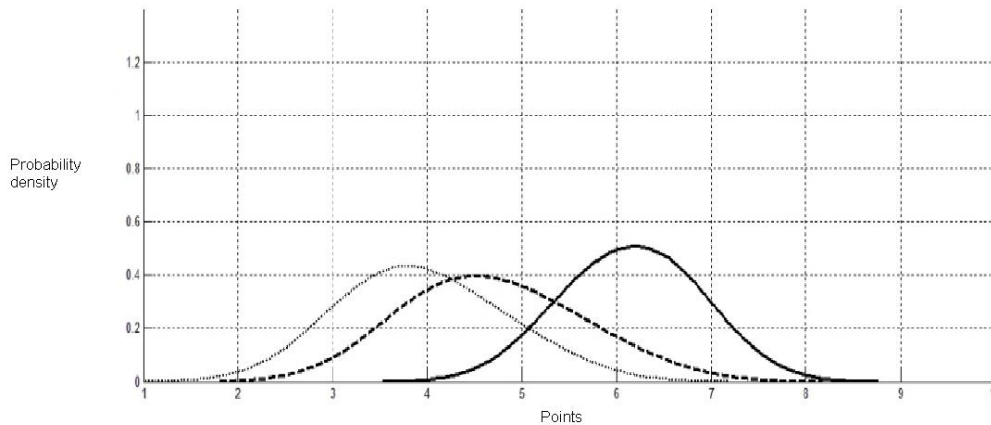
Analysis of the survey results and a comparison of the literature data, allowed to define requirements for the exercise program and of their use to develop and improve techniques for working with the subject (with pompoms) in cheerleading. They are as follows:

- duration of full comprehensive program of improving techniques for working with the subject (with pompoms) should range from 20 to 30 minutes of training time depending on the stage of preparation;
- exercises should switch from simple to more complex, amplitude and velocity gradually increases, reflecting the specific training activities of cheerleaders;
- each exercise should be directed to the formation and development of a certain quality or process;
- exercises should be integrated into the training process and do not contradict the formation of other skills and qualities of cheerleaders;
- exercises should take into account age-related features and the level of preparedness of cheerleaders;
- exercises should provide the necessary (planned) intensity of their performance;
- exercises should be carried out in standard and accessible conditions.

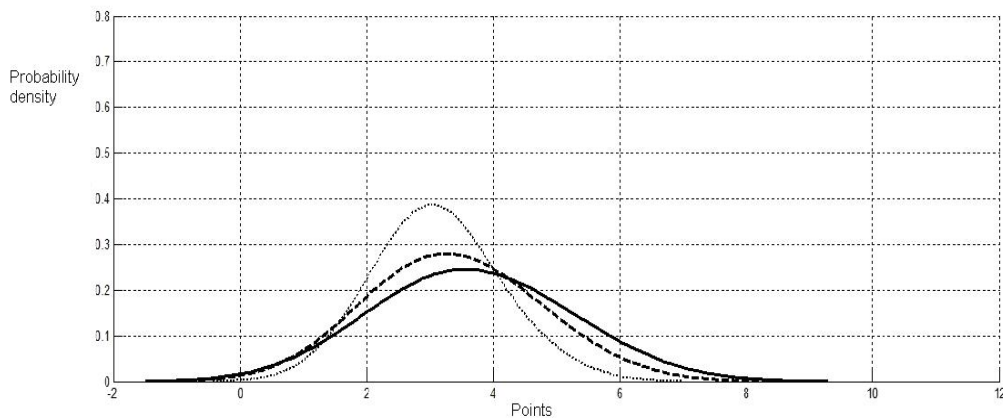
Based on the above identified components and requirements to exercise, we carried out selection of exercises and techniques that were the content of the experimental program to improve the techniques for working with the subject (with pompoms). For integration into the training process of cheerleaders "subjective preparation" we have developed an exemplary program of training sessions, including specially selected exercises and special training facilities that have a particular focus on the impact of technique of working with the subject.

Test results showed that the implementation of a special training program, including funds focused development techniques for working with the subject had a positive impact on the level of technical and physical preparedness of cheerleaders.

Fig. 1 shows the dynamics of changes in indicators of technical preparedness of cheerleaders of main and control groups.



a)



b)

- ..... the original data (before training)  
 - - - - - intermediate data (after 6 months of training)  
 \_\_\_\_\_ final data (after 1 year of training)

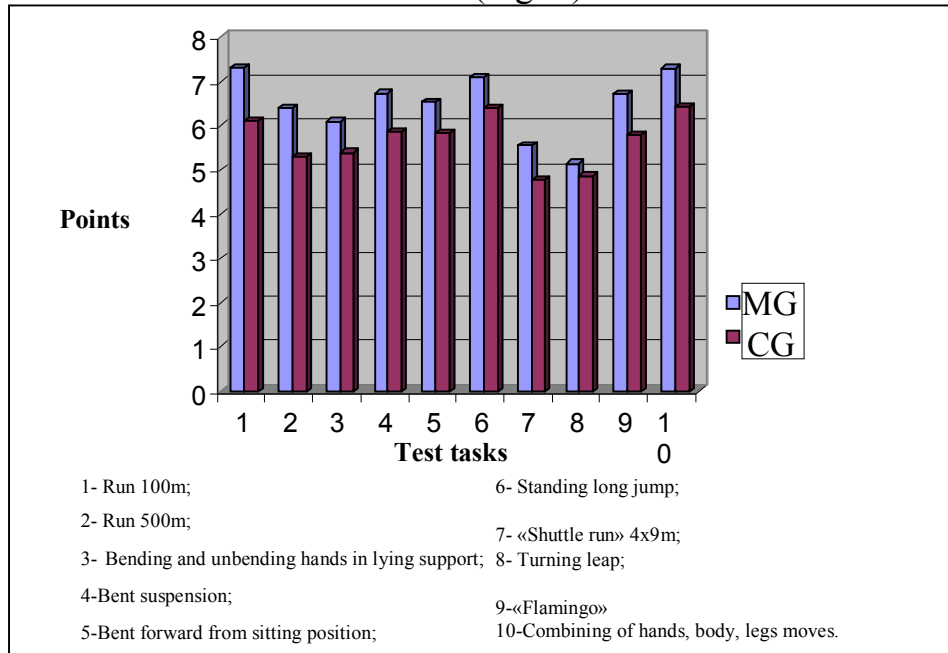
**Fig. 1. The probability density function of a technical preparedness of athletes of main and control groups at the stage of specialized basic training in cheerleading:**  
*a – MG; b – CG*

Changing of the distribution function of the probability density on the studied parameters of technical preparedness and two groups in the dynamics shows positive trends in the preparedness of MG athletes.

Distribution function of indicators of technical preparedness of MG is as follows: before training distribution is asymmetrical with a maximum in the area of 3.8 points, after 6 months of training distribution is symmetrical with a maximum at 4.5 points, and after the year line has the shape of the curve of normal distribution with a shift of the maximum to higher values of 6.3 points. The amplitude of all the indicators of technical preparedness coincides and consequently this group after the experiment (1 year of training) has achieved certain results and is homogeneous. As for the distribution function in the CG, all distributions of training data are asymmetric, the maximum value corresponds to 3 points, after 6 months of training,

it moves up to 3.3 points, and after a year it is 3.8 points, it says us about small changes in this group.

Comparative analysis of original and final data of development of physical qualities of athletes-cheerleaders showed significant changes with a significant advantage in athletes of MG in all indicators (Fig. 2).



**Fig. 2. Dynamics of physical preparedness of main and control groups of athletes-cheerleaders**

During the experiment, the athletes of MG we observed improvement in coordination indicators, speed and power and motor abilities, flexibility and strength. We emphasize that the dynamics of these indicators was equal – in all indicators. This testifies to the correctness and effectiveness of choice of training means and methods for this kind of sport.

### **Conclusions:**

1. Established that the duration of a full comprehensive program to improve the techniques for working with the subject (with pompoms) should range from 20 to 30 minutes of training time, depending on the stage of preparation.

2. Established that the most technically complex subjective work in cheerleading, the most spectacular and "valuable" in terms of competitive results are transferring, throws and catches. At competitions athletes most often make mistakes during performing these exercises.

3. Application authoring program of improving techniques for working with the subject (with pompoms) in cheerleading has provided a higher rate of growth of technical and physical preparedness of athletes than in training, regulated standard program used in the control group.

**In the perspective, further studies** will be aimed at developing of a multimedia program to improve catching and throwing of subject techniques in cheerleading on the stage of specialized base preparation.

**References:**

1. Bolyak A. A., Krikun Yu. Yu., Aukshtkalns Ye. I. Cherldeng. Pravila zmagan [Cheerleading. Competition Rules], Kyiv, 2005, 82 p. (ukr)
2. Verkhoshanskiy Yu. V. Nauka v olimpiyskom sporte [Science in Olympic sports], 1998, vol. 3, pp. 8–12. (rus)
3. Gaverdovskiy Yu. K. Tekhnika gimnasticheskikh uprazhneniy [Technique of gymnastic exercises], Moscow, 2002, 512 p. (rus)
4. Zatsiorskiy V. M. Fizicheskiye kachestva sportsmena [Physical quality athlete], Moscow, 2009, 200 p. (rus)
5. Zinchenko I. A., Lutsenko L. S., Bolyak A. A. Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkv, 2010, vol. 2, pp. 52–55. (rus)
6. Zinchenko I. A. Fizicheskoye vospitaniye studentov [Physical education of students], Kharkov, 2009, vol. 3, pp. 31–36. (rus)
7. Laputin A. N. Nauka v olimpiyskom sporte [Science in Olympic sports], 2001, vol. 2, pp. 38–46. (rus)
8. Krikun Yu. Yu. Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkv, 2009, vol. 2, pp. 72–75. (rus)
9. Ozolin N. G. Nauka pobezhdat [Science of Winning], Moscow, 2006, 863 p. (rus)
10. Platonov V. N. Sistema podgotovki sportsmenov v olimpiyskom sporte [System of training athletes in Olympic sports], Kyiv, 2004, 808 p. (rus)
11. Romanenko V. A. Diagnostika dvigatelnykh sposobnostey [Diagnosis of motor abilities], Donetsk, 2005, 290 p. (rus)
12. Sergenko L. P. Kompleksne testuvannya rukhovikh zdbnostey lyudini [Comprehensive testing of motor abilities], Mikolav, 2001, 360 p. (ukr)
13. Zinchenko I. O., Lutsenko L. S. Cherldeng «DANSE»: Zrazkova programa dlya sportivnykh klubov sportivnykh sektsy vishchikh navchalnykh zakladov [Cheerleading "DANSE": exemplary application for sports clubs and sports groups of higher education institutions], Kharkiv, 2013, 75 p. (ukr)
14. Shestakov M. P. Popov G. I. Statistika. Obrabotka sportivnykh dannykh na kompyutere [Statistics. Processing sports data on your computer], Moscow, 2002, 278 p. (rus)
15. Coaching Youth Cheerleading (Coaching Youth Sports Series) by ASEP. – Human Kinetics, 2009. – 152 p.

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## **STUDYING OF THE LEVEL OF THE FUNCTIONAL CONDITION OF AN ORGANISM OF SPORTSWOMEN BY MEANS OF NEW METHODOLOGICAL APPROACHES**

**Abstract. Purpose:** *determining the functional state of the volleyball players of 18–22 years old in the preparatory period of the annual cycle of training with a computer program "Sport-Express".* **Material and methods:** *the survey was conducted by 11 teams of female players "Orbita University" of 18–22 years old (Zaporozhe, Major League of Ukrainian championship in volleyball).* **Results:** *it is showed the dynamics of changes in preparation for the season. It is found that under the influence of training sessions at surveyed volleyball observed not only optimize their functional systems, but also significantly improves the level of functional state of the organism as a whole.* **Conclusions:** *it is proved that the evaluation of the functional state of sportsmen should play an important role in the overall system of medical and biological control due to the significant additional information about the state of their body and the possibility of timely correction of physical activity and prevention activities.*

**Keywords:** *volleyball, computer software, functional status, medical and biological control, optimization.*

**Introduction.** Now the modern level of the development of sports makes high demands to the level of functional preparedness of sportsmen in different types of sports activity during the educational and training process. But, as we know, it is possible to reach high sports results not only in the presence of the appropriate level of technical and tactical training of sportsmen who specialize in different types of sports, and on itself before at the sufficient functional preparedness [2; 7]. As specialists of the branch of physical training and sports consider, the major factor for the achievement of high sports results is the level of a functional condition of leading systems of an organism of sportsmen [4; 5]. The analysis of scientific researches testifies that the impossibility of the preservation of an optimum level of functional readiness for a long time is one of the main reasons of unsatisfactory sports results of our sportsmen [3; 6].

Due to the above for today the special relevance is gained by the pilot studies directed on studying of a state of health of sportsmen at different stages of the training process and the competitive activity. Especially important this problem is represented concerning sportsmen who already act in responsible competitions of the native and international level. On the basis of the analysis of results of these researches, the possible identification of the hidden periods of a functional overstrain,

decrease in the level of a functional condition of an organism, and, respectively, timely the development of effective remedies of the prevention and rehabilitation [1; 5].

Therefore, the development, the experimental approbation and the practical introduction in training process of sportsmen of new methodical approaches concerning the definition of their current functional state which considers specific signs of a kind of sport, the period of an annual cycle of the preparation, the nature of correlation communication of the level of functional preparedness, with separate components of their physical state, can promote the increase of the efficiency of the training process and defines the relevance and practical value of the outlined problem that is the subsoil of our research.

**The connection of the work with scientific programs, plans, subjects.** The work is a part of scientific programs of the department of physical training and the chair of the Olympic and professional sports of Zaporozhe national university and was carried out within the subject "Studying of adaptive opportunities of an organism of sportsmen at different stages of educational and training process" (the number of the state registration is 0106U000583) of the Built plan of RW of the Ministry of Education and Science of Ukraine for 2009-2014.

**The aim of the research:** to define a functional condition of an organism of volleyball players of 18-22 years old in the preparatory period of an annual cycle of preparation by the computer program «Sport – Express».

**The task of the research:**

1. To establish the level of a functional condition of volleyball players at different stages of the preparatory period.

2. To define dynamics of the level of a functional condition of an organism of sportswomen and its components in the preparatory period of educational and training process at a stage of the realization of individual opportunities.

**The material and research methods.** According to the purpose and tasks of the research we conducted the examination of 11 players of a women's team "Orbit-University" (city Zaporozhe, the Major League of Ukrainian championship of volleyball) within the preparatory period by a competitive season. The age of players made 18-22 years old. For an assessment of the level of a functional condition of sportswomen in the research the computer program Sport – Express» developed by us [1] was used. For this purpose at all volleyball players the following indicators were registered: frequency of heart reductions (FHR, bpm<sup>-1</sup>), systolic and diastolic arterial pressure (APs, mm of mercury; APd, mm of mercury.) the vital capacity of lungs (VCL, l), the time of delay of a breath on a breath (Tbr, s) and an exhalation (Tex, s), length (LB, sm) and weight (WB, kg) of a body were measured.

All obtained data were processed during the work by standard methods of mathematical statistics.

**Results of the research and their discussion.** Rather acceptable sizes practically all indicators studied the morpho-functional were registered at the beginning of the preparation for a season among the surveyed volleyball players. The total point of an assessment of the level of a functional condition of an organism of

team players "Orbit- University" made  $52,06 \pm 2,75$  points at the beginning of the preparatory period, and the level was considered as the "average" (tab. 1).

*Table 1*

**Sizes of morpho-functional indicators of volleyball players at different stages of the preparatory period (M $\pm$  m)**

Indicators	The preparatory period		
	At the beginning	In the middle	At the end
Weight of a body (kg)	69,76 $\pm$ 0,95	69,76 $\pm$ 0,95	69,76 $\pm$ 0,95
Length of a body (sm)	182,18 $\pm$ 1,20	182,29 $\pm$ 1,64	182,18 $\pm$ 1,2
Frequency of heart reductions (bpm <sup>-1</sup> )	66,71 $\pm$ 1,63	71,29 $\pm$ 1,22*	68,82 $\pm$ 1,22*
Arterial pressure of systolic (mm of mercury)	118,82 $\pm$ 2,04	116,76 $\pm$ 1,02	113,23 $\pm$ 0,68*
Arterial pressure of diastolic (mm of mercury)	73,14 $\pm$ 1,98	72,11 $\pm$ 2,19	74,11 $\pm$ 2,01
Vital capacity of lungs (l)	3,56 $\pm$ 0,05	3,68 $\pm$ 0,05	3,79 $\pm$ 0,05*
Time of a delay of breath on a breath (s)	58,09 $\pm$ 1,56	56,34 $\pm$ 2,08	58,21 $\pm$ 1,89
Time of a delay of breath on an exhalation (s)	44,47 $\pm$ 2,18	40,22 $\pm$ 2,64	45,29 $\pm$ 2,34
Level of a functional state (points)	52,06 $\pm$ 2,75	54,17 $\pm$ 1,83	55,28 $\pm$ 1,48

*Note:* \*  $p < 0,05$  in comparison with the beginning of the preparatory period.

The analysis of the data (tab. 2) obtained at the beginning of the research allowed to establish that the vast majority of sportswomen 17,65% – "above the average" had the "average" level of functional readiness of an organism (58,83%), and the representation of volleyball players in the functional classes the "high" and "below the average" looked out respectively as 11,76% and 11,76% of team players.

*Table 2*

**Distribution of volleyball players behind the levels of a functional condition of an organism at different stages of the preparatory period (in % of total of surveyed sportswomen)**

Levels of a functional state	The preparatory period		
	At the beginning	In the middle	At the end
Low	-	-	-
Below the average	11,76	11,76	-
Average	58,83	70,59	52,94
Above the average	17,65	11,77	41,18
High	11,76	5,88	5,88

The examination of sportswomen which is conducted in the middle of the preparatory period, allowed to establish the following. Apparently from the results



presented in tab. 1, at this stage of the experiment at surveyed girls statistically reliable increase of frequency of heart reductions, and also tendency to decrease in arterial pressure as systolic, and diastolic, increase of the vital capacity of lungs and increase of the total point of an assessment of the level of a functional condition of an organism to  $54,17 \pm 1,83$  points were registered. As a whole the presented dynamics of the change of studied indicators could be considered as positive (except for the growth of FHR).

At the same time, the number of volleyball players with the "average" level of a functional condition of an organism (to 70,59%) increased among sportswomen at this investigation phase and the decrease in their quantity with the "high" value of this indicator (to 5,88%) was observed.

The presented results convincingly testify that in the middle of the preparatory period which is characterized in large volume and intensity of training loads, at surveyed sportswomen-volleyball players, against favorable functional changes, a certain decrease in resistance of their organism to adverse external influences is observed that the process needs to consider when carrying out educational and training.

The analysis of the results received at the final stage of preparation for a season, showed that as a result of training occupations at surveyed volleyball players is observed not only the optimization of their functional systems of an organism, but also the level of a functional condition of an organism as a whole significantly improves.

Apparently from the data presented in tab. 1, at the end of the preparatory period size of FHR) practically returned to initial values, the reliable decrease in APs and similar increase of VCL were observed. Despite of the lack of statistically significant changes, the tendency to the improvement of the level of a functional condition of an organism of sportswomen also was obvious (the growth of size of this indicator to  $55,28 \pm 1,48$  points).

Not less convincing data were obtained by us in the analysis of intra group distribution of the surveyed sportswomen behind the level of a functional condition of an organism at the final stage of the experiment.

So, at the end of this period of the preparation for a season considerably increased the number of volleyball players with the level of a functional condition of an organism "above the average" (to 41,18%), the number of sportswomen with the "average" level of this indicator (52,94%) was high, and players with the level "below the average" it wasn't registered in general (tab. 2).

### **Conclusions:**

1. The obtained data testify that the important part in the general system of medico-biological control in connection with the essential additional information on a condition of their organism and possibility of timely correction of physical activities and carrying out preventive actions and rehabilitation actions has to be assigned to an assessment of a functional condition of an organism of sportsmen.

2. The conducted researches allowed to state a high informational used in the work of the exclusive computer program «Sport – Express» which predetermines the possibility of its wide practical appendix.

**Prospects of the subsequent researches in this direction.** Carrying out the medico-biological inspection of sportsmen of different ages, sex, different kinds of sports and specialization during the annual cycle of sports preparation and educational-training process as a whole is prospects of the subsequent researches.

**References:**

1. Boychenko K. Yu., Malikov N. V., Bogdanovskaya N. V. Kompyuternaya programma «ShVSM: ekspres-otsenka funktsionalnogo sostoyaniya fiziologicheskikh sistem» [Computer program «ShVSM: rapid assessment of the functional state of physiological systems» (certificate of copyright registration)], 2012, № 36283, 24.12.2012. (ukr)
2. Getmantsev S., Bogush V., Yatsunskiy O. Sportivnyy vsnik Pridnprov'ya [Sports Bulletin Dnieper], 2010, vol. 3, P. 50–54. (ukr)
3. Dudchak M. V. Pedagogka, psikhologiya ta mediko-bologchni problemi fizichnogo vikhovannya ta sportu [Pedagogics, psychology, medical- biological problems of physical education and sport], Kharkv, 2008, vol. 9, P. 34–43. (ukr)
4. Ivanova N. V. Slobozhanskiy naukovo-sportivniy visnyk [Slobozhansky scientific sports herald], 2013, vol. 5 (38), P. 108–111. (rus)
5. Malkov M. V., Bogdanovska N. V., Svatev A. V. Funktsionalna dagnostika u fizichnomu vikhovann sport [Functional diagnosis in physical education and sport], Zaporzhzhya, 2006, 227 p. (ukr)
6. Platonov V. N. Vestnik sportivnoy nauki [Journal sports science], 2010, vol. 3, P. 56–58. (rus)
7. Sergiyenko L. P. Slobozhanskiy naukovo-sportivniy vsnik [Slobozhansky scientific sports herald], 2013, vol. 5 (38), P. 228–238. (rus)

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**BOLSHAKOVA I.***National University of Physical Education and Sport of Ukraine***WORLD RECORDS AND AGE SWIMMERS IN ACHIEVING TOP SPORTS RESULTS**

**Abstract. Purpose:** establish a favorable age zone to achieve the best results by swimmers. **Material and methods:** analyzed age of world record-holders in swimming of the 1970–2001s performances. The methods of organizing, summarizing, analyzing and interpreting data are used **Results:** the comparative analysis of the age limits in demonstrating the best results of swimmers in different historical periods is carried out, Established is the favorable age period to demonstrate the best athletic performance at the present stage of development of swimming. **Conclusions:** it is found that the age of the strongest swimmers in achieving the highest athletic results was significantly shifted towards the older ones.

**Keywords:** world record- holders, age of athletes, the maximum possible, the current stage of development.

**Introduction.** While developing the problem of long-term sportive preparation the leading specialists oriented on data of advanced sportive practice, experience of long-term preparation of prominent sportsmen. Primary attention is being paid on the age-related limits in which sportsmen are able to show the greatest results, optimal age for the beginning of practicing by the concrete type of sport, and also on necessary duration of systematic long-term preparation, securing mastering of educational material, necessary for achievement of the greatest results [4; 5]. Intensive development of problem of long-term preparation in 1960-1970s in all measures is supported by the study of sports practice of highest achievements of those years. For example, in swimming an optimal age for demonstration of the top results for women was 15-18 years, for men – 17-22 years [1-3]. These data were stable enough, typical for the most prominent swimmers of different countries [7; 8]. Therefore theoretical generalizations, according to which optimal age for achievement of the greatest results is relative to the narrow age-related limits occurred fully natural and is stable enough, not depending on the methods of training and different sort of external factors [6,]. Well – known specialist Jan Olbrecht, author of fundamental paper "Science as to win: planning, division into periods and optimization of training in swimming", comprehensively analyzing duration and maintenance of long-term preparation of swimmers, distinguished the age-related range of the 18-20 years, as allowing a sportsman to achieve the greatest level of individual results [8]. Modern practice testifies, that the period of optimal possibilities was substantially shifted towards more senior age, and a study and

generalization of advanced experience is a major factor for the spread of learning in the field of preparation of swimmers of top-level class, transferring of them on a new high-quality level.

**Connection of work with the scientific programs, plans, themes.** Research is executed in obedience to by the Summary plan of research work in the field of physical culture and sport for 2011–2015 on the topic 2.1 "Division into periods of annual and long-term preparation of sportsmen". State registration number 0111U001720.

**Research purpose:** to establish the favorable age-related zones for achievement of the best results for swimmers.

**Material and research methods:** an age of world record-holders is analyzed in swimming; performances in 1970-2013s (biographic method); the methods of systematization, generalization, analysis and interpretation of data obtained. Obviously, that world records are set by sportsmen in the period of their highest prime of activity, and age-related limits in which sportsmen appeared to be apt to establish world records, may possibly be considered as optimal for achievement of the greatest sporting results.

**Results of researches and their discussion.** Since the 1970s of the last century, world records in all types of competitions were renewed repeatedly. In free style on the 100-meter distance for women world records were renewed 29 times, for men – 23 times; on the 200-meter, accordingly, – 24 and 30 times; on the 400-meter – 26 and 31 times. Approximately the same amount of world records for indicated period was renewed in all other methods of swimming. The most of world records (35) was renewed in the male swimming on a 100-m distance by breast-stroke, the least (19) – in the woman complex swimming on the 400-m distance. It is important to mark that in most cases world records were set during the period under review relatively and evenly, and their common amount was enough in order to reveal connection between age of swimmers and their capacity for establishment of world records.

Middle age of the world record-holders, specialized in swimming in the 100 m free style increased, on the average, more than for 8(!) years. If the most prominent sportsmen set records in the age of 15–14 (Shein-Gold), 15–18 years (Cornelius Ender), then for the last decade the age became far away limits of conceptions typical for swimming of the 70-s – Inga de Brjuin – 27 of age (2 records), Brita Shtefen – 23–26 of age (5 records). In the male swimming the middle age in this distance increased by 3,1 years. In 1970s not a single record was set by the sportsmen older than 22 years; in 2000–2013s greater part of records was set by 23–25-year-old swimmers. In the 200-m and 400-m distance for women an age for the most record-holders of the world of the first period was 15–16 years, in the second part – 20–21. In the 400-m distance in 1970–1980s 14 out of 18 world records were set by the 14–16-year-old sportsmen, and the rest 4 – 17–18- year-old. In 2000-2013s records were subdued to the 20-23-year-old sportswomen. Middle age of the world record-holders in the 800-m distance of the first period – 16,2 years, out of 18 records 5 of them were set by 14–15-year-old sportswomen and only 2 records by 19-years-old.

After 2000 only two world records were set by 19-years-old Rebecca Adlington and 16-years-old Cathie Ledetski.

In the male swimming in the first period in the 100-m distance all sportsmen, established 9 world records in total, were in the of age 17–22, in the second period out of 8 world records 2 were subdued to 22 sportsmen, 3 – 23-year-old sportsmen, and 3 rerecords to 25-years-old Alain Bernard. On the 200-meter distance in the first period of 1970-1980s the 17–19-years-old sportsmen dominated, while in the second period out of 9 records – 5 were set by the 22–23-year-old swimmers, and the rest of 4 belong to the legendary swimmer Jan Thorp who set the great number of the world records in the age of 18–19 and he is known for his young age on the peak of his sporting achievements and the unexpected early departure from the "big" sport.

In the distance of 400m in a period of 1999–2002s all 5 world records were also set by Jan Thorp in the age of 17–20, however 23-year-old Paul Bidermann became his successor soon. In the first period in the 1500 m free style out of 12 world records – 10 belong to the 15–18-year-old sportsmen, one record belongs to 19-year-old Vladimir Salnikov, and the other one to 25-year-old Mikhael Barton, what was sensation on that moment. In the second period in the 1500-m distance a world record was broken three times, by 21-year-old Grant Khakett and San Yang in the 20–21 of age.

In swimming by the breast-stroke for women, in 100 m swim the middle age of sportswomen, established world records, was 17,1 in the first period, in second one out of 7 world records, 6 were set by the sportswomen in 18–24 of age, and only the last world achievement, on the World cup in Barcelona in 2013, belongs to young, at the beginning of her sports career, 16-year-old Rutte Meilutit. On distance of 200 m in the first period the middle age of the world record-holders in breast-stroke style made 14,7 years, while in the second – 21,6, that by 6,9 years older than with predecessors.

For men in the 100-m breast-stroke, in the first period a middle age of the world record-holders made 20,2, and in the second – 22,8. In the 200-m distance in this discipline, an age of the record-holders of the first period was within the limits of 18–22, middle index – 19,3, while in the second period the age of record-holders was in a range of 18–26 years, and a middle index made 22,7.

For the women specializing in the 100 –m distance of butterfly stroke all world records in the first period subdued to the 15-19-year-old sportswomen, in the second period out of 6 world achievements – 3 belong to 27-year-old Inga De Bruin, one record – 25-years-old Dana Volmer, and 2 records belong to young 16-years-old Swedish sportswoman Dana Sjostrom. In the 200-m, in the first period, 19 world records were set by sportswomen from 21 to 15 of age, in the second – 8 world achievements belong to the sportswomen from 19 to 27 of a swimming age.

For men in the 100-m distance of butterfly stroke all world records at first were set by the 20-22-year-old sportsmen, however in the second period sportsmen continued to improve their results, and accordingly, world records made up to 23–25 of age. In the 200-m distance by butterfly stroke in the first period out of 12 world records 2 belong to the 15-year-old sportsman from GDR, others to the 19–22-year-

old sportsmen. All world achievements in the second period subdued to Michael Phelps, who in the age of 16–24 set 7 world records.

In the woman swimming by the back-stroke all world achievements of the first period were set by girls in the age of 14–18, in the second one out of 14 records, 9 subdued to the 25–26-year-old sportswomen, 4 records – to the 19–22-years-old sportswomen. However, now the world record, which was set in the 2012 Olympic Games in the 200-m distance of back-stroke, belongs to 17-year-old Missy Franklin.

Since 1967, in the male back- stroke swimming, in the 100 m and 200 m – 16 world records belong to Roland Mattesue, who set them in the 17–23 of age, and John Haber in the age of 20 became his successor. Notable is what, that indubitable leadership and in the second period belongs also to one sportsman – 13 from 16 world records in 100 m and 200 m Aaron Persol set in the period from 19 to 26 of the age. 3 records came to heel to the 23–24-year-old sportsmen.

In the medley swim for women, in the first period in 200 m and 400 m world leadership belonged to the 15-19-year-old sportswomen, in the second period the 4 world achievements in 200 m, belong to the 20-year-old sportswomen, and on the 400-m distance all world records subdued to girls, being in age of 16-20..

For men in the 200-m and 400-m medley swim all world records in the first period were set by 17–21-year-old sportsmen, in the second period and in the 200-m distance unduitable leadership since 2002 belongs to Michael Phelps, who set 16 world records in 17–23 of the age, and 25-year-old Rain Lohte became his successor, who in 2012 managed to improve a result, thus renewed the world record in the 28-year-old of age.

In table. 1, 2, presented are data about ages of the world record-holders who performed in different distances in the period of 1973–1986s and 2000–2013s. Apparently, age of the world record-holders performers in the period of 2000–2013s, approximately by 4,3 higher, than for predecessors. Middle age of world record-holders specialized in the modern swimming in the 100-m and 200-m distances – 22,3 years in the 400-m and 800-m distance – 19,1 year, that 3,2 year less, than for sportswomen, specialized in more short distances. Middle age of the men of world record-holders 3,3 year higher, than for predecessors. Those who specialize in the 100-m distance – a little more than for sportsmen of the distance of 200 m (23,5>23,3), that approximately by 1-1,2 year higher as to the women specializing in these distances. Middle age of the world record-holders in the 400-m and 1500-m distances is 22,75 years, that by half-year less than for the sportsmen specializing in shorter distances and by 2,6 year higher, than for women.

*Table 1*

**Age of world record-holders in swimming for women**

Distance, m	Number of world records	Number of world record-holders (1973-1986)	Middle age (years)	Number of world records	Number of world record-holders (2000-2013)	Middle age (years)
100	56	18	17,4	32	15	22,3
200	59	30	16,6	35	20	22,3
400, 800	33	18	16,6	14	9	19,1

Table 2

**Age of world record-holders in swimming for men**

Distance, m	Number of world records	Number of world record-holders (1973-1986)	Middle age (years)	Number of world records	Number of world record-holders (2000-2013)	Middle age (years)
100	35	17	<b>20,5</b>	33	17	<b>23,5</b>
200	49	23	<b>19,5</b>	46	13	<b>23,3</b>
400, 1500	35	14	<b>19,4</b>	17	4	<b>22,7</b>

**Conclusions.** The age-related zones of the greatest sportive results, typical for the modern swimming, were sharply shifted towards senior age: for women from the age-related range of 16–19 years, typical for swimming of 1950–1980s, to 18–25 years, that reflects the state of swimming of subsequent years; for men these limits were shifted from the age-related range of 18–23 years to 20–26 years.

**Prospects of further researches.** To establish duration of period of swimmers' preparation to higher results of their performances at that achieved level.

**References:**

1. Bulgakova N. Zh. *Otbor i podgotovka yunykh plovtsov* [Selection and training of young swimmers], Moscow, 1986, S. 100–191. (rus)
2. Vorontsov A. R., Solomatin V. R., Sidorov N. N. *Nauchno-metodicheskiye osnovy postroyeniya mnogoletney sportivnoy podgotovki yunykh plovtsov na osnove ucheta vozrastnoy dinamiki fizicheskogo razvitiya* [Scientific and methodological basis for constructing a multi-year athletic training young swimmers by taking into account the age dynamics of physical development], Moscow, 1987, 66 p. (rus)
3. Makarenko L. P. *Podgotovka yunykh plovtsov* [Preparing young swimmers], Moscow, 1974, 285 p. (rus)
4. Platonov V. N. *Sportivnoye plavaniye* [Competitive swimming], Kyiv, 2012, pp. 197–252. (rus)
5. Sakhnovskiy K. P. *Teoretiko-metodicheskiye osnovy sistemy mnogoletney sportivnoy podgotovki: dis...doktora ped. nauk* [Theoretical and methodological foundations of the system of long-term athletic training: diss.], Moscow, 1997, 262 p. (rus)
6. Khomenkov L. S. *Uchebnik trenera po legkoy atletike* [Tutorial coach athletics], Moscow, 1987, 258 p. (rus)
1. Carlisle F. *Selected Topics swimming Research* / F. Carlisle // *Swimming in the 21st Century*. – Champaign: Human Kinetics. – 1992. – P. 153–183.
7. Olbrecht J. *plannen, periodiseren, trainen bijsturen en Winnen: Guide voor moderne zwemtraining*. – Antwerpen: F&G Partner, 2007. –239 p.

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## **THE THEORETICAL BASIS OF CHILDREN AND YOUTH'S AND RESERVE SPORT OF UKRAINE**

**Abstract: Goal:** *studying of theoretical principles of youth and reserve sport. Materials and methods:* *monographs, thesis, authors' abstracts of thesis, scientific articles, publications; methods: analysis of literary sources and documents, methods of analysis of systematic analysis. Results:* *On the basis of analysis of scientific papers of leading scientific of soviet and modern period such as B. Ashmarin, V. Bal'sevich, T. Bondar, O. Borisova, V. Volkov, V. Filin, O. Vaceba, A. Nesterova, I. Prikhod'ko, G. Putyatina, S. Rodak, S. Stadnik, L. Chekhovska, O. Shinkaruk and others; conceptual positions of the youth and reserve sports, its structure and features of development are exposed. Conclusions:* *compiling of the materials will contribute to a subsequent scientific search in the direction of perfection of the youth and reserve sport in Ukraine.*

**Keywords:** *theoretical principles, scientific researches, children and youth's sport, reserve sport, structure, components.*

**Statement of the problem.** The Concept of National Target Program of Social Development of Physical Culture and Sport for 2012–2016 (Resolution of the Cabinet of Ministers of Ukraine on 31th of August 2011 № 828-p) states that one of the priorities of modern sport is to create conditions for the development of children, youth and sports and the reserve is not surprising, as most children and youth and backup is the foundation of the sport top sports achievements.

Children and youth sport is the key to the development of reserve sports and a factor for formation of a healthy society. It solves not merely health problems, and solves important social problems, such as providing recreational activities for children, helps to fill in their leisure when they are not studying, prevents appearing of bad habits, gets children off from the streets, promotes forming of healthy lifestyle, helps the child to socialize in society, to self-actualize, to build new friendship relations, to communicate, to have fun.

**Analysis of recent researches and publications.** To date, the development children and youth sports and reserve pretty well represented in the works of O. Andrianova (2011), N. Sereda (2012), S. Stadnik (2011, 2012), I. Petrenko (2012), G. Putyatina (, 2007) and others. authors, revealing features of activities out-of-school educational institutions, such as CYSS, SCYSSOR, SSHS and specialized educational institutions of I-II accreditation levels – Schools of Physical Education. In scientific researches of O. Shinkaruk (2011) reviewed the system of selection of athletes and the orientation of their training in a multi-process improvement.



A number of research studied a systematic approach to training athletes, which discussed some issues of training of young athletes (O. Kamaev, 2009, V. Platonov, 2004).

It should be noted that most of today's research is aimed at studying the specialized educational institutions that provide training of sports reserve, is considered the organizational structure of sports schools and schools of physical training, conditions of operation, the direction of their activities, some authors developed targeted programs to improve the activities of sports schools (G. Putyatina, 2007) and the School of Physical Education (S. Stadnik, 2012), however, in the works of contemporary authors, it was not considered a problem of organizational and managerial conditions of children and youth and reserve sports that led to the choice of the research topic.

**Connection of the research with academic programs, plans, topics.**

Research carried out by the Thematic plan of research of the Kharkiv State Academy of Physical Culture in 2011-2015 on the topics "Improving the training of athletes in engineering and applicative kinds of sports" 2.5. "Improving the training process in winter sports" 1.5. "Methodological foundations of the strategic development of the sphere of physical culture and sports in the region" (state registration number 0113U004615).

**Goal of the research:** study of the theoretical foundations of children and youth and reserve sports.

**Tasks of the research:**

1. Based on the theoretical analysis to reveal the structure and characteristics of modern children and youth and reserve sports.
2. To examine basic directions of scientific research of domestic and foreign experts on children and youth sports and reserve sports.

**Materials and methods of the research.** During the research we examined the scientific literature, namely, monographs, dissertations, synopsis of thesis, research papers and publications. During the research we used a set of scientific methods: a) analysis of the literature; b) analysis of documents; c) methods of system analysis.

**Statement of main material.** In the laws of Ukraine "On State Support of youth and children's public associations", "On General Secondary Education", "On Education", "On out-of-school education", "On Physical Culture and Sports" in the regulations – National Program of development of Physical Education and Sports, the National Program of education of children and youth in Ukraine, UN General Assembly of the United Nations "Sport as a means to promote education, health, development and peace" by pressing task of the moral, spiritual, values of young generation, preparation for active creativity socially significant and full of personal contents of the children's and youth groups. Important roles in solving these problems are children and youth and reserve sports.

By O. Vaceba, Ye. Vil'chkovskiy, O. Zhabokrytska, M. Zubaliy, O. Kuts, A. Tsios, B. Shyian are characterized pedagogical conditions of effective impact on out-of-school sports training on physical training of students in secondary schools.

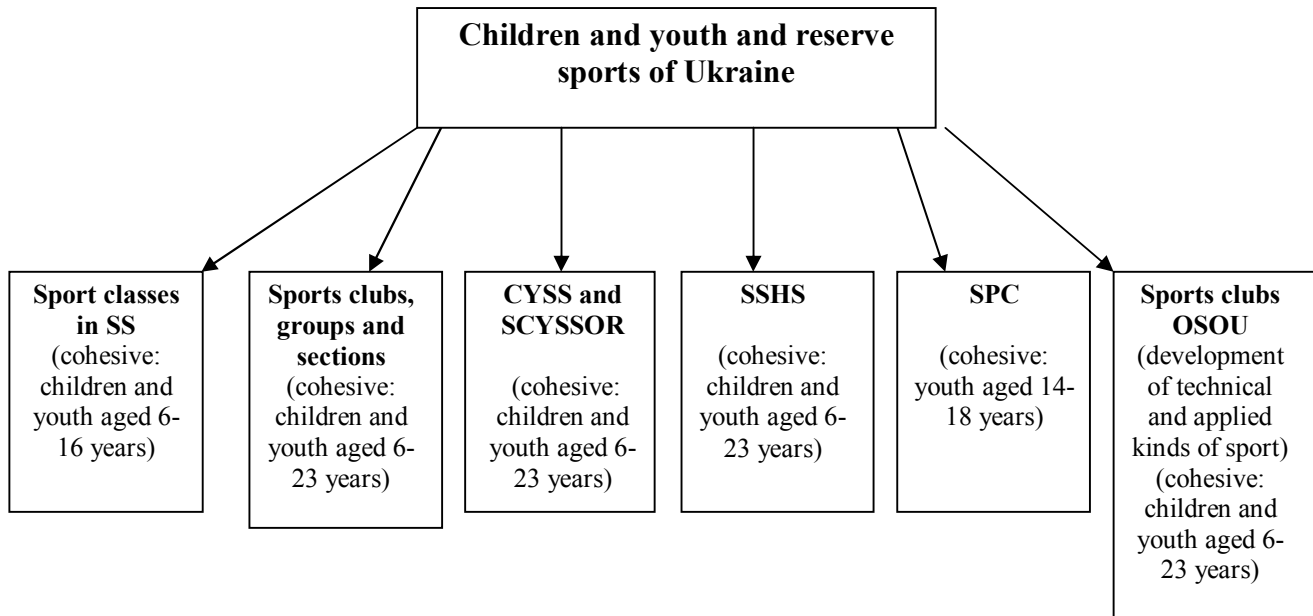
This issue is the subject of numerous works of Russian scientists (V. Bal'sevich, N. Barysheva and others) [16].

As noted by T. Nizhevskaya in her scientific publication "Theory and Methods of children and youth sports as an academic discipline in training future specialists in physical culture and sports" (2008) [11], active development of current issues of youth sports in this country began in the postwar years and has passed several stages: from the study of individual sections, which is typical for works of 1951–1960, to the major summarizing publications of 1974–1980. In the works of this time the main attention was focused on specialists identify patterns that are inherent to prepare children and adolescents due to their age characteristics. In this direction have been achieved the following results: establishes the basic stages of long-term training and rational orientation of process training for each of them; proved an effective means and methods of physical qualities; examined the influence of sport on the body of a young athlete; developed the selection of sports and orientation; established the certain features of teaching methods with young athletes of all ages and skills.

Conceptual position of children and youth sports in Ukraine is formed by domestic scientists of the Soviet period, such as B. Ashmarin, V. Bal'sevich, V. Volkov, A. Guzhalovskiy, L. Matveev, V. Filin, N. Fomin and others, and refer to the fundamental works of modern Ukrainian theorists: M. Bulatova, L. Volkov, A. Deminskiy, T. Krutsevich, G. Maksymenko, V. Platonov, K. Sahnovskiy, L. Sergienko and others [15].

Today, scientific research continues to optimize the development of children and youth and reserve sports in our country, as is stated in scientific publications A. Shinkaruk "Formation of view of the development children and youth sports through the analysis of the sports schools for the 1996–2003" (2004) [21], A. Nesterova "Legal aspects of children and youth sports in Ukraine" (2008) [10], in particular, the authors agree that the most important terms of development of top sports achievements and improve the efficiency of Olympic training system is to improve children and youth sport in the country based on date knowledge of science and world practice, it also emphasizes O. Varenik in his work "Features of the organization and development of children and youth sports around the world" (2007) [4]. Some aspects of sports reserve in Olympic sports in terms of commercialization and professionalization highlights A. Borisov in the scientific article "Theoretical and methodological bases of professional sports (on the basis of tennis)" (2013) [3].

The study determined the structure of children and youth and reserve sports in Ukraine [12–14; 19] (Fig. 1).



**Fig. 1. Organizational structure of children and youth and reserve sports in Ukraine**

The native scientists distinguish the components of modern system of children and youth and reserve sports. Moreover, in the research of O.Goncharenko, O.Mishenko «The selected questions of occupational guidance activity at general education institutions» (2009), which bases on scientific works of L.Ivanov (2004) [7], L.Lipova, P.Zamaskina, V.Malisheva (2007) [9], the activity of specialized sports classes of general education schools is under consideration. The issue of occupational guidance activity among senior pupils of specialized classes is examined in the research, and the positive effect from its high motion activity is underlined, as evidenced by the high level of the health of our pupils.

In the scientific works of T.Bondar (2009, 2010), the system of school physical culture and sports (recreational) clubs is deeply examined. The author has proved that physical education and sports club, as the organization, which is built under the principle of pupils self-government, is extremely efficient form of work with school children as for the instilling in them the active attitude to their own health and the formation of physical culture of the personality. Moreover, the author has scientifically proved and developed the organizational pedagogical technology of the management of pupils physical education and recreational clubs [2].

The considerable body of scientific works consists of the researches, which are dedicated to the activity of children and youth sports schools. In scientific works of O.Andrianova (2012), G.Putyatina (2008), I.Petrenko (2012), I.Prichodko (2009), N.Sereda (2009), the organizational and legal and economical basis of functioning of children and youth sports schools of Ukraine, the factors, which affect the conduct of sports selection, are identified, and the marketing activity of sports schools under the modern market conditions is considered.

The works of E.Bazhenkov, V.Bauer, S.Valyaev, O.Zhdanova, N.Zhmareva, Y.Karpova, A.Malinina, A.Mishukova, A.Nesterova, S.Panarina, S.Podobed, I.Samsonov, L.Chekhovskaya, V.Chistyakova, D.Pereplyotchikova, O.Shinkaruk and others are dedicated to the organization of the activity of children and youth sports schools as the constituent part of the system of out-of-school education. Currently, the issues of the improvement of the resource base of Children's and Youth Sports Schools, the condition of legal support, educational and training process, personnel and economical work are considered; the ways of overcoming the existing organizational defects of the modern system of Children's and Youth Sports Schools are clarified [14; 16; 20].

In addition, the native scientists studied the recreational and educational components of children and youth sports, the formation of healthy lifestyle and organization educational process in children and youth sports school in particular. Thus, O.Sviridenko, in his scientific work «The pedagogical conditions of the education of healthy lifestyle of teenagers in Children's and Youth Sports Schools» [17], identified the content of education of healthy lifestyle of teenagers in Children's and Youth Sports Schools (the formation in teenagers the consciousness as for saving and promotion of health; the collaborative activity of parents and coaches-teachers with the aim of education of healthy lifestyle; the formation of views, beliefs, system of values, emotional sphere as for the healthy lifestyle; the attitude to surroundings during the education of healthy lifestyle; self-education and self-control) and the principles of the education of healthy lifestyle of the teenagers in Children's and Youth Sports Schools (the activity, the interest and competitive spirit; the concreteness and perspective; independence and initiative; the purposeful approach to the process of education of healthy lifestyle; the unification of practical activity and work with educational influence; mutual understanding and humanity; the consistency, the correspondence of educational influence to the personality of a teenager.

T.Roters and V.Mazin, in their scientific work «The statement of the problem of the organization of educational process in children's and youth sports schools» (2012) [16], indicate that the execution of tasks, set to Children's and Youth Sports Schools by the state, includes three interrelated aspects: sports (the development of skills of pupils in selected sports, the preparation of sports reserve for Ukrainian teams), athletic (adequate health promotion, providing the appropriate recreation and leisure of children and youth, the formation of healthy behaviors) and educational (the contribution to harmonious education and self-actualization of pupils).

The issue of the development of the reserve sports in Ukraine, which is the derivative of children and youth sports and gives the basis of high performance sport, continues to be relevant. In particular, in National doctrine of physical culture and sports development [10], it is pointed out that the reserve sports system provides the preparation of the sportsmen, which graduated from the sports schools and have real opportunities for achieving high results of international level and successful participation in World University Games. This system unites specialized educational institutions of sports type, sports teams of ministries and other central executive

bodies, Autonomous Republic of Crimea, regions, towns, Kyiv and Sevastopol, and, besides, associations and federations.

S.Rodak and O. Vatceba, in their work «The relevant issues of the activity of specialized educational institutions of reserve sports» (2009) [15], point out that the important condition of efficient functioning of the system of native high performance sport is the appropriate development of the reserve and children and youth sports. The authors research the history of the formation of the reserve sports system, indicating that the first general education boarding schools of sports type appeared in the times of Soviet Union in 1966, and research its current state. The authors underline that sports educational institutions are the constituent part of the educational system of Ukraine and are aimed at the preparation of sportsmen of high qualification – the reserve for the national teams in corresponding sports. It is pointed out that, as of 2009, there were 18 specialized educational institutions of sports type in Ukraine, among them – nine colleges of physical culture, three colleges of Olympic reserve, four lyceum-boarding schools of sports type, two general education boarding schools of sports type, where the preparation of sportsmen in Olympic summer and winter sports, and, besides, non-Olympic ones, is carried out.

The more detailed examination of the activity of physical culture colleges of Ukraine can be found in scientific works of S.Stadnik, in particular, in dissertation «The organizational and management conditions of the activity of physical culture colleges in Ukraine» (2013) [18], the results of complex analysis of physical culture colleges in Ukraine are provided, the directions of their organizational and management activity are determined, the project of target complex program of optimization of the activity of physical culture colleges of Ukraine and a plan of its practical realization is proposed.

The system of preparation of young sportsmen in particular sports is examined in the works of some scientists. Thus, O.Kolotuha, in his work «The children and Youth tourism in Ukraine as a specific territorial recreational system» (2002) [8], underlines the social significance of recreational and tourist activity of children and characterizes the system of specialized of tourist and local institutions, which are the basis of the system of children and youth tourism in our country. The author indicates that, except the system of specialized tourist and local institutions, children and youth tourism is the constituent part of the system of the complex out-of-school institutions – Palaces, centers, the houses of out-of-school work. The children and youth tourism in Ukraine, as indicated in the research work, is subordinated to Ministry of Education and Science. The specialized tourist and local institutions, along with specialized institutions of ecological and naturalistic type and, besides, institutions of children and youth technical creativity and complex out-of-school institutions (palaces, centers, houses of out-of-school work, children and youth centers, are the constituent part of the system of out-of-school education in Ukraine. On the basis of the centers of children and youth tourism and local studies (the stations of young tourists), the temporal tourist, local, excursion groups, circles, sections, formed for the period of conducting the tourist event, the work of a base, a camp of the initial level, can be organized and work at tourist centers and camps.

It is necessary to mention that the system of children and youth sports is formed by physical culture and sports organizations, created due to public initiative, as, for example, federations, sports associations and organizations. The popularity of the technical and applied sports among children and youth of Ukraine, the expansion of which is provided by Association for support of the defense of Ukraine, is growing during the last time [6]. However, currently, this issue remains to be not adequately investigated. Among scientific researches of native authors, the works of V. Gradusov «The age stages of regulation of sportsmanship in motocross» (1988), I. Volobueva and V. Gradusov «The peculiarities of preparation of beginner parachutists in flying and parachute clubs of Ukraine» (2006) and E. Basenko, V. Ashanin, V. Gradusov «The creativity and sports result in motorsports (carting)» (2007), in which mainly the methodological basic foundations or special characteristics of sportsmen of technical sports are examined, and, at the same time, too little attention is paid to the issue of attracting children to taking these sports [1; 6].

**Conclusions.** Thus, the research conducted showed that, currently, there are no modern scientific researches, which compile and generalize theoretical knowledge as for children and youth and reserve sports as the integral system, in spite of the existence of a great body of scientific and methodological works of modern scientists, dedicated to the problems of children and youth and reserve sports, in particular to the issues of normative and legal regulation, the study of recreational and educational components of children and youth sports, the improvement of the system of preparation of young sportsmen, the activity of educational physical culture and sports institutions and organizations. The development of theoretical basis, in its turn, will provide the further scientific search as for the improvement of the system of children and youth and reserve sports in our country.

**The perspectives of further researches.** The issues of attracting the children to taking non-olympic sports, the technical and, besides, sports and applied ones in particular require the further scientific search.

#### References:

1. Basenko Ye. V., Ashanin V. S., Gradusov V. A. Pedagogika, psikhologiya ta mediko-bologchni problemi fizichnogo vikhovannya sportu [Pedagogics, psychology, medical-biological problems of physical education and sport], Kharkv, 2007, vol. 11, p. 5–7. (rus)
2. Bondar T. S. Organzatsyno-pedagogchna tekhnologiya menedzhmentu uchnivskikh fzkulturno-ozdorovchikh klubov: dis. ... kand. nauk fz. vikh. [Organizational and educational technology management student sports and recreation clubs], Kharkv, 2010, 232 p. (ukr)
3. Borisova O. V. Vsnik LNU men Tarasa Shevchenka [Journal of LNU], Lugansk, 2013, vol. 8 (267), iss. , p. 129–138. (ukr)
4. Varenik O. N. Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkv, 2007, vol. 12., pp. 322–324. (rus)
5. Volkov L. V. Teoriya i metodika detskogo i yunosheskogo sporta [Theory and technique of child and yunosheskoho sports], Kyiv, 2002, 294 s. (rus)
6. Volobueva . V., Gradusov V. O. Pedagogika, psikhologiya ta mediko-bologchni problemi fizichnogo vikhovannya sportu [Pedagogics, psychology, medical-biological problems of physical education and sport], Kharkv, 2006, Vol. 12, pp. 26–31. (ukr)
7. vanova L. Fzichne vikhovannya v shkol [Physical education in schools], 2004, № 1, pp. 5–6. (ukr)
8. Kolotukha O. V. Kultura narodov Prichernomorya [Culture of the peoples Black Sea], 2002, vol. 36, p. 283–288. (ukr)

9. Lipova L. A., Zamaskna P. ., Malishev V. V. Profline navchannya: teorya praktika [Profile Education: Theory and Practice], Kyiv, 2007, 192 p. (ukr)
10. Nesterova A. Sportivniy vsnik Pridnprov'ya [Sports Bulletin Dnieper], Dnpropetrovsk, 2008, vol. 1, pp. 100–103. (ukr)
11. Nzhevska T. V. Teorya ta metodika fizichnogo vikhovannya [Theory and methods of physical education], 2008, vol. 3, pp. 10–12. (ukr)
12. Platonov V. N., Sakhnovskiy K. P. Molodezh nauka olimpizm: II Mezhdunarodnyy forum [Youth Science Olympism: II International Forum], Moscow, 2002, pp. 173–176. (rus)
13. Prikhodko ., Levadnya S. Moloda sportivna nauka Ukraini [Young sports science of Ukraine], 2008, V. 12, T. 1, pp. 265–269. (ukr)
14. Putyatna G. M. Organzatsyn aspekti optimzats dyalnost sportivnikh shkl na osnov programno-tslovogo upravlnnya: avtoref. dis.... kand. nauk z fz. vikh. [Organizational aspects of optimization of sports schools based program target management: Authors thesis], Kharkiv, 2008, 21 p. (ukr)
15. Rodak S., Vatseba O., Tsos A. V., Kozbrotskiy S. P. Fzichne vikhovannya, sport kultura zdorov'ya u suchasnomu susplstv [Physical education, sport and health culture in modern society], Lutsk, 2009, vol. 2 (6), 117 p. (ukr)
16. Roters T. T., Mazn V. M. Pedagogka formuvannya tvorcho osobistost u vishchy zagalnoosvtny shkolakh [Pedagogy of forming a creative personality in higher and secondary schools], Zaporzhzhya, 2012, Vol. 24, pp. 294–301. (ukr)
17. Sviridenko O. O. Zbrnik naukovikh prats Poltavskogo derzhavnogo pedagogchnogo unversitetu men V.G. Korolenka [Collected Works of Poltava State Pedagogical University named after VG Korolenka], 2007, Vol. 3–4 (55–56), pp. 224–229. (ukr)
18. Stadnik S. Moloda sportivna nauka Ukraini [Young sports science Ukraine], Lviv, 2012, Vol. 16, T. 4, pp. 156–162. (ukr)
19. Filin V. P. Teoriya i metodika yunosheskogo sporta [Theory and methods of youth sports], Moscow, 1987, 128 p. (rus)
20. Chekhovska L., Karpa ., Paschnyak V. Materiali Vseukransko naukovopraktichno konferents z mzhnarod. uchastyu "Problemi aktivzats rekreatsino-ozdorovcho dyalnost naseleण्या" [Materials of the All-Ukrainian scientific-practical conference with international. participation "Problems activating recreational and health activities of the population"], Lvv, 2008, pp. 61–68. (ukr)
21. Shinkaruk O. A. Teorya metodika fizichnogo vikhovannya sportu [Theory and Methodology of Physical Education and Sport], 2004, № 2, pp. 65–69. (ukr)

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## **THE GEOPOLITICAL AND SOCIAL FACTORS INFLUENCE ON IMPROVEMENT OF THE TECHNIQUE OF FENCING OF PEOPLES OF RUS' IN THE PERIOD OF VII-XIV CENTURIES**

**Abstract. Objective:** *determine the extent of the influence of social and geopolitical factors in the improvement of the art of fencing of the peoples of Rus' in the period from VII till XIV centuries. Material and Methods:* *analysis of literary and archaeological sources. Results:* *the level of extend art of fencing peoples of Rus' in the period from VII till XIV centuries was determined. The analysis of the level of influence of geopolitical, social factors and weapons complex at improving fencing technique of peoples of Rus' in the period from VII till XIV centuries was determined. Conclusions:* *key social and geopolitical events in Rus' in the period from VII till XIV centuries was identified. Its influence on the improvement of techniques of sword fencing was proved.*

**Keywords:** *fencing technique of peoples of Rus', historical fencing, social and geopolitical factors, protective equipment.*

**Introduction.** It is known that during the Stone Age, along with household goods, weapons and armor was originated and developed. [4] Initially it was clubs, stone knives, axes, primitive bows and darts. In contrast, elements of protective equipment appeared and developed: wicker shields, simplest armor, made from treated fells and segments of animal armor. Gradually, protective equipment and armament improved [1; 4; 5; 8–10]. For efficient use of weapons against armed and equipped enemy with the defense, it become necessary to have special skills. This led to the birth and development of combat fencing technique, which continues to improve even in our times.

By analyzing most important social and geopolitical processes of society, we can determine the level of fencing on its territory. Of particular interest is the set of weapons, armor and fencing technique of peoples, who conduct the most large-scale conquests or the peoples, who fought off conquests of different opponents.



Therefore the study of the influence of social and geopolitical factors on improving peoples of Rus' fencing technique can significantly help in the study of development of weapons complex and art of fencing of peoples of Rus' in the period from VII till XIV centuries.

**Objective:** determine the extent of the influence of social and geopolitical factors in the improvement of the art of fencing of the peoples of Rus' in the period from VII–XIV centuries.

**Research objectives:**

1. Based on the study and analysis of the literature sources, to identify the main social and geopolitical processes, that have occurred in Rus' in the period from VII till XIV centuries.

2. Determine the impact of social and geopolitical factors on the peoples of Rus' weapons complex development and improvement and peoples of Rus' sword fencing technique improvement in the period from VII till XIV centuries.

**Material and methods of research:** analysis of literary and archaeological sources.

**Results of research and its discussion.** Analysis of literary and archaeological sources, relating to the work theme, indicates that the main social and geopolitical factors, inherent in Rus' in the period from VII till XIV centuries, include the following phases:

1. Khazar-Bulgar period (650–737 yy.). It can be claimed that in this time, most of the tribes inhabiting the territory of the future Rus', was in contact with the Khazar Khanate and Bulgar horde. Some part of the tribes led trade, the other part was conquered or paid tribute [4]. Starting from 825 y, Rus' tribes founded their own Khanate. In response, about 833, the Khazars built a Sarkel fortress.

2. Scandinavians and Rus' Khanate (737–839 yy.). From VIII century territory of Rus' was invaded and subsequently settled by Scandinavian peoples. In promoting south Varangians got great assistance from Alani tribes, who settled earlier in the upper regions of the Donets and lower Don, as well as in the North Caucasus. Thus, probably, began a collaboration between the Varangians and Alans, who was assimilated with the Alani tribes and Rus' tribes, adopting its name. [4; 6; 7].

3. Kievian Rus' genesis (839–878 yy.). By the middle of the IX century, Ukraine on right and left bank was controlled by the Khazars and the Magyars. In Northern Rus' were the Varangians. Thus the area between the Baltic and Black Seas was divided into two spheres of influence: Khazar-Magyar in the south and Varangian in the north [4; 6–8].

According to "Tale of Bygone Years", in 862 the Varangians were expelled. However, after the expulsion of the Danes, the troops for the war against the Khazars in the Il'men area was not enough. This is likely the main reason for "Varangians calling".

Rus' leader who, according to "Tale of Bygone Years", accepted an invitation to rule Il'men tribes, was a Danish feudal Rurik. A few years later Rurik in Novgorod built his castle, where he left his young son Igor, on whose behalf the first ruled his

kinsman Oleg. Between 878 and 880 years. Oleg captures Kiev, becoming the first ruler to do a lot to unite North and South Russia [4].

As the main political event of the IX century in Rus' history we should consider combining of all Rus' lands in one state, which occurred about 882 y.

4. Isolation of the military class and transformation of it to druzhina. In VI c. occurred isolation of the military class and transformation of it to druzhina, have acquired considerable power in the rule of principalities. The earliest mentions of the druzhinas among Slavs are in VI-VII century, in two ancient historical sources - "The war with the Goths" and "Miracles of St. Demetrios of Thessaloniki". Druzhinas is described as having military training, quality weapons and armor.

Archaeological findings confirm that in the above-mentioned period of time the Slavs druzhinas existed. (Rybakov B. A. «Kievan Rus and Russian principalities», p. 70–72; Sedov V. V. «Eastern Slavs in the VI-XIII centuries», p. 19–26).

In the first half of the IX century Kievan princes are growing impact on Drevlyane, Dregovichy, Krivichy and Severyane tribal alliances. System of tribute collecting and polyudie export is getting better. As a result, Kiev princes began to have the means to contain numerous troops. Druzhina, consisting of professional soldiers, was the basis of princely military troops. Most of the troops was a militia, so-called "voi". At the turn of the IX-X centuries militia was tribal. Gradually, with the middle of the IX century, militia ceases to be tribal, and this is connected with the organization of the new tribute collecting system, created by Princess Olga.

5. Reign of Yaroslav the Wise and Vladimir Monomakh. In 1036 Yaroslav the Wise defeated Pechenegs and freed the Ancient Rus' state from their raids. In the same year, after the death of his brother Mstislav Vladimirovich, Yaroslav became the sole ruler of most of Kievan Rus'.

After the death in 1113 of Svjatopolk Izyaslavich, the prince of Kiev, people of Kiev held uprising, which was suppressed by Prince Vladimir Monomakh. From 1116 to 1123 years. Monomakh led military action against Byzantium [4]. Vladimir Monomakh through his sons ruled 3/4 territory of Kievan Rus', bringing stability to the country and leading frequent wars with the Kipchaks..

6. Formation of military troops on a regular basis. In the XII century historians have noted the transformation of the structure of Russian military troops. In place of the junior and senior druzhinas come royal court, prototype of the regular army, and so-called "polk" – feudal militia of landowners (boyars), veche meaning falls down (except Novgorod, Rostov boyars influence was destroyed by princes in 1175).

7. Religion. It should be noted that religion played a significant role in shaping the social structure of the state in general and the army in particular. In 988, Christianity became Rus' single state religion. Introduction of Christianity in Russia, helped to create a centralized army, which is now obliged to defend not only their homeland, but also religion. Scientists believe that Christianity, weakening tribal ties, made it possible in the presence of an external enemy to create a unified army of whole Rus' [4].

After analyzing the chronicles and archaeological finds can be seen a gradual change in weaponry and combat tactics of Russian army. For a long time, the infantry

played a major role in the military actions. It should be noted that each soldier had a few types of weapons. Unarmored bowman with light weapons gradually lose its value as a combat unit on the battlefield. Cavalry troops becomes necessary for new forms of warfare and struggle with the nomads. In the XI century cavalry corps in significance compared with the infantry, and later achieves superiority. Rus' Cavalry troop, given the experience of the war against the nomads and knights, had medium or heavy armor, melee weapon and bow. Accordingly, except for ramming lance strike could apply steppe tactics - shooting enemy troops by bows. In fact, one can speak of enough universal kind troops for this time, which had the ability to apply both: European horse tactics and steppe tactics. In addition, if necessary, druzhina was dismounting and became infantry.

In the XI-XII centuries military troops begin to form regiments. In the XI century the main battle order become so-called "polchny ryad", which consisted of the center and the wings. This order increases the mobility of troops and allowed to carry out flanking coverage. Already in 1036 in the decisive battle with the Pechenegs Russian army was divided into three regiments with a congenerous structure on a territorial basis. By the end of the XII century to army division into three regiments on the front was added division into four regiments in depth.

Army troops were influenced by the life and structure of Russian cities. External and internal wars, social factors, development of crafts – show the goal and was determination factor of the direction and level of development of arms. In turn, the weapons complex defined the challenges and opportunities of a soldier in battle. Based on the protective equipment and armament, were selected and improved fencing movements in order to maximize soldier's opportunity to solve combat tasks. Studying the archaeological remains of the weapons complex, and knowing the basic geopolitical and social events, you can determine the relationship between archaeological finds and these events. This relationship, in the case of absence of archaeological finds, will allow to determine the level of development of arms on geopolitical and social factors studying basis.

According to archaeological findings [9–14] two major types of armor existed in Rus' in the period from VII till XIV centuries, were chain mail and lamellar armor.

Chain mail ("Kolchuga") – kind of armor consisting of steel rings. «Kolchuga» – Slavic word that was spread only in the XV–XVI centuries. The first mention of this protective equipment among Slavs refers to the VI century. Already in the VIII-IX centuries chain mail became widespread. Making chain mail is a long and laborious process, indirectly pointing to a well-developed infrastructure of the state. With the development of crafts and to increase the protection requirements on the battlefield, the diameter of the rings is gradually reduced, thereby increasing the level of protection. At the end of XII – early XIII century appear armor of flat rings (so-called "baydana"). This form increased area of protective cover for the same weight of the armor. In the XIII century in Russia knee-length chain mail appeared. Mail weaving are used to strengthen other parts of the protective equipment. Chain mail made by Slavic masters of the X century, were in demand in Khorezm and the knights' West, which confirms the high level of development of arms in Rus'. On the

territory of ancient Russia archaeologists found more than a hundred of chain mail armor of IX-XIII centuries, forty of them is whole. Any of the countries of Western Europe did not have so many finds of such armor type [10; 14].

Lamellar armor. According to recent studies, the bronze and iron lamellar armor was known on Rus' territory from the Scythian period. During archaeological excavations about 200 bronze and iron lamellar armor were found in the mounds and the catacombs of the North Caucasus, Crimea, Northern Black Sea and the Volga regions. Most often they are found during excavations of burial mounds dating from the VI till IV centuries. BC. In the Dnieper region and in Kiev and Poltava regions.

Gunsmith workshop of X century with preserved iron plates for lamellar armor in Slavonic settlement Alchedar in Moldova was excavated by G. B. Fedorov in 1957. One of the largest workshops have been found relatively recently in the Gomel region. Workshop was burned by the Mongols in 1239. During excavation of the workshop was discovered more than 1600 different items. Most part of the items is quite amenable to identification, including plates for lamellar armor. Analyzing archaeological, historical records and scientific works of scientists, we can conclude that the Russian army plate armor appeared during the formation of the state – in the VIII–X centuries. Thanks to discoveries in various cities of ancient Rus' of elements of lamellar armor, we can conclude the wide use of this type of armor in ancient Rus'.

According to the archaeological finds, in the IX–XII century armor for every four chain mails that have been found in the excavations, we have only one lamellar armor. In XII–XIII centuries in connection with the development of arms, tactics and strategy of combat, there is the necessary to increase armor. Replacement of chain mail armor by lamellar armor occurs gradually. For example, in Novgorod in archeological layers of XIV–XV centuries in every nine residues of lamellar armor, there are only one piece of chain mail

Thanks to archaeological and pictorial sources we can say with confidence that in Rus' are existed and was actively developing different systems of lamellar armor.

**Helmets.** According to archeological data, in wide use in the Rus' army helmets come in X century, and archaeological finds of helmets (just like chain mail) on Rus' territory is much more than in any other country in Europe. In the XII century in Rus' appear and become the most common high-spired helmets with nose protection. This is because the mass spreading of cavalry and sphericoconical form is best suited to protect against attack from above. In the second half of the XII century, ornate helmets with half mask appeared [15].

Despite the large number of similar items in eastern and Russian helmets, scientists believe that the helmets from Gnezdovo and Black Grave were created by local craftsmen, familiar with Asian models.

**Shields.** The earliest finds elements of shields are from X century. According to historians, round shield has an old scandinavian origin. Shields had a circular shape with a diameter of up to 95 cm. As well as among the remains of ancient Russian and Scandinavian shields were found rings and brackets for mounting the shield on belt on shoulder of its bearer. In the XI century shields of flat panels

become sphericoconical; preserved images of such shields "in profile" shows it as a form of "funnel" – this is particularly evident in the figures of XIII-XIV centuries. In the XI-XII centuries round shields almost completely are changed to the almond shape shields, but after that smaller round shields came back in use.

Spread of almond-form shields historians associate with the development of cavalry. Height of the shield was a third to half of the human height, the ratio of height and width there were two-to-one. Shields was flat or curved along the longitudinal axis. In the XII century, thanks to the development level of protective equipment, almond-shaped shield become smaller and have lost umbron.

Given the established relationship between social, geopolitical events and the development of protective equipment and tactics, you can draw some conclusions:

– Production of chain mail armor was known in Rus' before Khazar-Bulgar period (650–737 yy.), but was not common. Already in the VIII-IX centuries chain mail became widespread, and by improving technological solutions is an increase in the effectiveness of this type of protective equipment. This history period corresponds to, firstly, the war with the Khazars, and, secondly, contacts with the Varangians. During the same period the formation of cities in Rus' occurred.

– After formation of Kievan Rus', which was accompanied by continuous wars with knights, steppe nomads and Byzantium, chain mail was replaced by a new type of protective equipment – lamellar armor. Mass production of helmets and protective equipment for the hands and feet begins.

– Fights with steppe nomads, knights and long hikes of Russian troops in XI–XII centuries, led to the creation of heavy cavalry, armed with bows, besides other armament. Formation of a standing army and the division of troops on the regiments also occurs in these centuries. In the XI century the main battle order become so-called "polchny ryad". By the end of the XII century to army division into three regiments on the front was added division into four regiments in depth.

Thus, the transformation and strengthening of protective equipment, the emergence of new forms of tactics on the battlefield, put forward new demands not only for the design and manufacturing technology of the sword, but also to the technique of sword fencing.

For the experimental investigation of this assertion we have conducted a number of field tests.

1. To analyze the efficacy of the technique of sword fencing with opponents having different protective equipment, we have been remodeled and created three types of protective equipment: two chain mail armor, corresponded VII and X centuries and riveted lamellar armor of XII century. Strike attacks, different in technique and strength, was provided for each armor.

– During the execution of attacks on chain mail in sample of VII c., most of the attacks resulted cutting through chain mail protection and penetration of the blade of the sword in a wooden mannequin, which was wearing chain mail.

– During the execution of attacks on chain mail in sample of X c., some of the attacks was ineffective. The most effective were vertical chopping attack to the clavicle and horizontal chopping attack into the lower part of the body.

– Attacks on lamellar armor showed low efficiency of chopping attacks. The most effective were circular attacks, horizontal pricking and vertical bottom-up pricking attacks.

2. To analyze the effectiveness of the sword fencing technique during a fight with opponents, equipped with various types of shields, training duels were conducted. It was founded, that the most effective attacks against an opponent armed with almond form shield, was horizontal circular injection and diagonal chopping strike to attacking hand. The most effective attacks against an opponent armed with round shield, was chopping horizontal and diagonal strokes in hip and knee joint. In both cases, strikes to the head were also effective.

3. Analysis of the fights involving large amounts of fighters in close formation showed, that the most efficient and effective attacks were thrusting the body and head, secant attacks to the legs and brief attacks to the face shield of the helmet performed with sword hilt.

The emergence of new types of weapons [5] required new fencing movements. In the XII century. warriors began to use bear spear (“rogatina”). As shown by training fights, hard block by the sword, is not effective against this type of weapon. Diverting movements must be performed in this case.

### **Conclusions:**

1. Based on the study and analysis of the literature sources, main geopolitical and social events in Rus’ in the period from VII-XIV centuries. were identified, which could influence on the development of protective equipment and sword fencing technique. These events were: Khazar-Bulgar period and contacts with the Scandinavians and the Byzantines, the union of Rus’, the formation of army on a permanent basis.

2. Analysis of historical and archaeological sources revealed that the main types of armor (protective equipment) of the peoples of Rus’ in the period from VII till XIV centuries were: chain mail and lamellar armor. Phases of its development were also determined.

3. It was proved that the development of protective equipment and the emergence of new types of weapons in Rus’ in the period from VII till XIV centuries influenced on the improvement of techniques of sword fencing. Thus we have proved the impact of geopolitical and social factors that have occurred in Rus’ in the period from VII till XIV centuries, on improving the technique of sword fencing.

The prospect of further research is related with the study of the development of functional characteristics of weapons and protective equipment of peoples of Rus’, as well as the influence of historical fencing systems on modern sport fencing and practical fencing.

### **References:**

1. Bugorskaya O. A. Alyans nauk: vcheniy-vchenomu [Alliance sciences: scientist to scientists], 2013, vol. 4, pp. 33–38. (rus)
2. Medvedeva Ye. S. Slovar terminov po teorii sotsialnoy raboty [Glossary of social work theory], Access mode : <http://voluntary.ru/dictionary/853>. (rus)
3. Volovich V. I. Sotsiologicheskii spravochnik [sociological Directory], Kyiv, 1990, 382 p. (rus)
4. Vernadskiy G. V. Istoriya Rossii [History of Rus’ia], Moscow, 1999, vol. 1, 448 p. (rus)

5. Bugorskaya O. A. Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkv, 2013, vol. 5, pp. 37–40. (rus)
6. Gurevich A. Ya. Pokhody vikingov [Vikings], Moscow, 1966, 182 p. (rus)
7. Leontyev A. I. Pokhody normannov na Rus [Hiking Normans to Rus'ia], Moscow, 2009, 320 p. (rus)
8. Razin Ye. A. Voyennaya istoriya [Military history], vol. 2, Moscow, 1957, 655 s. (rus)
9. Makushnikov O. L., Lupinenko Yu. M. Lamellyarnyy dospekhn vostochnoslavyanskogo ratnika nachala XIII veka (po materialam raskopok v Gomele) [Lamellar armor East Slavic warrior beginning of the XIII century ( excavations in Gomel )], 2012, Access mode : <http://ludota.ru/lamellyarnyj-dospeh.html>. (rus)
10. Kirpichnikov A. N. DrevneRus'koye oruzhiye: Dospekhn, Kompleks boyevykh sredstv IX–XIII vv. [Ancient Weapon: Armor , complex combat assets IX-XIII centuries], Lvov, 1971, vol. 3. (rus)
11. Lupinenko Yu. M. Rus na perekhrest svtv (mzhnarodn vplivi na formuvannya davnorusko derzhavi) IX–XI st. materialy mzhnarodnogo polovogo arkheologchnogo semnaru : Cherngv-Shestovitsya, 20–23 lipnya 2006 r [Rus'ia at the crossroads of the Worlds ( mzhnarodni influence in shaping the ancient state ) IX-XI centuries. Field Archaeological Materials International Seminar], Cherngv, 2006, Access mode : [http://stezhky.io.ua/s414667/ylupinenko\\_plastinchatyy\\_dospeh\\_vostochnyh\\_slavyan\\_v\\_vii\\_-\\_x\\_vv](http://stezhky.io.ua/s414667/ylupinenko_plastinchatyy_dospeh_vostochnyh_slavyan_v_vii_-_x_vv). (rus)
12. Medvedev A. F. Sovetskaya arkheologiya [Soviet archeology], 1959, vol. 2, Access mode : <http://swordmaster.org/2010/05/10/a-f-medvedev-k-istorii-plastinchatogo-dospexa-na.html>. (rus)
13. Medvedev A. F. Sovetskaya arkheologiya [Soviet archeology], Moscow, 1959, vol. 4. (rus)
14. Kirpichnikov A. N., Medvedev A. F. Drevnyaya Rus: Gorod, zamok, selo [Ancient Rus: City , castle , village], Moscow, 1985. (rus)
15. Kirpichnikov A. N. Sovetskaya arkheologiya [Soviet archeology], 1958, iss. 4, Access mode : <http://annales.info/rus/weapon/helmets.htm>. (rus)
16. Shtykhov G. V. Drevniy Polotsk (IX–XII vv.) [Ancient Polotsk (IX–XII centuries).], Minsk, 1975, 136 p. (rus)

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## **CHANGES IN THE CARDIOVASCULAR SYSTEM OF MEN AND WOMEN FOR LONG JOGGING SESSIONS**

**Abstract. Goal:** comparison of some ECG indicators of students engaged and not engaged in jogging before physical activity and 10 min. after the test. **Material and methods:** the experiment involved 81 students. **Results:** Established that BA studies lead to an absolute increase in biopotential right and reduction potentials of the left ventricle. **Conclusion:** the most informative indicator of the running load is cardiointervals and bioelectric potentials amplitude of the right heart ventricle. The characteristic of indices electric cardiograms of men and women depending on duration of running exercises.

**Key words:** training seniority, jogging, ECG.

**Introduction.** The problem of the functional state of pupils and students, death on the lessons of physical training, the content of the physical education and the principle of children dividing into medical groups are desperately rised in printed works and interviews, figure in a considerable number of Internet publications [2; 3; 6; 9].

Practically all works we studied – both domestic and foreign – give us sad statistics of WHO and national health institutions about "rejuvenation" of cardiovascular disease [7]. Among the reasons for this phenomenon are called:

- Hereditary factors: 41.3% of students have an hereditary underlying for CVD [2];
- Diet quality (rated as unsatisfactory);
- Lifestyle (total hypodynamy).

Last factor prefer sad "advantage" in specialists' publications on physical education and sport. Hypertension and hypotension can be result of lack of locomotor activity sufficient amount.

It is established that the training in cross and marathon jogging can cause adaptation effect in the systems of the body, and these changes occur at the optimum ratio of the volume and intensity of training loads [1; 5; 8]. The overall jogging effect are adaptive changes in oxygen carrier system of blood circulation of the respiratory system in relation to the reduction of oxygen in the tissues, also noted a protective effect on the development of coronary heart disease, tumors, allergies [1; 4; 10].



However, changes in the cardiovascular system of men and women for a long jogging sessions haven't been studied until now, which determined the relevance of our research.

**Connection with scientific plans, themes.** Work is performed under the theme "Challenges of a healthy lifestyle of young people" of Ivan Franko Lviv National University research plan.

**Goals of the research:** explore some ECG changes at students who are engaged and not engaged in jogging.

**Tasks of the research.** Compare characteristics of some electrocardiogram (ECG) indicators at men and women, depending on the jogging (J) training seniority before cycle ergometrical exertion controlled by pulse and after it, on 10th minute of the rest.

**Matter and methods of the research.** The study involved 81 students, who were divided into 4 groups: Group 1 – students who are not engaged in jogging; 2nd – with 1 year of training seniority; 3rd – with 2-3 years of training seniority; 4th – with 5 and more years of training seniority. Students were training 3 – 4 times a week pre-dosed run lasting from 15 to 60 minutes, with pulse from 130 to 160 beats $\text{min}^{-1}$ , depending on the jogging training seniority.

The following research methods were used:

1. Analysis and study of scientific and methodical literature and empirical research.
2. Cycle ergometrical exertion controlled by pulse with a heart rate (HR) for 60 min on the verge of 140-150 beats per  $\text{min}^{-1}$  (CEECP) [5].
3. Electrocardiogram. ECG used in three standard and six precordial leads –  $V_1-V_6$ , 4.
4. Methods of mathematical statistics (mean  $X$ , standard deviation  $\sigma$ ).

Most informative ECG indicators are taken for computer calculations: amplitude  $P_2$ , sum of deflections amplitude  $R$  in I, II, III leads. Deflection amplitude  $T_3$ , Sokolow-Lyon index  $RV_1+SV_5$ ;  $SV_1+RV_5$ , intervals P-Q, Q-T, R-R.

**Results of the research and its' discussion.** Some ECG indicators are shown in Table 1, changes which under the influence of training jogging indicate an increase in myocardial adaptation to motor hypoxia. So intervals R – R1 in male students' group increased in comparison with other groups. In the women's group this trend continued for 1, 3, 4 groups.

Atrioventricular conduction of RR intervals (interval P–Q) did not significantly differ in all groups. An insignificant reduction was noticed in the interval P–Q at women's with one year of jogging training seniority. Electric miocardia (Q–T) meet the regulatory values in all groups and increased only at men's with 2 and 5 years of training seniority.  $T_3$  deflection amplitude increased especially in men's group.

$T_3$  deflection, more sensitive to hypoxia exertion, significantly increased in men groups (1–4). In group 1, between men and women were not significant differences, however, with training seniority increasing difference in  $T_3$  deflection amplitude largens.

Table 1

**ECG indicators of students depending on the jogging training seniority before cycle ergometrical exertion controlled by pulse performing ( $X \pm \sigma$ )**

Group	Sex	R-R <sub>1</sub> s	P-Q s	Q-T s	P <sub>2</sub> mv	T <sub>3</sub> mv	RV <sub>1</sub> +SV <sub>5</sub> mv	SV <sub>1</sub> +RV <sub>5</sub> mv	KS/d units
Not engaged in jogging	M	0,77	0,15	0,36	0,08	0,13	5,80	25,5	4,40
		0,06	0,01	0,01	0,00	0,01	0,40	2,12	0,33
	F	0,82	0,14	0,35	0,06	0,12	3,85	21,30	5,53
		0,01	0,00	0,01	0,00	0,01	0,41	0,87	0,42
Jogging for 1 year	M	0,91	0,16	0,37	0,08	0,15	6,45	24,45	3,79
		0,03	0,00	0,01	0,00	0,01	0,75	1,96	0,19
	F	0,74	0,14	0,31	0,07	0,10	10,05	23,30	2,33
		0,02	0,01	0,01	0,00	0,01	3,66	1,87	0,18
Jogging for 2 years and more	M	0,87	0,17	0,29	0,09	0,17	6,92	21,58	3,12
		0,04	0,01	0,01	0,01	0,01	0,81	2,19	0,21
	F	0,90	0,15	0,36	0,07	0,13	4,07	20,92	5,14
		0,02	0,00	0,01	0,00	0,01	0,50	1,80	0,33
Jogging for 5 years and more	M	1,01	0,16	0,29	0,22	0,18	7,90	27,81	3,52
		0,04	0,01	0,01	0,00	0,01	0,75	2,00	0,41
	F	0,87	0,15	0,37	0,16	0,10	7,81	27,09	3,47
		0,03	0,01	0,01	0,06	0,00	1,75	1,94	0,29

Index of heart asymmetry coefficient (S/d) was higher at women's. With jogging training seniority this index decreased and was similar at men and women with 5 years jogging training seniority. Its decreasing is associated with increasing of right Sokolow-Lyon index (S-L). Consequently, the exercise effects reflect mainly on the electrical activity of the right ventricle at both men and women.

Table 2 has comparative characteristic of some ECG indicators on 10th minute of resumption at men and women, depending on the jogging training seniority.

As you can see, at women's RR intervals R – R1 duration in 1, 2, 3 groups was significantly shorter. With increasing of training seniority R – R1 duration increased, especially at men's. Increase of RR intervals was observed before the test at women's with 2 and more years of jogging training seniority. Data confirm the general biological law that reflecting enhancement of cholinergic effects on reactivity cardiorythm, and this effect earlier occurs at men's (in a year, and women in two years). After the test on 10th minute R – R1 interval in these men groups was longer.

Right index (S-L) after the test increased with training seniority in almost all groups, which displays more exertion on the right ventricle. This index was significantly lower at women (at 27-33%). It was significantly higher only at female-athletes ( $p < 0.001$ ), which is one of the manifestations of right heart adaptation to jogging exertion. "Left" index after the test in all groups with training seniority was higher after exertions only for women the difference was significant. At men's groups increase the potential of the left ventricle is a trend.

The ratio of the left and right indexes in all groups was lower, due to the fractional increase in "right" S-L index. As before test in men and women groups who engage in jogging (group 4), coefficients of S-L indexes were lower. It is

interesting that at men who engaged in jogging there was no difference in the value of K S/d before and after the test.

Table 2

**ECG indicators of students depending on the jogging training seniority after cycle ergometrical exertion controlled by pulse performing on 10th minute of the rest ( $X \pm \sigma$ )**

Group	Sex	R-R <sub>1</sub> s	P-Q s	Q-T s	P <sub>2</sub> mv	T <sub>3</sub> mv	RV <sub>1</sub> +SV <sub>6</sub> mv	SV <sub>1</sub> +RV <sub>5</sub> mv	KS/d units
Not engaged in jogging	M	0,83	0,15	0,36	0,08	0,14	7,20	27,30	3,79
		0,03	0,01	0,01	0,00	0,01	0,62	1,60	0,26
	F	0,69	0,15	0,34	0,07	0,11	4,90	25,10	5,12
		0,01	0,00	0,00	0,00	0,00	0,25	2,06	0,17
Jogging for 1 year	M	0,85	0,16	0,36	0,09	0,14	7,27	26,90	3,70
		0,06	0,00	0,01	0,00	0,01	0,44	1,75	0,37
	F	0,71	0,13	0,34	0,06	0,10	5,30	24,20	4,57
		0,02	0,00	0,01	0,00	0,00	0,50	1,68	0,61
Jogging for 2 years and more	M	0,93	0,15	0,39	0,09	0,17	8,83	25,00	2,83
		0,05	0,01	0,01	0,00	0,01	0,87	1,69	0,19
	F	0,73	0,14	0,34	0,07	0,11	5,30	24,20	4,57
		0,02	0,00	0,01	0,00	0,01	0,50	0,68	0,53
Jogging for 5 years and more	M	0,96	0,16	0,39	0,08	0,18	8,90	28,27	3,18
		0,03	0,08	0,01	0,01	0,01	0,63	1,69	0,31
	F	0,91	0,14	0,38	0,07	0,13	9,90	30,10	3,04
		0,01	0,01	0,01	0,00	0,03	2,19	2,12.	0,30

"Left" index had a tendency to lower values at women, but the difference was not significant due to the large value of the standard deviation. Only for women who are engaged in jogging it was significantly ( $p < 0.05$ ) higher than for men.

To determine the correlation between the right and left biopotentials of ventricular we found K S/d coefficient, which is a result of "left" index on the "right" variables cleavage. Normative values of K S/d will be specified by us, however, a tendency for students with different jogging training seniority unidirectional: at women's this coefficient significantly reduces with jogging training seniority increasing. Only those who have training seniority more than 5 years K S/d was significantly lower due to increase of the "right" S-L index.

**Conclusion.** It is established that jogging lead to an absolute increase of biopotentials of right and decrease potential of left ventricles, which S/d coefficient dynamic confirms. Only at 5 and more years of training seniority significantly, to the limit of bradycardia, increase cardiocycles and significantly K S/d reduces. It turns out that cardiointervals and amplitude biopotentials right ventricle are most sensitive to jogging exertions. Other ECG indicators to a lesser extent change under the influence of jogging training.

**References:**

1. Amosov N. M. Entsiklopediya Amosova. Algoritmy zdorovya [Encyclopedia Amosov. The algorithms of health], Moscow; Donetsk, 2002, 12 p. (rus)
2. Apanasenko G. L. Zerkalo nedeli [Mirror of the Week], 2008, vol. 41 (720), p. 8. (rus)
3. Blagy O. Teoriya i Metodika Fizicheskogo Vospitaniya [Theory and methodology of Physical education], vol. 4, 2006, pp. 8–11. (ukr)
4. Bushuev Yu. V. Rven fzichnogo zdorov'ya studentv yak kliniko-fzologchna osnova fzichnogo vikhovannya u vuz: avtoref dis. kand. med. nauk [The level of physical health of students as clinical and physiological basis of physical education in high school: Authors thesis], Dniproptrovsk, 2007, 21 p. (ukr)
5. Dovganik M. S. Fzologchni mekhanizmi vplivu ozdorovchogo bgu na rozumovu ta fzichnu pratsezdatsn studentv – medikov: avtoref. dis. na zdobut. nauk. stup. kand. biolog. nauk [Physiological mechanisms of action of jogging on mental and physical performance students – doctors: Authors thesis], Lviv, 1994, 24 p. (ukr)
6. Kosinskiy E. O., Andrychuk Yu. M., Khodnov V. M., Ermakov S. S. Pedagogka, psikhologiya ta mediko-biologichni problemi fzichnogo vikhovannya sportu [Pedagogics, psychology, medical-biological problems of physical education and sport], Kharkiv, 2010, vol. 5, pp. 97–100. (ukr)
7. Platonov V. N. Sportivnaya meditsina [Sportyvnaya medicine], 2006, vol. 2, pp. 3–14. (rus)
8. Chertanovsky P. M., Ermakov S. S. Pedagogka, psikhologiya ta mediko-biologichni problemi fzichnogo vikhovannya sportu [Pedagogics, psychology, medical-biological problems of physical education and sport], Kharkiv, 2012, vol. 2, pp. 128–131. (ukr)
9. Khristovaya T. Ye. Slobozhans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkiv, 2013, vol. 1, pp. 74–78. (rus)
10. Wilmore J. H., Costill D. L. Physiology of sport and exercise. – Champaign, Illinois: Human Kinetics, 2004. – 726 p.

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## **FEATURES AND PERFORMANCE TECHNIQUES AIMING FLEXIBILITY OF YOUNG GYMNASTS 6–7 YEARS**

**Abstract. Goal:** to educe efficiency of the offered complex of physical exercises for development of flexibility for girls 6–7 years. **Material and methods:** the research was conducted in three stages on the basis of the sports school of the city of Zaporozhia, in the period from September 2013 and February 2014. The experiment was conducted with two groups of gymnastics (young gymnasts 2006 and 2007 years of birth). Evaluation of the results was the General methods of testing its flexibility. **Results:** based on the analysis of the special literature was developed directed development of flexible gymnasts aged 6–7 years at the initial stage of preparation and proved its efficiency. **Conclusions:** the offered technique for the development of flexible gymnasts 6–7 years is effective. Peculiarity of the method is to use two sets of exercises (the first – at the end of the preparatory training, the second – in the beginning of the main part), which are springy flexion-extension, machi, static electricity, and even to overcome resistance exercises (with a partner) and at the gym. The results of the study allow to recommend a system developed to promote flexibility in gymnastics for practical use at the initial stage of preparation.

**Keywords:** functional preparedness, preparatory stage, diagnostics, system of energy supply, sporting specialization.

**Introduction.** The level of the sportsmanship in the artistic gymnastics and many other kinds of sports such as athletics, football, high board diving etc. is measured mostly by flexibility. The lack of flexibility makes the process of mastering movements harder and slower, limits the strength, speed and coordination capabilities displaying, reduces operating economy, enhance the likelihood of the motor apparatus injuries.

Nowadays the modern sport features are its vast rejuvenation and sport achievements increase. The breeding of First Class sportsmen and stable longstanding training is a difficult process the success of which is based on different factors. One of them is the development of flexibility and finding effective ways, instruments and techniques for achieving the highest performance within the minimum time interval [1].

Purposefully the development of flexibility must start since 6–7 years. The development of this feature of the 9–14 year old children is almost twice as much effective than senior pupils. It is specified that the vast flexibility increase can be

achieved by the stretcher exercises (25–50 repetitions according to the individual characteristics of the sportsmen) twice a day every day during 1-2 months [4; 9]. The biggest move ability increase occurs with the average load of movements during stretch. At the same time taking into account muscle fatigability it is reasonable to include some exercises that improve passive flexibility to the final part.

The effect of the integrated stretch exercises is provided by both internal and external forces. There can be different variants of active and passive movements interchange during their performance. For example, slow rising the leg to the front, standing by the pylon with the help of the partner slowing it down in the highest point for 3–4 sec. with the following back swing. Back and forth leg swings standing by the pylon with the following slowing it down at the back-and-forth position in the highest point [11; 5].

Depending on the solving tasks, stretching pattern, age, sex, physical conditioning, joints organization, pressure dosage can be widely varied. This method has different variants: the method of repeated and dynamic exercises the method of repeated static exercises. Both active and passive muscular straining can be used in these cases. As traditional techniques not always provide us with the needed development of flexibility, other techniques aiming the increase of the physical conditioning level are created. Among these is the applying to the exercises that influence the muscle along the full length. [8; 13]

The balance of the used techniques for the flexibility development is being changed during the training process. At the first stage of the preparatory phase mostly the passive joint flexibility is noticed, at the second stage active flexibility is noticed, contest season is characterized by both active and passive flexibility. In the process of training flexibility it is also important to take into account that joint flexibility can widely vary depending on different environmental conditions and body state [2].

The main technique in the development of flexibility is a repeated technique. As the main task of flexibility developing exercises is the achievement of the maximal motion amplitude it is necessary to take into account the sort of the exercise, the amount of repetitions, the interval the relaxation period interval between exercises etc.

The development of passive flexibility increases active flexibility; this is the phenomenon of the so called “transfer” of flexibility. However, it is absent in a backward direction: the development of active flexibility has almost no influence on the passiveness increase [14]. The work on the development of joint flexibility must precede the strength training and afterwards they are to be carried out at the same time [12].

One of the main principles of the flexibility development is the necessary muscles warming-up. Motions that are stretching muscles must be performed with the maximal amplitude, avoiding abrupt movements. Only final movements can be performed abruptly as the muscles have already adapted to stretching. Finishing the stretching it is reasonable to do warming-up exercises that promote muscles relaxation. After that one should relax tight muscles and have a passive rest with no motion [10].

Therefore a great number of researches are devoted to the development of flexibility in gymnastics. However, we have to mention that the suggested flexibility development techniques are based on the general methodological techniques and do not consider age peculiarities of girls in full measure.

The research is carried out according to the Scientific Research Plan of Zaporizhia State University.

**Goal of the research:** to prove the efficiency of the offered physical exercises for flexibility development for girls of 6–7 years.

**Tasks of the research:**

1. To define modern and effective techniques for the flexibility development of young girls, age 6–7.

2. Basing on the professional literature, to develop the complex of special exercises adapted for young gymnast, age 6–7, for the development of their flexibility.

3. To estimate the effectiveness of the special exercises for the flexibility development by the comparative analyses of the initial and final flexibility index.

**Materials and Methods of the research:** the research was conducted on the basis of the Zaporizhia Sports School No. 5, in the period from September 2013 and February 2014. The experiment was conducted with two groups of gymnastics (young gymnasts 2006 and 2007 years of birth) that train the second year in the junior group with regulations of the trainings 8 hours per week. According to the medical examination data all the girls refer to the main group and are of approximately the same level of physical conditioning and physical development. One of the main objectives of this stage is the establishment of the correct posture and the gymnastic manner of the exercises execution.

The control group was training according to the Sport School program. The experimental group was training according to the worked out complex of special exercises that are aiming the development of flexibility. The experiment was based on the Technique of the Flexibility Development in Gymnastics by I.A. Viner [3]. Zaporizhia Sports School No. 5 uses the test and examination collection for special physical training according to the Educational Program of schools for children and young people. All the materials obtained during the Research conducting have been processed with Statistics package Microsoft Excel.

**Results of the research and its' discussions.** The characteristic features of the suggested technique is to use two sets of exercises: one of them is to be used at the end of the preparatory part of the training, the other one is for using it at the beginning of the main part. The exercises are the following: springy bend and unbend, swings, static strains, overcoming resistance in pair exercises (with a partner) and with training equipment.

Springy bends and unbends were performed by series of 3–5 rhythmical repetitions in succession with the ever increasing amplitude. Springy performance exercise makes the amplitude increasing easier and helps to reach its highest point. Swings were performed as one-off and repeated motions. Using the inertia of motions lets increase their effectiveness. Resistance exercises were used first of all to increase

the amplitude with the help of inertial motions; they were also used for the creation of the strain muscle stretch effect. However, the resistance must be used very carefully, especially in case when exercises are done quickly. Static strain exercises are characterized by a fixed pose. In this case muscles are in the stretching position for 5–10 minutes. In the process of flexibility development passive exercises with the help of the partner were also applied.

The evaluation of flexibility level was carried out with the help of mobility exercises such as cross split, crab position, front bows standing on the bench, hand backswings with a wand.

At the beginning of the experiment during the flexibility testing the sportsmen of the control and experimental groups demonstrated almost the same results (table). Using the grading system by Holodov, Kuznetsov these results can be graded as “good”. Then, after three months training according to the developed complex of exercises another evaluation of flexibility was held (tab).

#### Results of flexibility development evaluation (M±m)

Test	Stage of the Research			
	The beginning		The end	
	Control group	Experimental group	Control group (improvements, %)	Experimental group (improvements, %)
hand backswings with a wand, sm	38,81±1,8	39,55±0,67	37,9±1,7 (2,3)	37,57±0,56 (5,0)
cross split, sm	12,93±2,5	13,1±0,75	12,28±2,5 (5,0)	11,52±0,6 (12,1)
crab position, sm	22,12±1,7	20,42±0,8	21,15±1,5 (4,4)	17,80±0,7** (12,8)
front bows standing on the bench, sm	7,0±1,2	7,34±0,8	7,22±0,57 (3,1)	8,38±0,5** (14,2)

**Note.** \* – valid to basic data ( $P < 0,05$ ) ( $t_{cp} = 2,0$ ); \*\* – valid to the control group ( $P < 0,05$ ).

Hand backswings with a wand testing demonstrates the improvement of the flexibility index of the girls from the control group in 2, 3%; the flexibility index of the girls from the experimental group has improved in 5%.

Cross split testing demonstrates the improvement of the flexibility index of the girls from the control group in 4, 8%; the flexibility index of the girls from the experimental group has improved in 15%.

Crab position testing demonstrates the improvement of the flexibility index of the girls from the control group in 4, 4%; the flexibility index of the girls from the experimental group has improved in 12%.

Front bows standing on the bench testing demonstrates the improvement of the flexibility index of the girls from the control group in 3, 4%; the flexibility index of the girls from the experimental group has improved in 14%.



After the end of the experiment the average flexibility development data in experimental group increased much more than those in the control group.

**Conclusion:**

1. Scientific and methodical literature analyses and personal experiment at the physical development of young gymnasts demonstrates the importance and necessity of the responsible attitude to the flexibility development.

2. According to the special literature analyses there was developed a technique of directed flexibility development of young gymnasts, age 6–7, at the initial stage of trainings.

3. The suggested technique of the flexibility development of young gymnasts, age 6–7, is effective. Its characteristic feature is the usage of two complexes of exercises: the first is applied at the end of the preparation stage of trainings; the second one is performed at the beginning of the main stage. The exercises are the following: springy bend and unbend, swings, static strains, overcoming resistance in pair exercises (with a partner) and with training equipment.

**Prospects for further researches.** Further researches are to be conducted in the direction of studying other questions connected with special training of gymnasts at training and competitive process.

**References:**

1. Alter M. Dzh. Nauka o gibkosti [Science of flexibility], Kyiv, 2001, 420 p. (rus)
2. Arshavskiy I. A. Fiziologicheskiye mekhanizmy i zakonomernosti individualnogo razvitiya [Physiological mechanisms and patterns of individual development], Moscow, 2001, 285 p. (rus)
3. Voynarovska G. A. Slobozhanskiy naukovo-sportivniy vsnik [Slobozhanskiy scientific sports Herald], Kharkv, 2011, vol. 4, P. 54–58. 9 (ukr)
4. Volkov V. M. Sportivnyy otbor [Sports selection], Moscow, 2003, 170 p. (rus)
5. Getmantsev S. V. Slobozhanskiy naukovo-sportivniy visnyk [Slobozhanskiy scientific sports Herald], Kharkv, 2010, vol. 3, P. 58–62. (rus)
6. Donskoy D. Dvizheniya sportsmena: ocherki po biomekhanike sporta [Movement athlete: Essays on the biomechanics of sport], Moscow, 2005, 197 p. (rus)
7. Dubrovskiy V. I., Fedorova V. N. Biomekhanika [Biomechanics], Moscow, 2003, 672 p. (rus)
8. Kolodnitskiy G. A. Vneurochnaya deyatel'nost uchashchikhsya. Gimnastika [extracurricular activities of students Gymnastics], Moscow, 2011, 93 p. (rus)
9. Korenberg V. B. Osnovy kachestvennogo biomekhanicheskogo analiza [Basics of qualitative biomechanical analysis], 2001, 208 p. (rus)
10. Menkhin Yu. V., Menkhin A. V. Kombinirovannyye i kompleksnyye uprazhneniya [Combined and integrated exercises], Malakhovka, 1999, 64 p. (rus)
11. Ozolin N. G. Nastol'naya kniga trenera: nauka pobezhdat [Handbook coach: winning science], Moscow, 2002, 45 p. (rus)
12. Sergiyenko L. P. Slobozhanskiy naukovo-sportivniy vsnik [Slobozhanskiy scientific sports Herald], Kharkv, 2012, vol 2, P. 137–146. (rus)
13. Reshetnikov N. V., Kislitsyn Yu. V. Fizicheskaya kultura [Physical Education], Moscow, 2000, 110 p. (rus)
14. Shamardina G. N. Osnovy teorii i metodiki fizicheskogo vospitaniya [Fundamentals of the theory and methodology of physical education], Dnepropetrovsk, 2003, P. 285–301.

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**FEDYNYAK N.***Vasyl Stefanyk precarpathian national university***ANTI-AGING PROGRAM FOR MEN AND WOMEN  
OF 50–60 YEARS OLD**

**Abstract. Objective:** *To develop a program for slowing the aging process of people 50–60 years old. Material:* *program used to develop modern scientific works of leading domestic and foreign scholars. Results:* *The results of a comprehensive development the program of anti-aging for men and women 50–60 years old who has four components. The first component involves the use of morning hygienic gymnastics for 15–20 minutes every day. The second component includes its own navigation system with a block building sessions for differential effects on the body. The third component involves the use of stretching as a means of improving the flexibility and mobility of joints. The fourth part contains information on mastering the skills of self-control and self- organization of active longevity. Conclusions:* *The proposed program integrates modern scientific research on physical education and human aging.*

**Keywords:** *aging, biological age, anti-aging, swimming.*

**Introduction.** The problem of aging of the population taking into account its social consequences gets the increasing point [1; 2; 5; 17; 21]. In the conditions of aging of the population the problem of long preservation of working capacity and health of workings gets a special value, providing with their work which answers a profession, age-related and functional capabilities [3]. Biologists are sure that the approach of an old age can be delayed considerably [15]. The aging of an organism begins still when tissues and bodies start functioning normally, but cellular processes which are responsible for the counteraction to an organism of negative factor of an environment, don't manage with their work [15].

In the nineties the XX century a new section of medical science arose and began to develop promptly– anti-aging (anti-aging, anti-consenescence, anti- age-related medicine) [7]. In 1993 the group of the American doctors under the leadership of Ronald Klatts and Robert Goldmen forever changed a view of possibilities of medicine, especially preventive. They offered this latest theory of continuation of youth – anti-aging medicine – a new model of medical care which is considered as medical prevention of aging in Europe [7].

Anti-aging is a qualitatively new field of knowledge about the continuation of human life, directed on putting culture of a healthy lifestyle for the preservation of health and active longevity. The essence of anti-aging consists in that each person found the individual solution for him how he should remain healthy, despite of the age [7].

Nowadays there are many practical directions which are connected with medical and social care for the prevention of the presentation of a human body. But the main role belongs to classes by physical exercises [15]. We suggest to consider a complex anti-aging program as a kind of physical activity for people of 50–60 years old which includes: improving swimming, morning hygienic gymnastics, independent classes and stretching.

Against positive changes which happen thanks to classes by physical culture, our program is directed on the integration of these positive changes and their display at biological age of a person – as to one of the most informative indicators of a real condition of functionality of physiologic systems and adaptation opportunities of an organism. And also integrate the concept anti-aging into the plane of science of physical training.

**The aim of the research.** To develop the anti-aging program for men and women of 50-60 years old.

**The material and research methods:** analysis of scientifically methodical and special literature, modern scientific works of leading native and foreign scientists.

**Results of the research and their discussion.** The anti-aging program consists of three stages: preparatory – adaptive, training and supporting (tab. 1).

Table 1

**Stages of the anti-aging program for men and women of 50-60 years old**

№	Forms of classes	Means	Dispensing
Preparatory – adaptive stage (2 months)			
1	MHG	General-developing exercises. Respiratory exercises	Daily 10–15'
2	Swimming	Swimming by different ways with the use of block creation of classes	3 times for a week 35–40'
3	Stretching	Exercises directed on the improvement of flexibility and the development of mobility in joints.	3 times for a week 7–12'
4	Independent classes	Mastering special motor skills adapted for life conditions	daily
Training stage (5 months)			
1	MHG	General-developing exercises. Respiratory exercises	Daily 15–20'
2	Swimming	Swimming by different ways with the use of block creation of classes	3 times for a week 40–45'
3	Stretching	Exercises directed on the improvement of flexibility and the development of mobility in joints. Exercises with weighting	3 times for a week 12–15'
4	Independent classes	Special exercises with compliance of special motor procedure	daily
Supporting stage (3 months)			
1	MHG	General-developing exercises. Respiratory exercises	Daily 10–15'
2	Swimming	Swimming by different ways with the use of block creation of classes	2 times for a week 40–45'
3	Stretching	Exercises directed on support and improvement of the achieved flexibility.	2 times for a week 12–15'
4	Independent classes	Compliance of rules of motor procedure	daily

Each stage of the program includes: morning hygienic gymnastics (MHG) (general – developing exercises, respiratory exercises), swimming (the existence of special blocks for the purpose of complex influence on an organism), stretching (exercises for the increase of a tone of muscles, exercises for the development of flexibility and traumatism prevention) and independent classes.

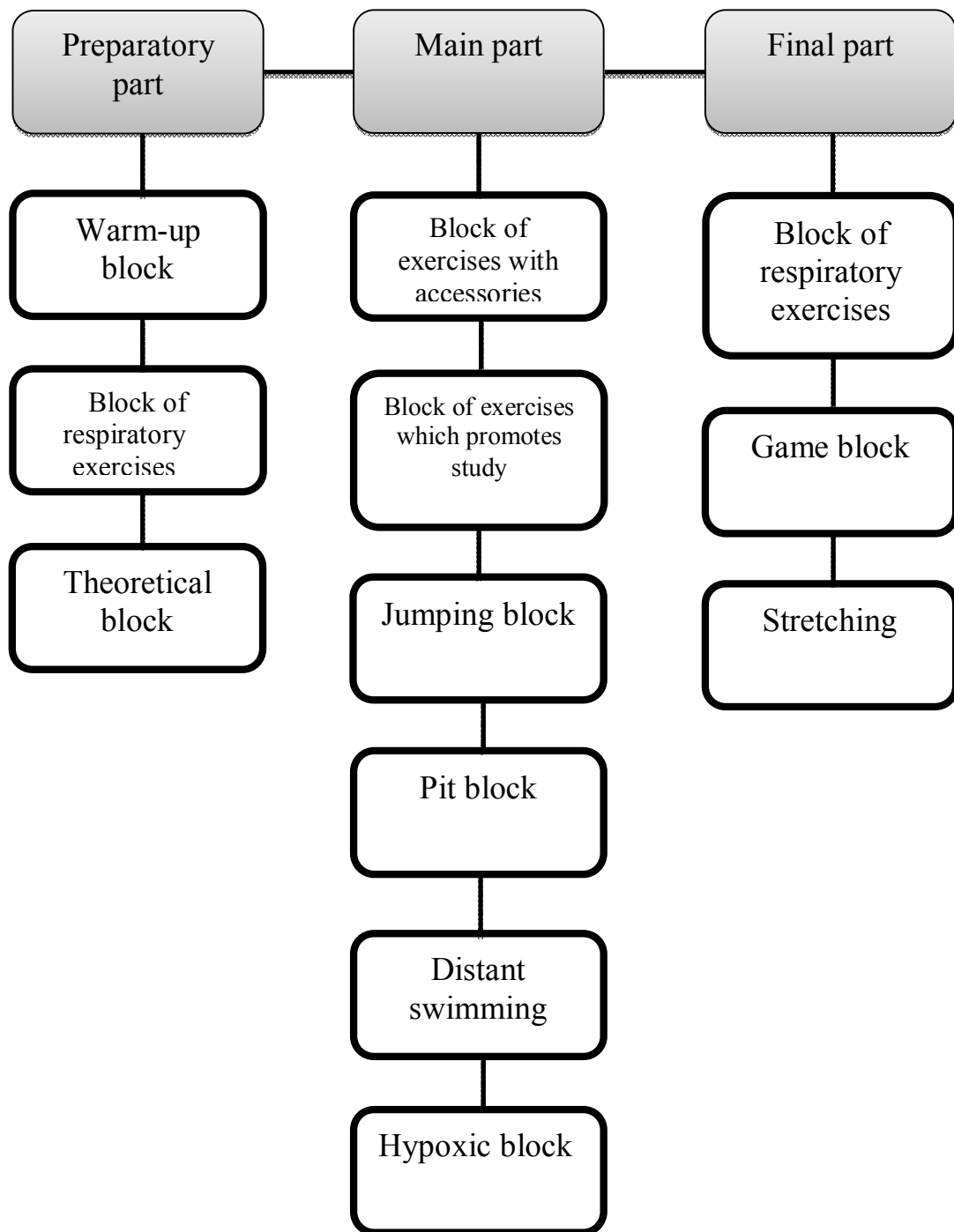
The preparatory – adaptive stage of the program lasts two months, against the threshold and the average intensity of loadings. Its main tasks are: the overcoming of hydrophobia and mastering or improvement of method of the main ways of swimming; the adaptation of cardiovascular and respiratory systems to physical activities; the decrease in psychological intensity and the creation of optimistic mood; the development of physical qualities; the tempering of organism.

The second stage – is the training stage, it lasts five months. It answers the average and peak intensity of loadings. The task of this stage: the increase of the level of functioning of physiologic systems of organism; the improvement of adaptation opportunities of organism; the improvement of a functional condition of cardiovascular and respiratory systems; the development of flexibility in all muscular groups; the unloading of a backbone and the increase in volume of movements in vertebral segments; the subsequent development of physical qualities.

The third stage – is supporting stage, it lasts for three months. Classes are carried out with the average intensity. Main tasks to this stage: the subsequent expansion of physical activity and preservation of the reached level of physical working capacity; the increase of power endurance of muscles of all body; the increase of the general endurance; the correction of a psychic-emotional state; the operating time of habits to a healthy lifestyle.

**Morning hygienic gymnastics (MHG).** It is carried out daily, for 15–20 minutes, in the morning till breakfast. The corresponding reaction of organism to physical exercises which join in complexes of hygienic gymnastics, depends on nervous system. The technique of carrying out MHG provides the application of simple exercises in a form with gradual inclusion in work of all main muscular groups and joints. All gymnastic exercises are carried out at slow and average speed, with gradually growing amplitude of movements, with attraction to work by different muscular groups.

**Swimming.** The structure of classes on swimming provides the existence of specialized blocks which give the chance to carry out the selective influence on different physiologic systems and parties of readiness of people of 50–60 years old (pic. 1).



**Pic. 1. The structure and the content of classes on swimming for persons of 50–60 years old**

The preparatory part of classes consists of the warm-up block, the block of respiratory exercises and the theoretical block. The main part consists of the block of exercises with accessories, the block of exercises which promote study of swimming, the jumping block, the pit block, distant swimming, the hypoxic block. The final part of classes consists of the block of respiratory exercises, the game block, stretching.

The anti-aging program is intended for persons of 50–60 years old. The optimum distance is limited by basic provisions of "Rules of improving swimming" which are offered both for men, and for women. The recommended optimum

dispensing of improving swimming by the rules is especially approximate and can be smaller or bigger, depending on individual opportunities of a person. For the purpose of more exact control of loading on indicators of the maximum, peak and threshold HR, formulas are offered:

$$HR_{max}=220 - \text{age (years old)}$$

$$\text{Lower limit of HR}=(220 - \text{age (years old)}) \times 0,6$$

$$\text{Top limit of HR}=(220 - \text{age (years old)}) \times 0,75$$

Training in this range, according to many authors, has the maximum improving effect [17].

**Stretching.** Stretching is a system of exercises directed on the improvement of flexibility and the development of mobility in joints [11; 22].

The purpose of classes of stretching is an achievement of physiologic feature of stretching – mistatic reflex at which in the stretched muscle there is a reduction of fibers. As a result, exchange processes amplify in a muscle, the high vitality is provided. Therefore stretching can be considered as a mean of the increase of working capacity and traumatism prevention [1; 2; 4; 11].

For the definition of the biological age and the rate of aging of an organism the methods of V. P. Voitenko (2001) and L. M. Belozeroва were used.

*Method of V. P. Voitenko* turns on "the battery of tests" of different degree of the complexity. The logical scheme of estimates of aging includes at itself the following stages.

1. The biological age (BA) was measured for a certain individual (behind clinic-physiologic indicators). For the definition of BA the following formulas were used:

– men:

$$BA = 44,3 + 0,68 \times VAH + 0,40 \times SAP - 0,22 \times DAP - 0,004 \times VCL - 0,11 \times DBB + 0,08 \times DBExh - 0,13 \times SB$$

- women:

$$BA = 17,4 + 0,82 \times VAH + 0,005 \times SAP + 0,016 \times DAP + 0,35 \times PAP - 0,004 \times VCL + 0,04 \times DBB - 0,06 \times DBExh - 0,11 \times SB,$$

where VAH is a value assessment of health (it is decided with the help of the questionnaire which contains 29 questions);

SAP – systolic arterial pressure, mm of mercury;

DAP, – diastolic arterial pressure, mm of mercury;

PAP – pulse arterial pressure, mm of mercury;

VCL – vital capacity of lungs, ml;

DBB – duration of a delay of breath after a deep breath, s;

DBExh – duration of a delay of breath after the maximum exhalation;

SB – static balancing, s.

2. The appropriate biological age (ABA) was counted of the individual (behind his calendar age). For the definition of ABA formulas were used:

– men:

$$ABA = 0,661 \times CA + 16,9$$

where CA – calendar age of the investigated.

– women:

$$ABA = 0,629 \times CA + 5,3$$

where CA – calendar age of the investigated.

3. The comparison of the biological age of the individual to his due biological age defines on how many years the investigated advances or lags behind the age-mates behind the rates of aging (tab. 2).

*Table 2*  
**Assessment of rates of ageing**

Level	Difference, years	Rates of ageing
I	from 15 till 9	sharply slowed down
II	from 8,9 till 3	slowed down
III	from 2,9 till +2,9	BA answers CA
IV	from +3 till +8,9	accelerated
V	from +9 till +15	sharply accelerated

The I level answers sharply slowed down rate of aging, and the V sharply accelerated; the level displays the relative compliance of BA and CA. People who have the IV and the V levels behind the rate of aging need to be carried to the contingent menacing on a state of health.

To learn the extent of aging in what measure answers the calendar age of the investigated, it is necessary to compare individual size of BA from ABA which characterizes the population standard of the age wear. The index of BA / ABA, displays in how many times the BA of investigated is more or less, than the middle biological age of his age-mates. Having calculated an index of (BA-ABA) it is possible to learn on how many years the investigated advances the age-mates behind the expressiveness of aging or lags behind them.

If the extent of aging of the investigated is less than the extent of aging (average) of people of identical with it CA,  $BA/ABA < 1$ , and  $BA-ABA < 0$ . If the extent of aging of the investigated and his age-mates are identical,  $BA/ABA = 1$ , and  $BA-ABA = 0$ .

The method of L. M. Belozeroва is behind anthropometry indicators. The scheme of estimation of aging includes at itself the following formulas:

– men:

$$BA = 82,0902 + 0,039 \times BW - 0,7726 \times ET - 0,0097 \times VCL - 0,2332 \times DR - 0,1761 \times DL$$

- women:

$$BA = 81,6929 + 0,199 \times BW - 1,6901 \times ET - 0,0092 \times VCL + 0,133 \times DR - 0,6078 \times DL,$$



where BW is a body weight, kg;  
 ET – excursion of a thorax, sm;  
 VCL – the vital capacity of lungs, ml;  
 DR – dynamometry of the right brush, kg;  
 DL – dynamometry of the left brush, kg.

For the calculation of the corresponding biological age the following formulas developed by the author were used:

– men:

$$ABA = 20,3629 + 0,5959 \times CA,$$

where CA – calendar age of the investigated.

– women:

$$ABA = 30,9847 + 0,4122 \times CA,$$

where CA – calendar age of the investigated.

### Conclusions.

1. The developed program of the prevention of presenilation includes four components: morning hygienic gymnastics, swimming, stretching and independent classes.

2. Classes on swimming provide the existence of specialized blocks which will give the chance to carry out the selective influence on different physiologic systems and the parties of readiness of an organism.

3. The offered anti-aging program is focused on men and women of 50-60 years old with the accelerated aging of an organism.

**In the subsequent researches** the experimental verification of the anti-aging program will be carried out for men and women of 50–60 year old.

### References:

1. Bletska V. V., Bondarenko . B., Danlchenko Yu. V. Vsnik Chernyvs'kogo natsionalnogo pedagogichnogo universitetu [Journal of Chernihiv National Pedagogical University], 2012, vol. 3, iss. 98, p. 36–40.
2. Brusnik T. A. Nauchno-teoreticheskiy zhurnal «Uchenyye zapiski» [Theoretically Science-journal "Scientists notes"], 2009, vol. 8, p. 27–31.
3. Bletska V. V. Vdoskonalennya metodiki rozvitku gnuchkost na zanyattyakh stretchingom z zhnkami pershogo zrlogo vku: prats konf., 18–19 kvtnya. 2013 r., T. 2 [Improvement methods for promoting flexibility on stretching exercises for women first mature age], Kyiv, 2013, p. 50–51.
4. Vengerova N. N., Piskun O. Ye., Vozovikov S. A. Naukovo-teoretichniy zhurnal «Uchen zapiski» [Theoretically Science-journal "Scientists notes"], 2009, vol. 4, p. 29–33.
5. Voychishin L. Fzichna reabltatsya uchnv starshogo shklnogo vku grskikh shkl karpatskogo regonu z porushennyami postavi u sagtalny ploshchin : dis. k. fz. vikh : 24.00.03 [Physical rehabilitation of senior high school age mountainous Carpathian region schools with posture in the sagittal plane], vano-Frankvsk, 2012, 271 p.
6. Gasanova ., Nastrugova O. nformatsyno-metodichne vidannya: Zdorov'ya ta fzichna kultura [Information and methodological publications: Health and Physical Education], 2012, vol. 1, p. 17–22.
7. Glushchenko N. V., Malkov M. V. Vsnik zaporz'kogo natsionalnogo universitetu [Journal of Zaporizhzhya National University], 2011, vol. 1, p. 19–24.
8. Glushchenko N. V. Pedagogka, psikhologya ta mediko-bologchni problemi fzichnogo vikhovannya sportu [Pedagogics, Psychology, Medical-Biological Problems of Physical Training and Sports], 2012, vol. 5, p. 41–46.

9. Gorbunov L. Fzichna kultura, fzichne vikhovannya rznikh grup naselennya [Physical culture, physical education of different groups], 2009, vol. 3, p. 55–57.
10. Yermakov S., Kozina Zh., Prusik K., Khakhner-Deregnovskaya M. Pedagogka, psikhologiya ta mediko-bologchni problemi fzichnogo vikhovannya ta sportu [Pedagogics, Psychology, Medical-Biological Problems of Physical Training and Sports], 2011, vol. 9, p. 43–48.
11. Korobeynikov G. Fzichna aktivnost, zdorov'ya sport [], 2010, vol. 2, p. 3–13.
12. Kurko Ya. V. Pedagogka, psikhologiya ta mediko-bologchni problemi fzichnogo vikhovannya sportu [Pedagogics, Psychology, Medical-Biological Problems of Physical Training and Sports], 2011, vol. 6, p. 70–73.
13. Kurko Ya. V. Pedagogka, psikhologiya ta mediko-bologchni problemi fzichnogo vikhovannya sportu [Pedagogics, Psychology, Medical-Biological Problems of Physical Training and Sports], 2011, vol. 12, p. 54–57.
14. Lyakh Yu. E., Vikhovanets Yu. G., T. A. Vikhovanets, Davidova V. R. Obladnannya ta tekhnolog kharchovikh virobnitstv [Equipment and technology of food production], 2011, vol. 27, p. 450–454.
15. Moshkin S. G., Kolpashnikova V. S., Dyakova Ye. Yu. Fizicheskaya kultura, zdavookhraneniye i obrazovaniye [Physical Culture, Education and Health], 2010, vol. 1, p. 48–50.
16. Plyarska . Fzichne vikhovannya, sport kultura zdorov'ya u suchasnomu susplstv: zbrnik naukovikh prats [Physical education, sport and health culture in modern society], 2012, vol. 4, p. 323–326.
17. Semenova N. L., Sukhareva L. V., Stoyka R. V. Lkuvalne ta proflaktichne plavannya pri zakhvoryuvannyakh skolozom [Therapeutic and prophylactic swimming in diseases of scoliosis], Donetsk, 2010, 24 p.
18. Getmanskaya O. N., Gavrilchenko L. V. Pedagogka, psikhologiya ta med.-bol. probl. fz. vikhovannya sportu [Pedagogics, Psychology, Medical-Biological Problems of Physical Training and Sports], 2002, vol. 10, p. 54–64.
19. Nosko M. O., Singovets V. . Pedagogka, psikhologiya ta mediko-bologchni problemi fzichnogo vikhovannya sportu [Pedagogics, Psychology, Medical-Biological Problems of Physical Training and Sports], Kharkv, 2001, p. 11–16.
20. Frolkis V. V. Dolgoletiy: deystvitelnoye i vozmoznoye [Longevity: the actual and potential], Kharkv, 1989, 247 p.
21. Sheyko L. V. Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkv, 2006, vol. 10, p. 34–36.
22. Yarimbash K. Moloda sportivna nauka Ukraini [Young sports science Ukraine], 2007, T. 2, p. 364–367.
23. Robert H. W., Wood J. M., Hondzinski C. M. IEE Evidence of an association among age-related changes in physical, psychomotor and autonomic function. *Age and Ageing*, 2003, Vol. 32, P. 415–421.
24. Sataro G., Hisashi N., Takao K. Hormetic effects of regular exercise in aging: correlation with oxidative stress. *Appl. Physiol. Nutr. Metab*, 2007, Vol. 32, P. 948–953.
25. Stephen B. T. The Impact of Stretching on Sports Injury Risk: A Systematic Review of the Literature // *Medicine and Science in Sport and Exercise* // B. T. Stephen, G. Julie, F. S. Donna. – 2004. – Vol. 36. – P. 371–378.

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**GANT O., GOLYKH R.***Kharkiv State Academy of Physical Culture***CHARACTERISTICS SPEED-STRENGTH AND PSYCHOLOGICAL CHARACTERISTICS OF ADOLESCENTS**

**Abstract. Purpose:** *complex psychological and pedagogical research of speed-power characteristics and psychological features of children of the secondary school age. Material and methods:* *test by V. Abalakov, standing long jump, running in 20 meters, shuttle run, technique «Tables of Schulte», methods of "Diagnostics Speed of Thought", the method of «Self-identity», the method of establishing the probability of deviations (t-Student's criterion). The speed- power of children in the age of 14–15 was studied. The levels of mobility of nervous processes of adolescents were analyzed.. It is found that children 14–15 of age has a weakness of the intensity of attention during the activity. The characteristics of mental health of students of secondary school age are analyzed. Found that mental performance of adolescents is characterized by hyposthenia version of asthenia. Analyzed are the features of personality in adolescence. The characteristics of adolescents with different levels of self- esteem is shown. The differences of self-esteem in boys and girls is established. Conclusions:* *the level of physical development of teenagers is characterized by variability in the speed and strength. In the age of 14–15 the progressive but uneven speed-power capacities, depending on sex, change the weakness of intensity of attention in the process of activity take place; the level of performance is characterized by good psychic entry into action of work, but insufficient mental stability.*

**Keywords:** *identity, self-esteem, teenager, attention, thinking, speed, power.*

**Introduction.** The problem of realization of principle of individual approach, at the mural departmental teaching, continues to remain one of live issues of modern pedagogical science [2; 5]. Under individuality it is accepted understanding the unique internals of concrete man, his both physical and psychic features [9]. Understanding of mental conditions of schoolchildren, and similarly knowledge psychical properties and psychic processes, typical for everyone, concrete child, come forward as one of the constituents of effective realization of the aims set by a teacher [1; 3–7].

The age-related changes in a state of the nervous system of teenagers are developed gradually and have certain specifics, preconditioned by subcortical structures and cortex of large hemispheres. The psycho-physiological features of teenagers are conditioned by main physiological new formation of this stage of ontogenesis which is determined as forming of genitival function. These changes find a reflection in a psyche and conduct of teenager [8–10].

In spite of numerous works, directed to the study of the dominants of development of child age-related, both physical and psychological, practically, unstudied is a problem on conformities to the regularities of forming speed-power features of schoolchildren, taking into account their psychical capacity, that is what stipulates an actuality of our work.

**Research purpose:** complex psychological and pedagogical research of speed-power characteristics and psychological features of children of middle school age.

In accordance with the set purpose the following tasks are to be solved:

1. To conduct the theoretical analysis of development of speed-power skills and psychological features of children of middle school age.
2. To define the indexes of level of development of speed and power skills of schoolchildren of middle school forms.
3. To study the features of forming of the teenagers' personality self-appraisal.
4. To trace the dynamics of psychical capacity and mobility of nervous processes of children of middle school age.

**Material and research methods.** Complex psychological and pedagogical research of speed-power capabilities and psychological features is conducted for thirty schoolchildren 14–15 of age (16 youths, 14 girls). **Research was carried out on the base of Kharkiv general school of – stages № 169.**

For the ground of actuality of theme theoretical methods were used: theory and methodological analysis of problem, comparison and generalization of data. For the study of speed-power skills of schoolboys we used: test of V Abalakov (height of jump), standing jump, run in 20 meters, shuttle run. For determination of level of psychical capacity and dynamic skills of thought we chose the methods of "Tables Shulte" and "Diagnostics of the thought speed ". For the study of features of personality of teenagers methods "Self-appraisal of personality" were applied. The statistical processing of the obtained empiric data was carried out by means of method of establishment of the rejections probability of (by  $t$  – Students criterion).

**Research results and their discussion.** For the study of psychical capacity of schoolchildren 14–15 of age, namely switching, concentration and stability of functions of attention, the methods of "Tables Shulte " were used. Results of research of the productivity of functions of attention of teenagers are presented in table 1.

*Table 1*

**Results of research of functions of arbitrary attention of children of 14–15 years (n=30)**

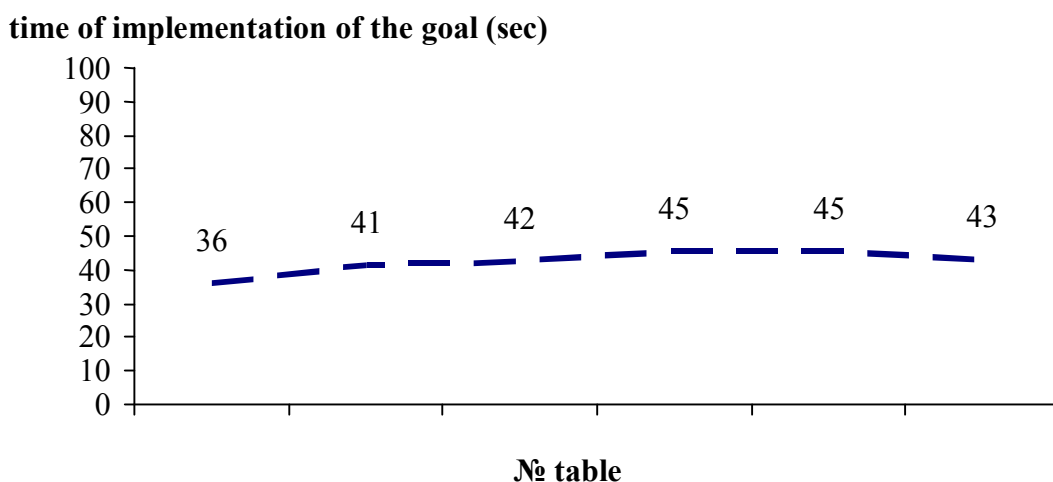
<b>Estimated parameters</b>	<b>Value, sec.</b>
Time, expended in the first table	36,27±2,24
Time, expended in the second table	41,73±3,12
Time, expended in the third table	42,60±2,74
Time, expended in a fourth table	45,61±5,12
Time, expended in a fifth table	43,60±3,69
Efficiency of work	44,15±1,12

According to tab. 1, a rate of execution of tasks in the "tables Shulte" by the inspected teenagers was uneven: middle initial level (36,27±2,24 sec. – time

implementation of task by the first table), and further gradual and steady decline of indexes, without fluctuations towards an improvement. I.e., for examinee schoolboys, there is an increase, in comparison with normative values, the time, necessary for the performance of objective by the "tables Shulte". (In a "norm" of searching for numbers on each table makes – 35–40 p. Thus, the search of numbers must process evenly, or there must be an acceleration of rate of sensomotor reactions during work with subsequent tables). In many cases the increase of general time for teenagers is conditioned by not that they were searching a number slowly, but by separate "casual" delays. That is the inspected named and showed the row of numbers with sufficient speed, and then suddenly they somehow could not find one any number (often declaring that such number in a table is not present at all).

When working with tables an examinee made different errors: skipped separate numbers, the sought simple number was shown in a two-digit number in which it enters as the complement. The uneven rate of the table processing and increase of amount of errors, with every next table, testify to weakness of intensity of attention in the process of work.

On the basis of results obtained by means of methods "Tables Shulte", charts – "Curves of capacity", reflecting kinetics of psychic capacity of teenagers were built (fig. 1).



**Fig. 1. Curve of psychic capacity of children 14-15 of age**

"Curve of psychic capacity" (fig. 1) of children of middle school age on the whole has a type of gradually ascending line, i.e. presented by the hyposthenic variant of asthenia.

By the results of the methods "Tables Shulte" following indexes were similarly estimated: degree of working-in ability and psychical stability (by the method of A. Kozireva). The degree of working-in ability (WA) was calculated by a formula:

$$WA = T1 / ERAS,$$

where T1 – time processing with table 1.

Psychical stability (PS) was calculated by a formula:

$$PS = T4 / ERAS,$$

where T4 – time processing with table 4

Finding presented in table 2.

*Table 2*

**Indexes of psychic stability and degree of working-in ability of children  
14-15 of age (points)**

Estimated parameters	Value
Degree of working-in ability	0,82
Psychic stability	1,03

Index of degree of working-in ability (see table. 2), the examinees were made by  $0,82 < 1,0$ , that means good psychic working-in ability. Index of psychic stability –  $1,03 > 1,0$  testifies to insufficient psychical stability of examinees.

For the study of speed of the power of abstract thought and mobility of nervous processes of teenagers we used methods "Description of quickness of thought". The results are presented in table. 3.

*Table 3*

**Results of research of speed of abstract thought of teenagers**

Description of quickness of thought and mobility of nervous processes	Indexes	Amount of examinees	
		Absolute value	%
Subzero	less than 20 words from 40	12	40,00
Middle	21-30 words	11	36,67
High	31 and more	7	23,33

As shown in table 3, high ability to find correct decisions, in the conditions of deficit of time, took place for 7 teenagers (23,33 %). Such schoolchildren revealed ability to react swiftly on irritants, quickly to calm down after rampage, and also easily pass in a state of excitations or in the moment of excitation quickly to react on commands to brake. Examinees of the middle level of mobility of nervous processes are capable protractedly enough to carry out a productive power of abstract thought; in execution of tasks they were helped by the repeated stimulation by the examiners. Subzero mobility of nervous processes is shown by 12 teenagers (40,00%), that can be explained by both an asthenic syndrome and aspiration of pupil to dodge difficulty, to its overestimation with faith in oneself. In this case adults must help a child in a time to overcome such problem.

The study of speed-power skills of teenagers was carried out by means of standing jump, standing high jump, run in 20 meters and shuttle run (table. 4).

Table 4

**Indexes of power descriptions of children 14-15 of age (cm)**

Indexes	Standing jump		Standing high jump	
	Youths (n=16)	Girls (n=14)	Youths (n=16)	Girls (n=14)
Middle	11,6	9,8	9,5	8,7
High	14,5	12,2	14,1	12,3
Subzero	9,6	6,4	7,6	8,1

The indexes of power characteristics of youths and girls 14–15 of age are presented in a range from subzero to high. That is, the age-related development of different muscular groups takes place unevenly and individually, one can mark gradual, depending on sex change of speed-power capabilities of teenagers.

The results of research of the speed characteristics of girls and youths 14–15 of age are presented in table 5.

Table 5

**Indexes of speed descriptions of children 14-15 of age**

Tasks	Middle indexes		t	P
	Youths (n=16)	Girls (n=14)		
Run in 20 meters (sec.)	2,02±0,27	2,06±0,16	1,02	>0,05
Shuttle run (sec.)	10,24±1,22	11,21±1,74	0,44	>0,05

It is established in researches, that the speed indexes of youths are higher than results of girls, however distinctions are below the degree of meaningful ( $p>0,05$ ). It should be noted, that the highest indexes both girls and youths were approximately at one level.

By the following stage of our work, was the research of personality descriptions of children of middle school age. Results of study of self-appraisal of teenagers are presented in table. 6.

Table 6

**Distribution of teenagers according to the levels of self-appraisal**

Level of self-appraisal	Amount of points	Amount of examinee					
		Youths (n=16)		Girls (n=14)		Total (n=30)	
		Absolute value	%	Absolute value	%	Absolute value	%
Overestimated	from 100 to 90	0	00	4	28,58	4	13,33
High	from 89 to 75	4	25,00	2	14,24	6	20,00
Middle	from 74 to 60	8	50,00	2	14,24	10	33,33
Subzero	less than 60	4	25,00	6	42,87	10	33,33

The high level of self-appraisal was marked for 6 (20,00 %) teenagers. Such children, realizing own significance, as a rule, create themselves the halo of

satisfaction. They are less dependent upon support and approval of surrounding people, as they had learned to stimulate themselves. These teenagers differ in the initiative and enterprise, compel others to lavish attentions on them and get considerable benefits out of it. They are not distressed, when being criticized, and try to correct their errors and does not fear to be rejected, offering the fundamental point of view in one or another issues. They are rather ready to thank for "structural advice". Getting a refuse in something, they do not perceive it as humiliation of the person, seen a reason of happening not in themselves, but in outsiders and try to change external circumstances in a favor side for them, such youths and girls being easily optimists. They can critically estimate not only their acts but also the acts of their surrounding people. They achieve more frequently their set goals and rarely lose.

At 10 examinees (33,33%), the middle level of self-appraisal is observed. This result confirms authentic presentation of examinees about their possibilities, that is the important factor of the personality development of child. The low level of self-appraisal was marked for the 10 (33,33%) participants of research. The understated self-appraisal (underestimation oneself) testifies to extreme trouble in the development of personality, and teenagers with such self-appraisal make a "risk group". Behind a subzero self-appraisal there are two quite different psychological phenomena can be hidden: veritable lack of confidence and "protective", when declaring (to itself) of own lack of ability, absence of aptitude and the like, that leads to make no efforts. 4 teenagers (13,33%) estimated themselves at level from 100 to 90 points; these results testify to the overestimated self-appraisal and unrealistic, uncritical attitude of personality towards own possibilities. The overestimated self-appraisal can confirm personality's immaturity, the lack of ability to estimate correctly the results of one's activity, to compare himself to the others.

### **Conclusions:**

1. A theoretical grounds are carried out under the research and new solution of live task is offered – a study of physical and psychic descriptions of children 14-15 of age, which consists of complex research of speed-power and psychological characteristics of teenagers and devising, on this basis, practical recommendations for the teachers of physical culture.

2. It is established that the level of physical development of teenagers is characterized by variability of speed and power indexes. Children 14-15 of age are characterized by gradual but uneven, depending on sex, changes of speed-power capabilities.

3. It is revealed, that for children of 14–15 years, the weakness of intensity of attention is observed in the process of activity, the curve of psychical capacity of schoolchildren of middle school age is presented by the hyposthenic variant of asthenia. The level of working capacity of the examinees is characterized by good psychical working-in ability, but by insufficient psychic stability.

4. It is established that the children 14-15 of age have different speed of power of abstract thought. More frequent, levels of mobility of nervous processes of teenagers are presented by subzero and middle rate of indexes, that it can be explained by a presence of asthenic syndrome.



5. The self-appraisal of children 14-15 of age are presented in a range from understated to adequate and overestimated. Self-appraisal of youths, characterized by a higher level, greater adequacy as compared to the self-appraisal of girls who are inclined to understate or overstate their characteristics.

6. On the basis of results of complex psychological and pedagogical research of physical and psychic indexes of children in the age of 14–15, the practical recommendations were worked out for the teachers of physical culture, on the account of psychological descriptions of schoolchildren' features in the process of development of speed-power capabilities.

**Prospects of researches: working out** of the development program of speed-power capabilities of the middle school age children taking into account of their psychological features.

**References:**

1. Volkov L. V. Fizicheskiye sposobnosti detey i podrostkov [Physical abilities of children and adolescents], Kyiv, 1981, 215 p. (rus)
2. Guba V. P. Vozrastnyye osnovy formirovaniya sportivnykh umeniy [Age bases of formation of sports skills], Smolensk, 1996, 140 p. (rus)
3. Gant Ye. Ye. Slobozhanskiy naukovo-sportivniy vsnik [Slobozhanskiy scientific sports Herald], Kharkv, 2011, vol. 2, P. 215–218. (ukr)
4. Gant Ye. Ye. Slobozhanskiy naukovo-sportivniy vsnik [Slobozhanskiy scientific sports Herald], Kharkv, 2011, vol. 4, P. 272. (rus)
5. Gant Ye. Ye. Vsnik Kharkvskogo natsionalnogo pedagogchnogo universitetu [Journal of Kharkiv National Pedagogical University], 2011, vol. 41, P. 52–59. (rus)
6. Gant Ye. Ye. Pedagogka, psikhologiya ta med.-bol. problemi fzichnogo vikhovannya [Pedagogy, Psychology and med.-biolog. problems of physical education], Kharkv, 2011, vol. 6, P. 17–21. (rus)
7. Gant Ye. Ye. Materiali mzhnarodnoi naukovo-praktichnoi konferentsi «Kharkvska shkola psikhologi: spadshchina ta suchasna nauka» [Proceedings of the International Scientific Conference «Kharkiv School of Psychology: Heritage and Modern Science»], Kharkv, 2012, P. 57. (ukr)
8. Gant Ye. Ye. Materiali mzhvuzvskoi naukovo-praktichnoi konferentsi «Psikhologo-pedagogchni problemi sportivnoi ta profesynoi dyalnost» [Proceedings of the ground of the scientific-practical conference «Psychological and pedagogical problems of sports and professional activities»], Kharkv, 2013, P. 17. (rus)
9. Merlin V. S. Psikhologiya individualnosti: izbrannyye psikhologicheskiye trudy [Psychology of personality: Selected Psychological Works], Moscow-Voronezh, 2005, 544 p. (rus)
10. Sergiyenko L. P. Slobozhanskiy naukovo-sportivniy vsnik [Slobozhanskiy scientific sports Herald], Kharkv, 2011, vol. 2, P. 101–113. (ukr)

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**GRYBAN G.***Ivan Franko Zhytomyr State University***THE BACKGROUND FOR CREATION OF METHODOLOGICAL SYSTEM  
OF PHYSICAL EDUCATION OF STUDENTS  
OF HIGHER EDUCATIONAL INSTITUTIONS**

**Abstract. Goal:** *the identification of the conditions of physical education functioning in higher educational institutions of Ukraine and the creation of the new methodical system of physical education of students. Material and methods:* *the analysis of literature on psychology and education, the analysis of programs and guiding documents for Physical Education, the realization of the survey of the students of higher education institutions. Results:* *It is established that the system of physical education of students depends on social, economic, spiritual and cultural factors. It shows that physical education is one of the most important subjects in the educational system of Ukraine, which is aimed at providing and implementing educational and recreational potential of future specialist. It is established that the current system of physical education in Ukraine is experiencing a period of the search of strategic decisions of its development and requires the development of new methodical support of such subject as “Physical Education” from the scientists. Conclusions:* *It is proved that the modernization of the methodical system should ensure the transition from traditional educational process to a new one by using modern sports and recreation technologies.*

**Keywords:** *physical education system, methodical system, methodical support, physical education, student.*

**Introduction.** On its way to the independence, Ukraine has faced a great number of difficulties, which negatively influenced all life spheres, such as social, economic, spiritual and cultural ones. Nowadays, the motives of professional activity in both society and physical culture and sports are changing significantly. Frequently, the functions of physical education are directed at rendering services, aimed at realization of full leisure using the recreational activities, healthy lifestyle support, that is they are reaching the social scale.

At the same time, the current system of physical education is experiencing the period of the search of strategic decisions of its development that impels the scientists to the development of new methodical support of such subject as «Physical education», health-saving technologies using recreational activities, which should be notable for innovative approach in the process of preparation of the students for labor activity and viability [5; 7; 8].

The important steps to the reformation of the system of sports and recreation education in Ukraine were made with the adoption of the State national program

«Education. Ukraine of XX century», the laws of Ukraine «Education Law», «On higher education», «On Physical Culture and Sports», the National doctrine of education development, the National doctrine of physical culture and sports development, the Conception of physical education in the educational system of Ukraine and other documents, where the main priorities of the formation of new educational system according to the Target complex program «Physical education is the health of nation» were determined.

The one of such steps is the creation of scientifically based technology of the methodical system of physical education of students. The modernization of methodical system of physical education of students is of great importance for the ensuring the transition from traditional educational process to a new one using modern technologies, oriented to the formation of practical skills and abilities of solicitous attitude to the own health and the health of other people. There are various approaches to the solution of program tasks of the preparation of future specialists in the current system of physical education, but they are declarative and unsystematic, while the success of the introduction of something new is impossible without systematic character and distinct vision of ultimate goal [6, p.64].

The physical education is still one of the quite important subjects in the educational system of Ukraine, which is oriented to providing and implementing the educational and recreational potential of future specialist. However, the complex solution of these tasks is connected with overcoming of certain difficulties, which, first of all, were made in organization and management of physical education of students of higher education institutions, and were caused by the absence of modern methodical system of physical education, poor material and technical facilities and the whole complex of psychological and pedagogical mistakes in organization, conduct and assessment of the effectiveness of educational process of the students.

Inefficiency of the physical education system of the students in Ukraine, first of all, is caused by transference of soviet methodology, means, methods and forms of physical education, which were developed for the State production association complex, as a program and normative base of the physical education system in USSR. In 60–80<sup>th</sup> the SPA complex lost its popularity, led to upward distortions, formalism, and rushed work, inculcation of administration methods, subordination of systematic tasks in physical education to reaching qualifying standards of State production association, and the preparation of a great number of reporting documentation. All these factors led to the decline of the physical education system, and, besides, to the loss of interests and motivation of students [6, p. 114]. During the same time, in USA, Canada, Japan and leading European countries different forms of recreational physical culture grew in popularity [10-13 etc.]. The native recreational physical culture also developed [1; 2; 9 etc.], but state organs turned out not to ready to admit that the SPA complex exhausted its resources and a fundamentally new methodology of the construction of the system of physical education of the students and the whole population is needed.

When examining the personality of a student, following the way of his formation and education with a help of physical education facilities, it is possible to

state that this process consists of stable objective and subjective social qualities, which appear and develop in the course of learning activity, and under the influence of social environment. The dynamics of the interests, motives and concernment of students by physical education facilities during the time of study at higher education institutions shows that no changes in the understanding of its significance for keeping healthy lifestyle, labor and professional activity are observed. That is why future specialists stop their physical exercises after passing final tests or graduation from the higher education institutions.

The one of the main reasons of low effectiveness of physical education in higher education institutions is also that in time of the existing organization of learning process the teachers use the one-person style of management, which is directive and authoritarian by its nature. It is characterized by making all the main decisions as for the organization of physical education process by the teacher himself, without the approval of the students. The activity of the students during the lessons is strictly regulated; the teacher controls and assesses the each student separately. The communication is mainly official, where the protection and authoritative forms predominate [6].

Hereby, the enforcement contributes to the education of the obstinacy, and it makes students unwilling to consider someone's advices and requirements. In case of ignorance of this pedagogical axiom, it is impossible to achieve the positive results in formation of any cultural need, including the physical improvement and increasing the level of motor activity. Such way of the conducting lessons makes students refuse from independence and that level of freedom, which they possess, and act in strict regulation mode. At the same time, the complete subordination always leads to inactivity, and the result of it is the absence of desire to take physical exercises and attend physical culture classes. Such methodics of organization in a greater degree contribute to the estrangement from the physical education. The efficiency of physical education and sports activity is determined not by enforcement and overall regulation, but mainly by the students' understanding of a purpose, tasks, facilities and ways of their achievement, the inner attitude to activity, and the aspiration for taking exercises to the best of their forces and abilities.

**The connection of the research with scientific programs, plans and topics.**

The work was being conducted according to the topic «The theoretical and methodological basis of optimization of the system of physical education of students of higher education institutions of Ukraine» (the state registration number is 0112U001618)

**The goal of the research** is to establish the conditions of physical education functioning in higher education institutions of Ukraine, which will give the opportunity for modernization and creation of new methodical physical education system.

**The tasks of the research:**

1. To conduct the theoretical analysis of such problem as functioning of the operating physical education system of students of higher education institutions of Ukraine.

2. To determine the reasons for the necessity for the modernization of methodical system and the conditions of its functioning in the physical education process.

**The material and methods of the research.** In order to solve the tasks set the literature on psychology and education was researched and analyzed, the analysis of programs and guiding documents for Physical Education and the realization of the survey of the students of higher education institutions were carried out.

**The research results and its' discussion.** The modern students want the teachers to listen to them, take into account their points of view and wishes, but not only to make demands and force the students to fulfill them. The survey showed that the most of the students, beginning from 1990 and until 2013, to one extent or another are dissatisfied with the system of organization, the methods used, and the forms of conducting the lessons, their content and orientation. This, in turn, negatively affects the attitude to the physical education process and taking the physical exercises during the extracurricular time. The more students are dissatisfied with the organization and support of the sporting and mass work and, besides, sports and recreation one in higher education institutions (Table 1).

*Table 1*

**The students' assessment of the organization and support of physical education during the study at higher education institutions, %**

The kind of activity	Subjective assessment	The year of the research									
		1990		2000		2007		2010		2013	
		M	W	M	W	M	W	M	W	M	W
Educational	Satisfied	58,9	53,6	27,4	36,6	39,2	38,1	49,7	44,3	41,7	37,4
	Partially satisfied	34,4	37,1	47,7	46,2	51,0	49,5	44,1	47,4	38,6	42,3
	Dissatisfied	6,7	9,3	24,9	17,2	9,8	12,4	6,2	8,3	19,7	20,3
Sports activity; sports and recreation activity	Satisfied	53,7	46,2	22,1	24,4	31,3	27,7	41,8	36,1	32,5	19,6
	Partially satisfied	40,1	44,5	63,6	55,9	53,4	53,5	48,6	52,5	43,6	38,5
	Dissatisfied	6,2	9,3	14,3	19,7	15,3	18,8	9,6	11,4	23,9	41,9

It is also necessary to draw attention to the outdated theoretical background and the presence of physical education tasks, which have no topicality in the context of higher education, a small volume of purposeful motor activity that requires reconsideration and optimization of the existent propositions, and the development and systematization of means, methods and forms of improvement of physical training components in interrelation with the principle of all-round and harmonious development of the student's personality, the formation of sports and recreative competences [3; 4].

The survey conducted showed that the efficiency of educational process depends largely on the purpose of attendance of physical culture classes by the students. The main purpose of attendance of classes, according to the point of view of 38,3 per cent of students, is health promotion. Moreover, 33,6 per cent attend classes for successful passing of the final physical education test, 33,5 per cent – for

increasing the level of physical efficiency, 19,2 per cent have a desire to become attractive at the expense of taking physical exercises and, unfortunately, only 7,1 per cent of students enjoy the physical education classes (Table 2).

Table 2

**The purpose of attendance of the physical education classes by the students, % (n=647)**

The purpose	Sex	The year of study				Total %
					V	
Health promotion	M	37,1	51,6	37,1	23,5	39,1
	W	41,5	39,3	42,9	30,6	37,9
For successful passing of the final test	M	30,5	31,3	34,3	38,2	32,4
	W	41,5	34,6	43,1	51,8	40,6
Increasing of physical efficiency	M	46,7	42,2	42,9	41,2	44,1
	W	26,8	30,4	39,2	29,4	30,6
Desire to be attractive	M	10,5	15,6	17,1	5,9	12,2
	W	21,9	23,6	23,5	23,5	23,2
The improvement of sports results	M	5,7	26,6	20,0	5,9	13,4
	W	15,9	9,4	9,8	8,2	10,5
Getting enjoyment	M	1,9	15,6	14,3	14,7	9,2
	W	7,3	4,2	3,9	9,4	5,9
Fear of being punished	M	10,5	1,6	5,7	2,9	6,3
	W	3,7	3,7	5,9	4,7	4,2

The formation of value orientations in the field of physical education is possible only in case of directing the students to the opportunity realization of their definite, the most significant needs in this field. The formation of value attitude, and then – humanistic and culturological value orientations, takes place only under such condition.

It is also a matter of concern that the main purpose of attendance of physical education classes of the IV academic year is successful passing of the final test (47,9 per cent), and, regarding women, this indicator is even higher (51,8 per cent). This suggests that the system of sports and recreation education in higher education institutions were not able to foster in half of the students the correct attitude to taking physical exercises and sports, it was not developing positive motives, it just formed the negative attitude to physical education process. Currently, only 10,9 per cent of the students of V academic year enjoy the classes and have strong desire to continue keeping their level of physical development and physical fitness during the lifetime.

The criteria of efficiency and quality of the process of physical education is the good breeding of a student, that is he should possess high spiritual features, based on the inner desire to maintain the state of health, the sufficient level of physical fitness and development, love of physical culture and sports and, besides, the healthy lifestyle. In the process of physical education, the attention of the teachers should be oriented to the transformation of external, real factors to the internal, ideal features of personality, physical health. In order to fulfill this requirement, it is necessary to provide the teachers of physical education with such methodical arsenal, which would motivate the students to motor activity, form the sports and recreation

competency in the present life activity.

There are many factors, which contribute to attraction of students to taking physical exercises and sport, but often they lose their topicality in case when students face certain difficulties and obstacles. The main factors, contributing to the positive attitude of students to physical education classes, are responsibility and discipline, which are the characteristics only of 30,9 per cent of students. Only 27,9 per cent of students attend physical education classes with the aim of getting enjoyment, 21,9 per cent have a positive attitude due to the educational work of a physical education teacher, 10,8 per cent follow the example of their friends, 3,2 per cent – of their parents (Table 3). Rather small number of students (16,8 per cent) aspire to spiritual and physical development, the control on the part of dean's office and physical education department are also the important factors.

*Table 3*

**The factors, which contribute to the positive attitude of students to physical education classes, %, (n=647)**

The factors	Sex	The year of study				Total %
					V	
The responsibility and discipline	M	43,8	34,4	34,2	44,1	39,9
	W	13,4	36,6	19,6	16,4	25,6
Getting enjoyment from taking physical exercises	M	25,7	40,6	42,8	17,6	31,1
	W	18,3	29,3	14,1	28,2	26,2
The teacher of physical education	M	14,3	10,9	22,8	14,7	14,7
	W	28,0	25,6	39,2	17,6	26,2
The harmony of spiritual and physical development	M	16,2	25,0	22,8	11,7	18,9
	W	14,6	14,1	17,6	18,8	15,6
The control on the part of dean's office and physical education department	M	11,4	4,7	20,0	8,8	10,5
	W	17,1	16,7	19,6	23,5	18,6
The availability and accessibility of sports facilities	M	15,2	15,6	17,1	20,5	16,3
	W	6,1	9,9	7,8	5,9	8,1
The friends	M	10,5	21,8	5,7	11,7	13,0
	W	7,3	12,0	11,7	4,7	9,5
The parents	M	3,8	6,2	3,1	2,9	4,2
	W	3,7	3,1	1,9	1,1	2,7

Despite the low level of physical development and physical fitness, defects of students' health, the creation of methodological basis for the construction of methodical system of physical education of students requires the application of systematic and complex approaches to the physical education process. Moreover, it is necessary: 1) to identify the components of a system and find out their content; 2) to give proof of necessity for functioning of each system component; 3) to find out the system forming relations; 4) to disclose the correspondence of the components within the system; 5) to demonstrate the functional existence of a system.

The study of the statement and solving of a problem of research in the theory

and methodics of physical education and pedagogics preceded this, and, on this ground, the basis for the construction of methodical system of physical education of students was created [6]. At the same time, pedagogical conditions of the functioning methodical system of physical education of students require considering the physical educational process as a complex system with a great number of components. The system concept includes various sides of overall educational process: its structure, content, methods of functioning, means of influence, forms of development etc. The methodical system of physical education of students hierarchically forms the part of a single system of higher pedagogical education and is the complete formation, which allows forming in students the special knowledge, essential motor skills and abilities; harmonious development of forms and functions of organism, aimed at all-round improvement of physical talents; strong health. Moreover, it also allows ensuring the creative longevity and educating volitional, spiritual and aesthetic qualities of a personality.

### **The conclusions.**

1. The improvement of a system of physical education of young students should take place in the direction of the development of program, scientific and methodical, normative and legal support, bringing the educational standards into accordance with new requirements and opportunities of society development. The physical education criteria and standards of assessment should be considerably reviewed and grounded. The system of assessment of students in physical education should be supplemented considering the theoretical and methodical aspects and the formation of sports and recreation and educational competences.

2. The activation of physical education process requires the creation of a new methodical system, which is able to find out the regularities of educational activity, to forecast the analysis of the physical education state in every concrete higher education institution, to provide methods, means and forms of teaching, which should correlate with the level of physical and mental development of the students, and with different levels of formation of individual motor qualities, material and technical facilities for classes in order to ensure the performance of tasks set. The modernization of methodical system should ensure the transition from traditional educational process to a new one by using modern sports and recreation technologies.

**The perspectives of further researches** are oriented to the creation of the technology of support of educational process of students with modern methodical systems of physical education.

### **References:**

1. Amosov M. M. Rozdumi pro zdorov'ya [Thinking about Health], Kyiv, 1990, 168 p. (ukr)
2. Baranov V. M. V mire ozdorovitelnoy fizkultury [In the world of improving physical culture], Kyiv, 1987, 134 p. (rus)
3. Volkov V. L. Rozvitok fzichnikh zdbnostey studentv u sistem fzichnoi pdgotovki [Development of faculty students in physical fitness], Kyiv, 2011, 420 p. (ukr)
4. Griban G. P. Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkv, 2013, vol. 5 (38), pp. 78–81. (ukr)



5. Griban G. P. Modulno-reytingova sistema u fzychnomu vikhovann [Module-rating system in physical education], Zhitomir, 2008, 106 p. (ukr)
6. Griban G. P. Fzichne vikhovannya studentv agrarnikh vishchikh navchalnikh zakladv [Physical education students agricultural universities], Zhitomir, 2012, 514 p. (ukr)
7. Zavidvska N. N. Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkv, 2014, vol. 1 (39), pp. 37–42. (ukr)
8. Chukhlantseva N. V., Sokol L. G., Napalkova T. V., Barevka N. L. Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkv, 2013, vol. 4 (37), pp. 107–110. (ukr)
9. Chaykovskiy A. M., Shenkman S. B. Isskustvo byt zdorovym [Art to be healthy], Moscow, 1984, pp. 351–352. (rus)
10. Kaman R. L. Justification of employee fitness programs: cost versus benefit / R. L. Kaman, J. Huckaby // *Fitness in business*, 1988. – Dec. – P. 90–95.
11. Schwartz D. Career wellness II Fitness in business / D. Schwartz. – 1989. – V. 3. – № 4. – P. 138–140.
12. Shore G. Metrofit: a cost-effective fitness program / G. Shore, P. Pracad, M. Zroback // *Fitness in business*. – 1989. – V. 3. – N 4. – P. 147–153.
13. Sullivan R. The unfit room / R. Sullivan // *Sports illus traded*. – 1989. – V. 7. – Nil. – P. 13.

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## HISTORICALLY CONDITIONED FEATURES OF PHYSICAL CULTURE OF THE CRIMEAN TATAR PEOPLE

**Abstract. Purpose:** *The fundamentals of physical culture of the Crimean Tatar people are considered and its features are specified. Material and methods:* the perspective of the research was studied behind the main literary and historical editions, 82 sources are considered. Folk games, dances, types of fight and religious practices are analysed. **Results:** *It is found that the Crimean Tatars had rich experience in application of physical culture, not only in everyday life but also in religious ceremonies. Crimean Tatars used means of physical culture for the formation of physical qualities, strengthening health at national holidays. Conclusions.* *Introduction of physical culture of Crimean Tatars had an educational impact on human dignity. After the deportation to their historical homeland Crimean Tatars have the opportunity to revive the national physical culture.*

**Keywords:** *Crimean Tatars, physical culture, features, deportation, means of physical culture.*

**Introduction:** In the national doctrine of education (in 2002) personal orientation of education, ensuring educational requirements of minority groups, development of ethnoculture, and also formation, cultures of interethnic and interpersonal relations which have historically caused regularities are provided. The question of the organization of physical training among student's youth of the Crimea is actual which part representatives are of the deported people, including the Crimean Tatars.

Considering above-mentioned factors becomes obvious that traditional functions of physical training after the introduction of youth in higher educational institutions have not only to be beyond the formation of physical qualities and the study of motive actions, but also to carry out function of physical development according to ceremonies and the customs inherent in each of ethnoses. Considerably this situation concerns student's youth of the Crimean peninsula which is occupied by representatives of many nationalities among whom the Crimean Tatar population plays a significant role in the formation of culture of Autonomous Republic of Crimea.

The integral part of national physical culture of the Crimean Tatar people is national games, dances, fight and other physical exercises. They are characterized as one of the oldest main assets of physical, social, labor and esthetic training of younger generation. In their set games synthesized elements of folk theater, folk songs, children's types of folklore, labor and military education. Thus, in the

formation of the improving orientation of physical culture of the Crimean Tatar people religious practices, dances and specific means of physical training [6] are of great importance.

The analytical research of scientifically methodical, historical literature found out that almost absent works are directed on studying of historical features of means and methods of Crimean Tatar physical culture.

The work is performed according to the plan of the research work of Crimean Economic Institute of Vadym Hetman Kyiv National Economic University

**The aim of the research:** to define historical features of physical culture of the Crimean Tatar people.

**The research task:** to find features of application of ceremonies, national games, types of fight, dances, as improving factors in the life of the Crimean Tatar people.

**The material and methods of the research.** The perspective of the research was studied behind the main literary and historical editions, 82 sources are considered. The analysis of scientifically methodical literature and historical method of the research were applied.

**Results of the research and their discussion.** During the centuries-old history there was a unique confessional situation in the Crimea, there is a set of religious trends. Islam in the Crimea was proclaimed in 1313–1314 as the state religion which extended on the most part of the population [2].

The Crimean Tatar people worships Islam. Islam orders the implementation of five obligatory daily Mohammedan prayers (prayer), voluntary Mohammedan prayers during a year (Sunna, Nafl) and prayers Taravikh. Soft physical exercises which are carried out during a Mohammedan prayer, improve health, an emotional state and quality of life of who prays. When a person makes small physical efforts as when performing the prayer Taravikh, endurance and strength of mind raise. It was noted that the fivefold daily prayer provides the same physiologic actions (without any undesirable side effect), as jog trot or fast walking [6]. Elderly people who daily carry out a Mohammedan prayer, will cope with insignificant physical activities without a special work. Thus, people of any age find many advantages at physical activity of this sort.

The Crimean Tatar national physical culture is developing a lot of centuries. Traditional national sports and folk games [5] are and remain its basis. Describing the Crimean Tatars, researchers note that they are " strong, courageous and steadfast in a body, have extremely pleasant appearance, dexterous bodies in movements, strong, tireless in works, fearless" [7]. All listed qualities of national character, undoubtedly, were formed by a complete training system of the youth which major elements were ethical and physical education. Traditions, living conditions, public opinions, laws in the Crimea were such that its inhabitants with milk of mother incorporated the high feeling of human dignity. Such men's qualities as courage, physical force, nobility were highly appreciated by the Crimean society [7].

Jumps of horses and camels, fight and hunting were the most favourite entertainments of the Crimean Tatars. Navrez, Derviza were included surely the

national fight kurash, jumps on horses, rope pulling in sports program of national holidays. In these competitions took part both children and adults [6]. Kurash on holidays is carried out since the ancient times. National fight, one of the most worthy sports [8]. The fight at first was used for military and physical training of boys, then as fun, entertainments where it was possible to show force, the will to win. Boys taught methods of national fight, horse jumps, javelin throw from five-years old. It was sacredly carried out in the open air. Each fighter clasps a belt of the opponent for a waist and thus, combats, seeking to defeat him. Boys of 7–8 years old came first to the square, then more senior on the age Kurash fighters fought.

In the past the fight was arranged on the principle «to contact the winner», that is, anyone to test the strength, struggled only with the winner of the previous match. Thus, the Olympic principle adhered: the lost left a tournament. Therefore the strongest fighters entered the fight at a late stage of competitions. The Crimean Tatars paid special attention to the development of methods and kits of sports and mass work which answers household and national features [5].

Single combat "Kara-Kaplan" has a great popularity among the Crimean Tatars. "Kara-Kaplan ("A black tiger")" – other Turkic type of single combat which includes the system of military and physical and ideological education of an ideal soldier [9]. At the heart of Kara-Kaplan style was an inheritance to a tiger. These are noble animals combine big physical force in themselves together with mobility, resourcefulness and confidence, in itself. "Kara-Kaplan" was perfected and supplemented for centuries. The Crimean Tatars inherited this fighting style from ancient ancestors, most likely from Polovtsians. Unfortunately, today we are compelled to speak about the almost total disappearance of Kara-Kaplan style.

As it is known that each people had and has its national games which each person played in the childhood. A lot of games, as well as dances, songs, folklore are very similar, one people borrowed in another, thereby enriching the culture. The majority of games is constructed by means of the imagination. Absolutely absent games with the application of toys. The last circumstance is explained by that Islam forbids to be amused even hardly planned image of a person. That is why Tatar children also don't know a toy, mainly dolls, in that sense as we understand them. All games of Tatar children can be divided into the following groups: ball games, games with stones, games with bones, games with movements (run, jumps), games with a whip, creative games [11].

Studying Crimean Tatar games, we are convinced, how deep the purpose of these would seem childish sports. Boundless fields of the steppe Crimea, mountain pastures of the southern coast, were expanse for children. Nothing complicated them their movements. Run, jumps – basic elements of these games. They were both entertainment, and at the same time physical culture.

A favourite game of children who grazed cattle, was the game "Hello, Hodge Nasredin" in which children having broken into two teams, jumped through "a horse". And ball games are known since the ancient times at many people. In a coastal zone children played games where stones, a shepherd's stick were the main element. "Game with 5 stones", "Shepherd", "Hide-and-see" are the games which

developed at children the lightning reaction, agility. The aim of the game is to catch a stone the back party of a palm, in time to escape aside that on you will not be hooked by a stick, to manage to hide. The shepherdess needed to be caught in time, that who wishes to destroy the mountain which is built by him from stones. The game "Hide-and-see" is known to children of many people. Simple at the first sight game develops the confidence at a child, he can quickly think over where it is better to hide that the leader doesn't find him.

As well as another people, the Crimean Tatars, paid much attention to education of children. Conditions which historically developed, prompted to the people that boys need to be brought up so that they were hardy, transferred any difficulties, danger. Courage, boldness, will, agility were the main streaks of the Crimean Tatar men.

So, for example, "Jeviz oyuni" – ("Game with nuts"). It was played in autumn when nuts ripened. Children gathered nuts in pockets and went to a big platform. They played for two persons. One throws the nuts on the earth, other from the distance of 5-6 steps has to force down them. The nut to what he got, he takes away to himself. If it isn't possible to do it, the game is entered by other player. As we see, this game made agility and accuracy at boys.

Games with belts were very popular. These games are known in the people since the ancient times. The Crimean Tatar children always had the belts made from wool. And children used them as a game element. These games developed the speed of movements, plasticity in the child. As a game element the skullcap was also used. The team game developed mobility, speed, run.

By means of games parents sought to keep and strengthen health of children, to develop beautiful kits of a body, to increase force, speed of movement, to develop accuracy in movements and self-confidence, to add cheerfulness and determination of spirit.

Dances play a large role in education of children. The dance, as well as the song accompanies the person all his life. Each people store its dances, don't allow to forget, pass them from generation to generation. All national holidays, as we know, are accompanied by dances. From the national dance began the harvest festival "Derviza". To the Great Patriotic War the harvest festival Derviza was widely noted in the Crimea. In the territory of the Village Councils the small Derviza was carried out, inhabitants of several villages celebrated the average Derviza, and the big Derviza covered all area. The war, deportation of the Crimean Tatar people and the half-century subsequent stay in the foreign land, led it to the holiday loss. In a hard time of return and people arrangement in the Crimea the Crimean Tatar fund of culture seeks to revive an old holiday. During the holiday singers and dancers, performers of chastushkas participated, art collectives acted. Competitions of national fight, horse races [6] were held. The festival ended with the general dance "Horan" [4].

It is hard to say, which these national dances were in ancient times. But it is possible to list with confidence those that the people carefully kept up to now: "Agir ava be Haytarma" (a slow dance and a fast Haytarma), "Horan" (a round dance),

"Choban oyuni" (a dance of a sheep breeder), "Dzhiyin" (a women's round dance), "Yavluk'oyuni" (a dance with a scarf) [1].

Nnational dances are studied since the childhood. Even, if a girl or a boy in the future also don't become known dancers, everybody are able to dance. The Crimean Tatar national dances are constructed so that at a person the correct breath, the correct physical build, ability to hold a bearing are made since the childhood. If we more fixedly learn art features of dancing movements, we will see that it is some kind of physical exercises. There are a strange reasonableness of composition, dramatic art clearness in samples of national choreography. The Crimean Tatar national choreography is interesting and various. Men's dances which sing bravery, force, military skill, differ remarkable temperament, dynamics, virtuosity of movements. For example, the dance "A sheep breeder oyuni" – "a dance of a sheep breeder", "Yavluk oyuni " – "a dance with a scarf".

In women the case is harmonous and stately. Hands are generally opened in the parties hardly below shoulders, elbows are a little bit bended. Quiet wavy movements of hands ahead of themselves, and also rotary motions of hands "from themselves" are applied. Hands are mainly directed by palms down: fingers are rounded slightly off. The main characteristic movement of feet – "A course of a variable step". Characteristic are also small movements of shoulders up-down, forward – back.

In men the case is harmonous, graceful. Hands are generally opened in the parties, hardly above shoulders, elbows are a little bit bended. Rotary motions of hands "from themselves" by palms down with the fingers collected in a semi-fist are also frostily applied.

As we see, each movement of hands, feet, head is thought over. Elaborately, as these movements will promote the development and the improvement of a young organism [3].

And as an integral part of the general culture is the physical culture, no wonder, that kinds of sport, national games and dances gained value of decisive factors at the Crimean Tatars which define and provide the vital activity of people.

**Conclusions.** The analytical review of historical researches from physical culture of the Crimean Tatar ethnos, testifies to its cumulative component which consists of many components which unite the culture of the among generation social experience. The experience is gained by the Crimean Tatar people in religious practices, national games, dances, types of fight has not only a social value, but directed in a support of health.

**The prospect of the subsequent researches** are directed on the introduction of means of physical culture of the Crimean Tatars in educational process of physical training.

#### References:

1. Alimov Ali. Tantsy krymskikh tatar [Dancing Crimean Tatars], Simferopol, 1993, 39 p. (rus)
2. Burov G. M., Koptukhov S. G., Petrova E. B. Istoriya Kryma [History of Crimea], Simferopol, 2007, 408 p. (rus)

3. Dzhemilev Akim. Tantsy ansamblya «Khaytarma» [Dance ensemble "Haytarma"], Tashkent, 1984, 93 p. (rus)
4. Zakharov R. V. Slovo o tantse [Word about the dance], Moscow, 1979, p. 77. (rus)
5. Aradzhiyoni M .A., Gertsen A. G. Krymskiye tatory: Khrestomatiya po etnicheskoy istorii i traditsionnoy kulture [Crimean Tatars: Readings on ethnic history and traditional culture], Simferopol, 2005, 576 p. (rus)
6. Kurtiyev R. Kalendarnyye obryady krymskikh tatar [Calendar rites of the Crimean Tatars], Simferopol, 1996, 41 p. (rus)
7. Lyzlov A. I. Skifskaya istoriya [Scythian history], Moscow, 1990, 166 p. (rus)
8. Khayrutdinov A. G. Mudrost vekov. Kniga dlya chteniya po krymskotatarskoy etnopedagogike [Wisdom of the Ages. The book to read on the Crimean Tatar ethnopedagogics], Simferopol, 1996, pp. 109–132. (rus)
9. Mustafayev S. Kara-kaplan – krimskotatarske boyove mistetstvo [Kara Kaplan - Crimean Tatar martial arts], 2002, p. 6. (rus)
10. Usmanov M. Kh. Uroki chteniya serdtsem. Sufiyskiye sekrety zdorovya [Reading lessons heart. Sufi health secrets], Saint Petersburg, 2006, 248 p. (rus)
11. Filonenko V. I. Detskiye igry krymskikh tatar [Kids Games Crimean Tatars], 1919, vol. 5, pp. 242–266. (rus)

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**KRASOTA V.***P. S. Nakhimov Academy of naval forces***MILITARY-APPLIED PHYSICAL CADETS TRAINING**

**Abstract. Goal:** *The formation of structural system model of military-applied physical cadets training of higher military institutions. Material and methods:* scientific, managerial and documentary sources. **Results:** *Usage of the basic theory provisions of anticipation of reality reflection to define the main structural model's characteristics and components (directionally-informative, functional- implementing, effective) of military-applied system of cadets physical training in the higher military school. This pattern is reflecting the interaction of its two major subsystems (subject and object of training and education), reasonably formed with respect to the direction of the educational process for anticipating cadets' adaptation to the specific mode of future professional activity. Usage of certain provisions (on the study results) reflected the programmed stages of learning: adaptive, base-formatinal, stabilization, realizable. Conclusions:* *The developed structural system pattern of military-applied physical training, marked the beginning of practical realization of its content component in educational process for cadets of higher military educational institutions.*

**Key words:** *cadet, model, officer, structure, physical training.*

**Entry.** After a year of the professional stage of young officers in military unites of Military Forces (MF) of Ukraine there are references as to higher military educational establishments (MHEI), in relation to professional readiness and other features of activity of newly graduating officers. As for a customer in which the troops (forces) of MF is in this case, claims against professional preparation of young officers are not observed, then lines which are characterized by commander's skills, organizationally-administrative capabilities, methodical abilities and military-applied skills of the newly arrived specialists, open to criticism [5; 7; 8].

In this connection optimal selection of facilities of pedagogical influence on educational process, taking into account the timely providing of effective anticipating adaptation of cadets to the specific pattern of future professional activity, which will include all above-mentioned features, acquires actuality and expediency of further research.

Research is conducted in accordance with the General plans of scientific and scientific and technical activity of MF of Ukraine on themes: the "Organizational aspects of functioning of the system of physical preparation (PT) of servicemen of MF of Ukraine in modern terms" (number of state registration 0101U001284), "Improvement of the military-applied skills of cadets (listeners) of MHEI in the system of special PT for servicemen" (number of state registration 0101U001622).

The conducted analysis of the last researches and publications testifies that the



pattern of the operating system of PT is worked out within the framework of theory of empiric cognition of the cadets of MHEI are embraced by a number of unequivocally "gap-filling" components and constituents on results of the uncoordinated co-operation in which there are blanks in the problems of forming of volitional qualities, methodical and organizationally-administrative abilities, military-applied skills of graduating cadets of higher military school [5; 7; 8].

**A research purpose consists** in the reasonable forming of structural pattern of the system of the military-applied physical training of cadets of military higher educational establishments.

**Results of researches and their discussion.** Difficult dynamic character of the system PT MHEI, as well as to a number of other pedagogical systems, allows us to examine it as an aggregate of co-operation of two basic subsystems: subject of studies (teacher) and object of studies and education (student). Co-operation of these subsystems in an educational-teaching process is characterized by influence of subject on the object of studies and education. An indirect way is also reverse influence of a party which studies, of what are thought, that can result in the change of character of educational- training influence of teaching actions [1–3; 5].

Scientific accompaniment of organization of process of studies in MHEI requires continuous development, experimental verification and adjustment of models of its constituents [3]. Hierarchy and organization of constituents of the educational system of higher military school must be based on unity of decisions of the set tasks and is managed by the special bodies which will provide integration of facilities of pedagogical influence of different educational disciplines with the purpose to obtain programmed final outcome of this system [3; 5; 6].

Here, the structurally-logical schemes of process (study) of these disciplines will play exactly an integrating role in relation to co-ordination of efforts of educational department and departments of MHEI in determination of sequence or parallelness, mutual addition and intensity of disciplines, volume of their content and degree of influence on cadets during the different stages of studies.

Section of each disciplines must be connected in a way, that on the following stage new transformation of previous result of teaching was provided of high quality, and a necessary base was created for the next stage of teaching. In the case of violation of functioning of elements of the system, or its subsystems, the results of such contradictory influence will be integrated, not reaching the values of the programmed pedagogical influence [1; 2].

For provision of the high quality functioning and realization of ultimate (final) goals and tasks of newly- built patterns of the pedagogical systems, it is recommended to use scientific information about effectiveness of its constituents [2; 3]. We assumed that the complex solution of problems of optimization of functioning of educational- training process MF BHEI is credible due to its radical alteration on the basis of anticipating adaptation of cadets to the modern requirements of their further professional activity [9; 10].

When using, during the ground of structure and content of educational- training process in MF, P.Anokhin's formulated position about indissoluble connection of theory of anticipating reflection of reality [1] with ultimate result we, actually, design the process of co-operation (of adaptation) of cadet (listener, student) with a future

professional environment. In basis of such pattern there will be planning and management of education, advancement and adaptation those, who study for the perspective professional environment. In the process of simulation we are allowed applying the substantive provisions of theory of anticipation of the reality reflection to distinguish two basic lines of the created pattern of the system of the BHEI cadets, these are: orientation on an eventual adaptation effect [1; 9] – the programed result of studies (officer with the high enough level of professional training, capable execute service-battle functions as to the professional destination, to teach, to bring up and manage an inferior personnel) which comes forward as a systematic and organizing factor; process of afferent synthesis [1] – combination of the experience gained in the results of an educational- training process with anticipation (ability to foresee the phenomena, course of events, forecast way of circumstances and probable consequences of different actions) of the future.

Thus, in an afferent synthesis they distinguish four obligatory ingredients (dominant motivation, situational and starting afferention, memory) co-operation of those actually predetermines the process of making decision [1], which are one of inalienable constituents of service activity of every officer of MF. An episodic synthesis and decision-making predetermine the construction of the concrete program of actions, which is the specific set of episodic impulses, which will provide a peripheral action and further combination of all constituents of the investigated system in final outcome which is pulled out as its primary purpose and actually is a system –creating factor.

The ultimate outcome is the pattern of future professional actions of cadet, which are as the result of implementation of certain actions or behavior reactions, which are formed on the basis of having made decisions [7; 9; 10].

Coming from the resulted, setting on final result of studies foresees a ground and introduction in practice of such model of PT of MHEI, which would assist in maximum to anticipating development and forming in the cadets of necessary physical, psychological and other qualities which will provide them fruitful adaptation on the successive stages of the military-professional formation. Such approach, combining in itself the forming and anticipating functions of scientific ground in pedagogical practice, is acceptable, to our opinion, to the ground of the system of MHEI in the field of educational- training process of future officers of MF of Ukraine.

By a dominant in the process of the further forming of model of the system MPPT of the MHEI cadets inalienable position came forward in relation to its abidance to the requirements of further military service [7]. Leading here is the criterion of its accordance to the systems of the highest order (combat training, physical education, physical preparation, educational systems of higher military schools) which are determined by the necessary initial level of professional and physical readiness of graduating cadet of higher military school.

Thus, as foundation of reasonable creation of structural model, exposure of substantial community of elements, constituents and components of the system of the MPPT in the field functioning of educational- training process of MHEI are demands which objectively are made to the cadets according to character and conditions of their perspective military-professional activity and by the system of the combat

training [5;7;8]. These demands are partly determined by the stages of the professional destination by initial, intermediate and eventual aims and tasks of the present system of MHEI, which are in detail enough investigated by contemporary researchers.

Thus examining, offered by S. Romanchuk's experimental program [8], we notice that the complex orientation of PT of cadets of Institute of Land (Army) forces gets organized and conducted on the base and special stages of training.

The structurally-based stage is divided into three substages, they are [8]:

- primary military-professional preparation – cadets adapt themselves to the features of military service;
- initial – (1<sup>st</sup>. year) cadets gain set tutorial of physical exercises, methods and actions, theoretical positions and organizational-methodical abilities to teach special physical exercises, techniques and actions;
- shock – (2<sup>nd</sup>. year) cadets master all volume of physical exercises and meet with the military-applied techniques and actions, theoretical positions and methodical skills, stipulated by the program.

On the stage of the special preparation (this stage consists of two-three substages during 3<sup>rd</sup>. and 4th. years of studies in the Institute of Army forces) cadets master the certain experimental program volume of the special exercises, military-applied techniques and actions, acquire organizationally-methodical abilities by realization of PT in role a commander of platoon and company [8].

On results of researches by O. Olkhovsky organization of training of cadets of MHEI for implementation of functional duties in the management of PT in MF of Ukraine it is recommended to conduct by the next stages [5]:

- preparatory (entrance examination, primary PT) – achievement of certain level of physical preparedness and functional state of organism of cadets for fast adaptation to the further military-professional studies;
- base (1<sup>st</sup>. year) forming and development in the cadets of general physical skills, ability to the physical improvement, mastering of initial abilities, techniques and habits;
- general – professionally-directed (2-3<sup>rd</sup>. year) – development and perfection of general and special physical qualities, gain abilities, methods and skills of improvement of physical qualities of cadets;
- special – professionally-directed (4-5<sup>th</sup>. year) – perfection of the special and applied physical skills of cadets.

These and a number of other researches [7] certify that content of the system PT of cadets of MHEI is full with the problems of special PT, mainly on senior (3-5) years. In it (content) the issues of development of the military-applied skills and special physical skills of cadets of junior (1–2) years of studies of higher military school are absent. The above marked results in a conclusion: as far as goal of MPPT is concerned we see an expediency of the stage-by-stage programed use of positions of anticipation adaptation of cadets to the modern requirements of further professional activity from the first days of military-professional studies (fig. 1.)

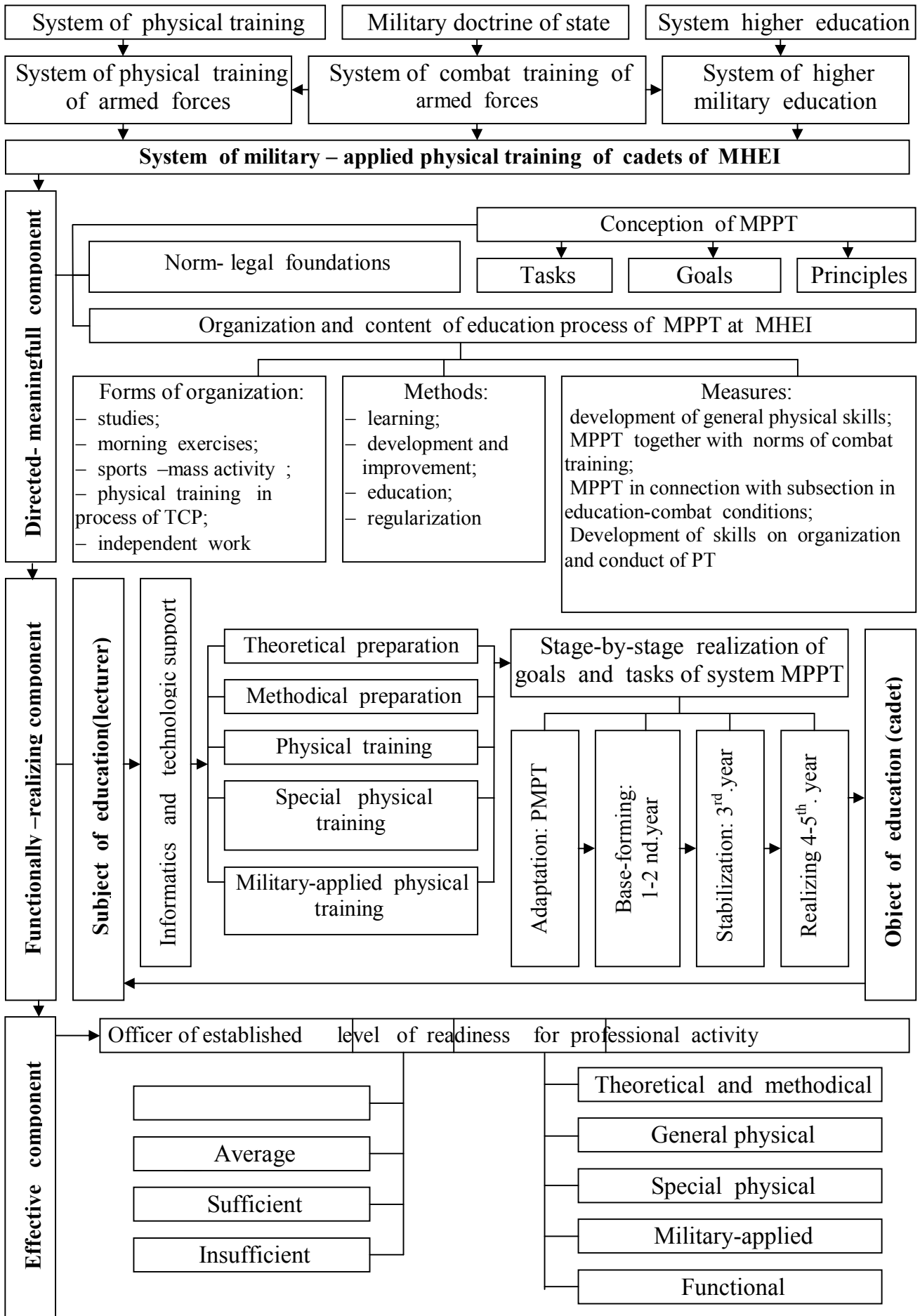


Fig. 1. Structural model of the system MPPT cadets of MHEI

Beginning from the adaptation stage (6 weeks of primary military-professional preparation on authorial technology), by a primary acquaintance and personal interest of cadets to content and meaningfulness of the special (swimming in 100m free style, diving in distance, exercise on flexibility) and military-applied (the special or general steeple-chase, techniques of hand-to-hand duel without weapon) exercises [4], providing of minimum level of physical and functional readiness of their organism gained by the further features of educational –training process in the conditions of military reality of MHEI.

On the stage of base-forming (1–2<sup>nd</sup>. year) of teaching the primary purpose of MPPT is envisaged more rapid gain by cadets of professional skills and habits. They are obtained by anticipating development of professionally important physical habits and motor skills due to the application of the special (salto forward or backward on trampoline, diving, turns on a stationary gymnastic wheel, turns on loping, complex co-ordinating exercise, holding of trunk in horizontal position and the like) and military-applied (throwing of grenade of F-1 on a distance, exact throwing of grenade of F-1, run in 100m with weapon, militarized cross-country race in 3000m with firing from a machine-gun and throwing of grenade, dive from a 5-m diving platform and moving onto the rescue 10- seat raft, diving in an uniform in distance) facilities of PT [4] in combination with implementation of norms of the combat training.

For effective implementation of actions by cadets with a weapon or on a military equipment on the stage of securing (3<sup>rd</sup>. year) of professional skills and habits it is necessary to create the physical loading at execution of the military-applied exercises in composition with subsection (swimming in an uniform with a weapon; rowing on six-oar marine yawls in 2 kilometres, marsh-sprint race on 5 or 10 kilometres, 6x100 –m shuttle run with a machine-gun, 100- m run from a lying start, run in 3100-m, 1100- m with clearing of obstacles, techniques of hand-to-hand fight with a weapon)[4] in educational-combat conditions. Thus on this stage we see forming and perfection of the basic tasks of MPPT for the cadets of functional basis of psychological readiness [10] as to future professional activity of officer.

During process of the realization stage (4-5<sup>th</sup>. year) the ultimate goal of the system MPPT becomes further perfection and stabilization of readiness of graduating cadets to the display of high combat skill in any conditions of educational- combat activity. For this purpose, due to the use exactly of the military-applied methods of PT, it is necessary to ensure physical and psychological readiness of future officers for execution of official-combat functions by the professional assignment in the modelled difficult and extreme conditions of educational environment.

On the results of conducted work the pattern of the system MPPT (see fig. 1) designed and grounded, which is structurally filled with directly-substantial, functionally – realizing and effective components and reflects co-operation of its two basic subsystems: subject and object of studies and education. Each of the noted components anticipates the presence of a number of constituents and elements:

- directly-substantial – normatively-legal pre-conditions, conception (goal, task, principles), organization and content of educational- teaching process of MPPT of cadets in MHEI (forms of organization, methods and facilities of PT);

- functionally –realizing – informatively-technical provision and stage-by-stage sequence of the directed educational influence (theoretical, methodical, special physical, military-applied physical body-conditioning) and co-operation of subject and object of studies and education on mastering of content and realization of eventual goal and tasks of the system MPPT;

- effective – indexes and criteria of levels of physical readiness of future officers for execution of official- combat functions under the professional predestination.

**Conclusions. Application** in the process of the conducted researches of the approach of anticipating reflection of reality [1], which is oriented to the eventual adaptation effect has provided a possibility to construct both normative –substantial and judicial aspects of the PT process for cadets on the successive stages of military-professional studies. The structural pattern of MPPT for the MHEI cadets was worked out accordingly and became the starting point of practical realization of educational-teaching process. Later on it will be interpreted in the concepts of the real studding and methodical recommendations for the structure and contents of educational material.

In prospects we will direct our researches to the concentrated reflection of the formed structural pattern in the experimental program of educational discipline "Physical education, special PT and sport", on the results of forming verification of effectiveness of functioning by which the scientific ground of the system of MPPT of the MHEI cadets will be completed.

**References:**

1. Anokhin P. K. Izbrannyye trudy. Filosofskiye aspekty teorii funktsionalnykh sistem [Selected Works. Philosophical aspects of the theory of functional systems], Moscow, 1978, pp. 7–26. (rus)
2. Konotopov P. Yu., Kulikova N. V. Osnovy informatsionno-analiticheskoy deyatelnosti i modelnogo obespecheniya protsessov upravleniya (sistemno-etalonnyy podkhod) [Fundamentals of information-analytical work and modeling software management processes], Moscow, 2005, pp. 23–42. (rus)
3. Lgotskiy A. O. Teoretichn osnovi proyektuvannya suchasnikh osvtnkh sistem [The theoretical basis of modern educational systems design], Kyiv, 1997, 340 p. (ukr)
4. Nakaz Mnstra oboroni Ukraini vd 30.12.2009 № 685 «Pro zatverdzhennya Nastanovi z FP u Zbroynikh Silakh Ukraini» [Order of the Minister of Defense of Ukraine from 30.12.2009 № 685 "On Approval Guidelines of AF in the Armed Forces of Ukraine"], Kyiv, 2009, 231 p. (ukr)
5. Olkhoviy O. M. Teoretiko-metodichn osnovi profesyno-spryamovano fzichno pdgotovki kursantv VVNZ ZS Ukraini [Theoretical and methodological foundations of professional-directed physical training of cadets HMEI Armed Forces of Ukraine], Kharkiv, 2012, 286 p. (ukr)
6. Pilipey L. P. Pedagogka, psikhologya ta mediko-bologchn problemi fzichnogo vikhovannya sportu [Pedagogics, psychology, medical-biological problems of physical education and sport], Kharkiv, 2012, № 10, pp. 59–63. (ukr)
7. Popov A. G. Professionalno-prikladnaya fizicheskaya podgotovka kursantov vysshikh voyennykh uchebnykh zavedeniy na osnove modelirovaniya usloviy boyevoy deyatelnosti: dis. ... k.p.n: 13.00.04 [Professionally-applied physical training students of higher military educational institutions on the basis of simulation conditions of combat activities], Nizhniy Novgorod, 2009, 151 p. (rus)

8. Romanchuk S. V. Fzichna pdgotovka kursantv vysokivkh navchalnikh zakladv Sukhoputnikh vysk ZS Ukraini [Physical training of cadets of military schools Army Forces of Ukraine], Lvov, 2012, 367 p. (ukr)

9. Rotenberg B. C., Arshavskiy V. V. Poiskovaya aktivnost i adaptatsiya [Search activity and adaptation], Moscow, 1984, 192 p. (rus)

10. Rusalov V. M. Koshman C. L. Differentsialno-psikhologicheskiiy analiz intellektualnogo povedeniya v veroyatnostnoy srede [Differential-psychological analysis of intelligent behavior in a probabilistic environment], Moscow, 1980, 115 p. (rus)

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## **COMPARATIVE ANALYSIS OF THE PHYSICAL FITNESS LEVEL TESTS IN UKRAINE AND FOREIGN COUNTRIES**

**Abstract. Purpose:** *to compare the main features of the physical fitness tests in secondary schools in Ukraine and some foreign countries. Material and methods:* program normative documents, which define the content of physical fitness tests in Ukraine and abroad, were analyzed applying the methods of analysis, synthesis and content analysis. **Results:** *The specificity of the tests of physical fitness level of students in the system of physical education in different countries was established. The article offers standards, which students of secondary schools in Ukraine and foreign countries should perform. Typical exercises used in the testing of physical fitness level of students were determined. Approaches to the organization and preparation of test standards of physical fitness in different countries were represented. Conclusions* physical fitness level tests are provided by the existing programs of physical education in the United States, Poland and the Russian Federation. Performance of relevant tests affects the assessment of student achievement during the lesson of physical education. In the United States, Poland and the Russian Federation physical fitness level tests are aimed at assessing the level of development of basic motor skills – endurance, strength, speed, agility and flexibility.

**Key words:** *physical education, physical conditioning, motive qualities, qualifying standards, testing.*

**Introduction.** The problem of physical fitness level testing of students of different ages has gained a new level of actuality after the notorious lethal cases during physical education lessons, which took place in secondary schools in Ukraine. As a result, physical education programs for students of different ages have been changed, including the part of compiling the standards of physical fitness. Unfortunately, a number of these standards has been modified in a manner that violated the principle of science, namely they have been reduced or abolished, without a proper scientific justification. The proposed innovations, in fact, have completely changed the system of assessment, which has been traditional for the secondary school for decades. It has also led to the appearance of different points of view among experts, who deny such an approach, or support it.

Studying the experience of physical education in world leading countries can solve a number of problems, which national scholars and educators are currently facing, as well as encourage the improvement of the national system of physical education.



During the last time, many authors have researched a wide range of issues associated with certain components of the process of physical education in different countries. Specifically, Vindyuk A.V. has researched peculiarities of the sports recreational activities with 5-7 years old children, and analyzed the history of the physical education school curriculum in the USA (2001). Bessarabova O. N. has researched high school educational standards in USA (2006). [1]

Concerning scientific publications associated with various aspects of physical education in the secondary schools of the Russian Federation, should be allocated the following: Vaskov Yu. V. "Innovative approaches in the organizing educational process of secondary school students"(2012), Berkutova I. Yu. "Improving the process of motor skills development of secondary school students by optimizing physical exertion through the integrated education"(2012). Peculiarities of the profile education with sports orientation have been researched by Kotov E. V. (2012). Kozhemyakina B. has studied " Peculiarities of approaches to the assessment of physical fitness of primary school children" [3]. In the native scientific literature, studies devoted to the peculiarities of physical education in China have appeared. This issue has been studied by Bondar A. (2013) [2].

Simultaneously, in the available to us literature, analytical and comparative points of view of academics on various components of the process of physical education in different countries are described insufficiently, particularly in the context of elucidation of peculiarities of passing physical fitness tests.

The research was conducted within the limits of the theme: "Justification of the normative basis of physical fitness of students 5-9th grades of secondary schools" (state registration number: 0112U003242).

**Aim of research:** Comparison of the main features of the physical fitness tests in secondary schools in Ukraine and some foreign countries.

**Tasks of research:**

1. To establish approaches to physical fitness level testing in school physical education system in Ukraine and abroad.
2. To identify the specificity of physical fitness level tests in secondary schools in different countries.

**Material and methods of research:** analysis of scientific- and methodical literature; content analysis; analysis and synthesis.

**Results and discussion.** Comparing approaches to physical education in Ukraine and abroad, one should pay attention to the fact, that the whole national system of physical education is built and structured in a similar way to physical education systems in leading foreign countries. First and foremost, that the content of physical education in Ukraine is determined by the relevant executive bodies of state power, which develop and confirm program normative documents and monitor the implementation of government programs in physical education. This approach is typical, in particular, for Poland. Concerning the United States and the Russian Federation, it should be mentioned that, given the specificity of these countries, as federal entities, legal and regulatory framework is developed and confirmed by the relevant state authorities of the local federal government.

Henceforward, we will focus more detailed on a comparison of physical fitness standards abroad and in Ukraine. As a basis we take the standards provided for pupils of secondary school age. It is in this age period complicated processes of rebuilding of the organism associated with the intensification of the activity of the endocrine system are happening.

Firstly, we will consider which test exercises and standards are offered for the assessment of **endurance**.

**Ukraine.** It should be noted, that according to the results of performance of test standards of physical fitness, students in Ukrainian schools are divided into the following levels: low, medium, sufficient, high [5].

For the estimation of endurance in 7-9 grades steady running without regard to time is offered. This approach is practiced till 6th grade, inclusively. Also it takes into account the distance that student is physically ready to overcome. Standards in this exercise have the following quantitative measurements: 1200 m (boys); 1000 m (Girls) – a high level; up to 700 m (boys); up to 600 m (girls) – a low level.

Starting from the 7th grade, for assessment of endurance steady running on a certain distance considering the time is offered. This distance increases from 1000 m in the 7th grade to 1500 m in the 9th grade.

**Russia.** In the Russian Federation for the estimation of endurance of students a 6-minute running followed by considering the overcoming distance is offered. To get the highest score, an 11 year old boy should overcome the 1,300 m, a girl of the same age – 1100 m With age, this standard increases, and at the age of 15 is 1500 m (boys) and 1300 m (girls) [4].

For comparison, in Ukraine, a 9th grade student to get the highest score for the similar exercise test should overcome the distance of 1500 meters at least in 6.30 min. That is to say, standard in our country is almost 30 seconds lower than in Russia.

**Poland.** In the Polish republic level of endurance is determined by performing the test standards in the following exercises – 1,000 m run for boys, 600 m run for girls and 12-minute Cooper test. For 13 year old students, who claim to get the highest mark, test standard in 1,000 m (boys) in 600 m (girls) is – 3.47 min and 2.19 min accordingly [6; 8].

In Ukrainian secondary schools 7th grade student to get the highest mark in the exercise – 1,000 m run, should overcome the distance in 4.40 min. As we can see, the same standard in Polish schools is 53 seconds higher than in Ukrainian schools.

**USA.** In secondary schools in the USA to determine aerobic capacity one mile running for boys and girls is offered [7]. Standard in this exercise test increases gradually with age. At the age of 13, to get the highest mark, it constitutes 10 min for boys and 11.30 min for girls. At the age of 15, standard is higher and constitutes 9 min and 10.30 min for boys and girls accordingly. If we convert these parameters into metric measurements, a 13 year old student should overcome 1600 m in 10 min (Table 1).

Table 1

**Test standards for the assessment of endurance in different countries**

Age (years)	Ukraine		Russian Federation		Poland		USA	
	Steady run		6- minutes run		1000 m/600 m run		One-mile run	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
13	1000 m	1000 m	1400 m	1200 m	3.47 min	2.19 min	10.30 min	11.30 min
	4.40 min	5.10 min						
14	1500 m	1000 m	1450 m	1250 m	3.39 min	2.18 min	10.00 min	11.00 min
	6.50 min	5.10 min						
15	1500 m	1000 m	1500 m	1300 m	3.33 min	2.17 min	9.30 min	10.30 min
	6.30 min	5.10 min						

Further we will analyze the standards designed to determine the level of **strength** development.

In **Ukraine**, in present education program, the following test standard is offered – pull up for boys and a modified type of pull up for girls is offered [5].

A similar approach is proposed in physical education program in the **Russian Federation**. However, one should pay attention, that the standard for girls decreases with age. Perhaps this is due to the natural decrease of relative strength, that is actually taken into account in current programs.

In the USA the assessment of strength implements by performing a test exercise, which consists of three different exercises, including: *push ups*; *pull up*; *flexed-arm hang*. In table 2 test standards for the assessment of strength are indicated.

Table 2

**Test standards for the assessment of strength in different countries**

Age (years)	Ukraine		Russian Federation		Poland	USA
	Pull-up (number of times)		Pull-up (number of times)			
	Boys (Completed)	Girls (Over Under Grip Grip)	Boys (Completed)	Girls (Over Under Grip Grip)		
13	7	15	8	19	Test standards were not defined	Push-ups; Pull-up; Flexed-Arm Hang
14	8	16	9	17		
15	10	18	10	16		

As we can see, the test standard in the USA is differentiated in a way that each student can express themselves in the performance of certain motor actions [7; 10]. This approach is typical for educational programs in the U.S. and Poland, where students are offered to perform alternative methods of test standards. For the practice of physical education in Russia and Ukraine a more conservative approach with standardized requirements is typical.

To assess the level of **speed** in physical education programs in **Ukraine, Russia and Poland** short-distance run is offered. In the Polish Republic, however,

the distance is longer, and constitutes 60 m, in contrast to Ukraine and Russia, where the same test standard is performed at a distance of 30 meters.

If we compare the test standards defined in the relevant educational programs of Ukraine and Russia, we can see quite a significant difference (Table 3).

Table 3

#### Test standards for the assessment of speed in different countries

Age (years)	Ukraine		Russian Federation		Poland		USA
	30 m run, s		30 m run, s		60 m run, s		
	Boys	Girls	Boys	Girls	Boys	Girls	
13	5,4	5,8	4,8	5,0	8,8	9,4	Test standards were not defined
14	5,2	5,6	4,7	4,9	8,4	9,3	
15	5.0	5.5	4,5	4,9	8,2	9,2	

In the Russian Federation, these test standards are significantly higher than our native standards.

If we analyze the content of test standards for the assessment of **flexibility**, we can see, that in all the mentioned countries the same classic exercise is applied – Sit and reach. Some other approach is only in the Polish Republic, where the mentioned exercise is performed from the basic stand.

As shown in the Table. 4, test standards for the assessment of flexibility in comparison to other countries are much higher in the U.S., than in other countries.

Table 4

#### Test standards for the assessment of flexibility in different countries

Age (years)	Ukraine		Russian Federation		Poland		USA	
	Sit and reach (cm)		Sit and reach (cm)		Stand and reach (cm)		Sit and reach (cm)	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
13	7	12	9	18	head should reach knees		26	31
14	8	13	11	20			28	33
15	9	14	12	20			30	36

Mentioned test standards are almost twice higher than the analogous standards in Ukraine and the Russian Federation. This circumstance requires a detailed analysis, because test standards for the assessment of other motor skills in the USA are somewhat lower.

In the Polish Republic a slightly different approach for the assessment of flexibility is offered, in which the anthropometric characteristics of a particular student are taken into account. The same approach to the assessment of **speed-strength** abilities is applied in this country. It is about the measurement of the result in the exercise – standing long jump. The result of this exercise is measured by the length of the foot of each individual student, that is in terms of the education program, provides a more objective assessment.

The same exercise test is used in the practice of physical education in **Ukraine** and the **Russian Federation** (Table 5).

Table 5

**Test standards for the assessment of speed-strength abilities in different countries**

Age (years)	Ukraine		Russian Federation		Poland
	Standing Long Jump (cm)		Standing Long Jump (cm)		Standing Long Jump. The result is measured in the footsteps. In the calculation the result is rounded: less than half a foot – decreases; more than half a foot – increases
	Boys	Girls	Boys	Girls	10 footsteps
13	180	160	205	200	
14	185	165	210	200	
15	200	170	220	205	

The parameters, listed in the table, clearly illustrate the fact that for schoolchildren in the Russian Federation test standards in this exercise are higher than for schoolchildren in Ukraine. As for the USA, there is a certain peculiarity – a lot of test exercises are specific, which makes it impossible to compare them correctly with the test exercises applied in Ukraine.

In general, the results of comparative analysis indicate that in the practice of physical education in Ukraine, Russian Federation, the Republic of Poland and the United States similar approaches to the assessment of the level of development of motor skills are applied. For the most part, in the mentioned countries classical exercises for the national system of physical education are used. The most significant differences are in the magnitude of test standards, which differ from country to country, and in the application of different differentiation criteria in test standards compiling process. As to the latter feature, the most clearly differentiated approach can be traced in the educational programs of Poland and the United States.

Another feature, which should be noted, is that in Ukraine, most test standards for the assessment of motor skills are lower than analogous test standards in other countries. This fact confirms the necessity of formation an objective scientific basis for each test standard and a convincing rationale of measurement of these standards.

**Conclusions:**

1. Physical fitness level tests are provided by the existing programs of physical education in the United States, Poland and the Russian Federation. Performance of relevant tests affects the assessment of student achievement during the lesson of physical education. In the United States, Poland and the Russian Federation physical fitness level tests are aimed at assessing the level of development of basic motor skills – endurance, strength, speed, agility and flexibility.

2. In all mentioned countries, physical fitness level tests are differentiated by two classical criteria – age and gender. For the physical education in the USA and Poland is differentiation and performing of test standards in a way, that allows to involve a larger number of students to the test performance process is typical. In particular, in the Republic of Poland complexes of test exercises provide differentiation of test standards according to the anthropometric characteristics of a particular student. That is why, the assessment of the performance of a certain test

standard includes interrelationship between the performance of exercise test and individual peculiarities of physical development of each student.

**Future prospects of research.** Further research of the peculiarities of foreign physical education systems should be directed towards studying the scientific basis of relevant educational programs and exploring the practical side of physical education classes with different categories of population.

**References:**

1. Bessarabova O. N. *Obrazovatelnyye standarty sredney shkoly SShA: sostoyaniye i tendentsii razvitiya: dis. ... kand. ped. nauk* [Educational standards are high school USA: state and development trends], Volgograd, 2006, 223 p. (rus)
2. Van Tszin, Bondar A. *Slobozhans'kij nauk.-sport. visn.* [Slobozhanskyi science and sport bulletin], Kharkv, 2013, vol. 5 (38), pp. 45–48. (rus)
3. Kozhemyakna V. *Moloda sportivna nauka Ukraini* [Young sports science of Ukraine], Lviv, 2001, vol. 5, iss. 1, pp. 214–215. (ukr)
4. Matveyev A. P. Petrova T. V. *Programma fizicheskogo vospitaniya uchashchikhsya 1–11-kh klassov s napravlenym razvitiyem dvigatelnykh sposobnostey* [Program of physical education students 1-11th grades with the direction of development of motor abilities], 2000. (rus)
5. *Navchalna programa z fizichnoi kulturi dlya zagalnoosvtnkh navchalnikh zakladv (5–9 klasi)* [The curriculum of physical training for secondary schools (Grades 5–9)], Access mode: [http://www.mon.gov.ua/ua/activity/education/56/692/educational\\_programs/1349869429/](http://www.mon.gov.ua/ua/activity/education/56/692/educational_programs/1349869429/). (ukr)
6. Ministerstwo Edukacji Narodowej. Departament Programó w nauczaniach Podręczników. *Informacja o wynikach monitorowania wdrażania podstawy programowej wychowania przedszkolnego i kształcenia ogólnego w roku szkolnym 2009/2010*.
7. Kent King D. *Missouri Physical Fitness Assessment Manual*. Missouri Department of Elementary and Secondary Education / D. Kent King // Commissioner of Education. – October, 2000. – 22 p.
8. Wróblewski P. *Realizacja podstawy programowej z wychowania fizycznego* / P. Wróblewski. – Warszawa. – 15 p.
9. *Systemy edukacji w Europie – Stan obecny*. – Czerwiec, 2011. – [http://eacea.ec.europa.eu/education/eurydice/documents/eurybase/national\\_summary\\_sheets/047\\_PL\\_PL.pdf](http://eacea.ec.europa.eu/education/eurydice/documents/eurybase/national_summary_sheets/047_PL_PL.pdf)
10. *Physical Education Trends in Our Nation's Schools* [E-resource] / Access mode: [www.aahperd.org/naspe/about/announcements/upload/PE-Trends-Report.pdf](http://www.aahperd.org/naspe/about/announcements/upload/PE-Trends-Report.pdf).

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## **PREPARATION OF TEACHERS OF PHYSICAL CULTURE FOR THE IMPROVEMENT OF PUPILS IN THE HISTORICAL ASPECT**

**Abstract. Research:** shows the need for a theoretical understanding of the problem of formation of professional readiness of future teachers of physical training to recreational activities. **Material and methods:** the theoretical analysis and the generalization of special scientific and methodical literature. **Results:** we examined scientifically-pedagogical analysis of the historical features of training future teachers of physical culture. A fundamentally new approach is analyzed of solving complex problems of education of health culture and health of pupils. The causes of the crisis state of physical culture in Ukraine. **Conclusions:** the necessity of a theoretical understanding of the problem of formation of professional readiness of the future teachers of physical training to recreational activities.

**Keywords:** health, pupils, historical analysis, physical culture.

**Introduction.** The vast majority of children and teenagers in Ukraine have considerable deviations in a state of health, about a half – unsatisfactory physical preparation. The critical level of health and physical development of student's youth as a result of the decrease in physical activity at growing static (to 72% of school hours) and at psychoemotional pressure of the process of study, introduction of computer technologies, in a daily life, adverse ecological conditions, growth of antisocial manifestations, among student's youth, put forward a paramount task at government bodies, pedagogical public, – the preservation and the promotion of health of pupils, the formation of skills of a healthy lifestyle in them [5].

The big role in the course of physical training of younger generation, the formation of its readiness for the healthy activity belongs to a teacher, in particular physical culture which acts as a carrier of values of physical culture, an effective factor of the improvement of pupils. In this regard pedagogues- scientists, teachers-methodologists and experts on physical culture conduct intensive searches of the new contents, kits and methods of the improvement of quality of the preparation of teacher's personnels on the physical training which activity fruitfully influences providing and the development of physical, mental and spiritual health of younger generation [6].

To the creative search of ways of the improvement of the preparation of teacher's personnels on physical training and to the solution of a number of problems which sharply appear before modern higher pedagogical institutions, will be promoted by the studying, the reconsideration and the constructive use of historical and pedagogical acquisitions of the past. The researches of modern scientists

G. Gryban [2], M. Danylka [3], L. Yeliseyeva [4] L. Ivanova [6], N. Krutogorska [7], L. Sushchenko [10], A. Tsiosya [11], B. Shiyan [13] and so forth are devoted to different aspects of professionally pedagogical training of students of faculties of physical training of the higher pedagogical institutions of Ukraine.

"Studying of history of physical culture enriches an outlook, promotes the formation of outlook, helps to acquire the theory of physical training and to realize the practice of physical culture" [9, page 152]. At the same time during the analysis of scientific literature available for today on the outlined subject it is established [8; 9; 12] that the problem of training of teachers of physical culture to the improvement of pupils in the historical aspect wasn't a subject of the special research.

The research is executed according to the direction of the scientific work of the department of valueology and correctional medicine "Medicobiological rehabilitation in valueology (methods, factors, means of influence on mental, physical and intellectual working capacity)" (the number of the state registration is 0103U000516).

**The aim of the research:** to prove the need of the conception of training of teachers of physical culture to the improvement of pupils, relying on the historical aspect.

**The task of the research:**

1. To carry out scientifically pedagogical analysis of historical features of training of future teachers of physical culture.
2. To find the reasons of a crisis state of physical culture in Ukraine.

**The material and methods of the research:** the analysis and synthesis of data of scientifically methodical and special literature on the research problem.

**Results of the research and their discussion.** It is revealed that educational reforms of the second half of XIX century, recognition by the pedagogical public of an important role of physical training in formation healthy, harmoniously developed persons and the need of its introduction to the teaching and educational process of schools therefore there was a need for qualified experts from this branch of education were prerequisites of the formation and the development of pedagogical training of future teachers of physical culture in higher pedagogical institutions of Ukraine.

In the second half of the XIX century preparation of pedagogical personnels on physical culture for different educational institutions begins in teacher's seminaries, institutes and on pedagogical courses, and at the beginning of the XX century special courses of the physical culture, in particular the High courses of teachers and conductresses of physical education of P. Lesgaft, the courses at gymnastic and sports societies and short-term courses on training of teachers and instructors of physical training are opened.

It is established that scientifically methodical aspects of preparation of teacher's specialists on physical culture were considered by outstanding native teachers, specialists in physical training and doctors, V. Gorynevsky, M. Demkov, P. Lesgaft, S. Miropolsky, M. Pirogov and K. Ushinsky. They insisted on gymnastics introduction to curricula of schools as to an obligatory subject, tried to define the contents, methods and kits of physical training of pupils of different age groups are pedagogically expedient, and defended the need of training of the qualified teachers



of physical culture which are armed with deep general-pedagogical, medicobiological and specially methodical knowledge for the improvement of pupils [12].

The analysis of archival materials [1] showed that at the beginning of the 20th of the XX century in connection with requirements of social and economic development of society and new requirements to primary, secondary and higher education a training system of future teachers of physical training was reconstructed. New institutions are opened: Kharkov six-months courses of physical culture (1924), similar short-term courses in Kiev, Odessa and Chernigov, and also All-Ukrainian one-year courses in Kharkov (1925) the preparation on which was carried out behind such main directions: school, pre-higher educational institution, club, treatment-and-prophylactic, rural, organizationally methodical, referee's and scientifically control.

After the revolution in 1917 in Russia on change to humanistic ideals of physical training developed by Y. A. Komensky, K. D. Ushinsky, P.F. Lesgaft, physical training is transformed to "the Soviet sports movement" which according to the resolution of the Central Committee of All-Union Communist Party (bolsheviks) (1925) turns into means of improvement and unity of wide workers and country masses round those or other parties, Soviet and trade-union organizations, through what Workers' and Peasants' masses are attracted to the political life [1]. The essence of physical training and its appointment change. It finally loses national roots, politicized and submits to idea of the class fight. The last, naturally, defines a task, the contents and kits of a school subject, "physical culture". Physical training, as the channel, via which physical culture (as the public phenomenon) it is acquired by pupils, it is reduced to physical preparation and studying of limited number of motive actions (it is mainly professional and also military and applied).

The analysis of pre-war school programs on physical culture, carried out by E. Y. Bondarevsky and A. V. Kadetova [1] specifies that the called subject didn't put before itself the tasks connected with the formation of the identity of a pupil. From it the idea of "physical education" P.F. Lesgaft was forced out. Therefore, the school physical culture was excluded from the sphere of socialization of younger generation in its humanistic understanding, but in the meantime played a role of an effective remedy and a method of russification under the internationalization screen (in particular, through the terminology, unification of means). That is the process of physical training as the social pedagogically phenomenon successfully carried out the special educational functions by the principle to "on the contrary". The reorientation of school physical culture happened against the defeat of psychological and pedagogical science. The works of school introduced in practice in the late 20<sup>th</sup> of the XX century the brigade and laboratory methods of study, elements of the involvement of pupils in independent study were called harmful pedagogical daydreaming. The researches of specific mental features of children, introductions of the differentiation of the study are condemned as pedagogical twisting. Having changed for itself psychology, "the Soviet ideology" appropriated a task of the formation of communistic consciousness, having left to physical training of training of a body. The consciousness and the corporality included in different education as

"components of communistic education of the Soviet person", gained pseudo-integrity.

It should be noted that the fight for the prestige of the USSR in the world, especially in the post-war time, generated one more negative phenomenon in the sphere of physical culture. Politicians and ideologists relied on victories in big-time sports for the demonstration of advantages of "a social way of life". Contrary to classical ideas to an Olympism where sports are means of attraction to classes by physical exercises of the general public, the slogan "victory whenever is happened" with known consequences moves forward. In the end result, sports completely turned into the arena of the ideological fight and, having absorbed physical culture, began to satisfy only the requirements.

Thus, after the October revolution in the Russian empire absolutely a new type of physical training was created both behind the rigid organizational kit, and according to the contents with limited number of the physical exercises provided by the state programs, obligatory for the performance in all territory of the big empire. The physical culture turns into means and a component of communistic education. Thus (contrary to M. Bernstein's doctrine) the formation of control systems by movements doesn't answer the internal logic of the activity as the pupil is subordinated to the relations constructed by the principle "the chief, – the subordinate" and works in an order and a fear mode.

All this gave to paradoxical, at first sight, situations. At the most prestigious competitions (the Olympic Games, the World championships and Europe and so forth) the sports elite reaches the high results and victories, and units go in for physical culture (2–6% from total population). At the same time the life expectancy as an integrated indicator of health of the nation lowered to the level of underdeveloped countries. Besides, conditions of medical care of the most part of the population are worsened. The high cost of paid medical services and drugs often become a cause of the failure from the effective treatment. In these conditions on the first place the question of treatment, and the question of the prevention of diseases move forward any more.

The hypertrophied development of sports finished transformation of school physical culture in physical preparation. School sports education incapable is destroyed to the influence the formation the social psychological of structures of youth, loses the importance and for the state education. Moreover, recently, from the known reasons, and the demand for the physical potential of youth from military and production structures began to lose the relevance. As a result, school physical training with the direction on the physical fitness to work and service in army also loses the real importance.

The declaration of the state independence of Ukraine, the principles of democratization and humanization of the public life, new political and economic realities, were, unfortunately, apprehended by the part of members of the society (including employees of the branch of physical training) as the permissiveness and anarchy. Other part of experts felt nostalgia for regulations, the others became puzzled and found full helplessness [1] in these conditions.

On this background in the society the interest to classes by physical exercise is sharply reduced, the management of the process of physical training in educational branch is weakened, sports constructions are collapsed, the level of the competence of experts of physical culture decreases (and mostly doesn't answer the modern conditions). At the same time the number of diseases of the musculoskeletal device, the cardiovascular system, other bodies and systems of an organism of children and teenagers [8] continue to grow.

In other words, the system of physical training of youth, having entered an irreconcilable contradiction with real requirements of the updated society, generated the crisis phenomena. The attempt to untie this contradiction "renovation" of old system of physical training, to correct and add its ideological, program and standard, organizational bases with new physical exercises, organizational innovations, or to remember the old one, didn't yield positive results.

Therefore, each stage of the historical development of our state makes new demands to the activity of the teacher in a modern education system and education [7]. The recovery from the crisis demands the search of essentially new methodological approach to the solution of a complex problem of education of culture of health and the improvement of pupils. It is especially important because the bases of physical and mental health of the person are formed in the age from a born till sixteen years, from them ten years the child studies at school.

It is quite obvious that the teacher always influenced a course of historical process of his personality and activity, the destiny of the society. He actively participates in the society formation, and, therefore, has to feel a big responsibility for his destiny before the last, modern and future generations of mankind.

**Conclusions.** The analysis of problems of physical training shows that its crisis state is predetermined by the following reasons. The first is caused by the modern social and economic crisis, characteristic for a transition period from the authoritative to the democratic forms of government of the state and the society and from a socialist state to the state independence. It is reflected in financing, material, medical, staffing, and so forth, objectively passing and can't significantly change or stop the development of physical culture.

The second reason which in a decisive measure defined the direction of the development of physical training of student's youth for a long time has deep historical roots. It is predetermined by the change in 1917 of a social order of all Russian empire, including on the Ukrainian lands. The change of the political system raised a question of the appointment in this society of physical training. The process of the reorganization of a native education system, that is the transition from the system of the Soviet education to an education system of the European type began from the acquisition of the independence by Ukraine.

The modern life demands the formation of the new concept concerning an education role in strengthening of health of children and teenagers in which the operating place is taken by physical culture. Considering that fact that health of modern pupils promptly worsens, we consider that it is necessary to look for the exit in essentially new approach to the solution of a complex problem of education of

culture of health and improvement of pupils. And it is necessary to begin from the formation of culture of health of the future expert because only he is represented the potential carrier of physical culture which influences physical, spiritual, intellectual, moral readiness of the pupil.

Thus, above-mentioned researches prove that today there were prerequisites which demand to carry out the theoretical understanding of the problem of the formation of professional readiness of the future teacher of physical culture to the improving activity.

**The prospect of the subsequent researches** is the search of new real conditions of training of physical education of teachers to the improvement of younger generation in this direction.

**References:**

1. Bondarevskiy Ye. Ya., Kadetova A. V. Fizkultura v shkole [Sport in school], 1987, vol. 3, P. 31–35. (rus)
2. Griban G. P. Slobozhanskiy naukovo-sportivniy vsnik [Slobozhanskiy scientific sports herald], Kharkv, 2013, vol. 5, P. 78–81. (ukr)
3. Danilko M. P. Formuvannya gotovnost do profesynoi dyalnost maybutnkh vchitelv fzichnoi kulturi [Formation of readiness for professional activity of future teachers of physical education] : avtoref. dis. na zdobuttya nauk. stupenya kand. ped. nauk : 24.00.02, Volinskiy derzh. un-t m. Les Ukrainki, Lutsk, 2000, 19 p. (ukr)
4. Eliseyeva L. A. Podgotovka uchitelya fizicheskoy kultury k ispolzovaniyu netraditsionnykh sredstv ozdorovleniya uchashchikhsya na urokakh i vo vneurochnoye vremya [Teacher Preparation of physical training to use unconventional means of improvement of students in the classroom and outside school hours] : dis. ... kand. ped. nauk : 13.00.08, Eliseyeva Lyudmila Aleksandrovna, Barnaul, 2005, 206 p. (rus)
5. Zubaly M. Fzichne vikhovannya v shkol [Physical education in school], 2006, vol. 4, P. 6–9. (ukr)
6. vanova L. . Pdgotovka maybutnkh vchitelv fzichnoi kulturi do fzkulturno-ozdorovchoi roboti z uchnyami zagalnoosvtnkh navchalnikh zakladv : avtoref. dis. na zdobuttya nauk. stupenya kand. ped. nauk [Preparing future teachers of physical culture to sports and recreation activities with pupils of secondary schools] : 13.00.04, Nats. ped. un-t m. M. P. Dragomanova, 2007, 22 p. (ukr)
7. Krutogorska N. Gumanzatsya navchalno-vikhovnogo protsesu [Humanization of the educational process], vol. , Slov`yansk, 2010, P. 40–51.
8. Muskharna Yu. Yu. Pedagogka ta psikhologya [Pedagogy and Psychology], Kharkv, 2011, vol. 40, iss. 2, P. 158–165. (ukr)
9. Popovich O. Slobozhanskiy naukovo-sportivniy vsnik [Slobozhanskiy scientific sports herald], Kharkv, 2012, vol. 5, P. 152–156. (ukr)
10. Sushchenko L. P. Profesyna pdgotovka maybutnkh fakhvtstv fzichnogo vikhovannya ta sportu (teoretiko-metodologchniy aspekt) [Professional training of future specialists of Physical Education and Sport (theoretical and methodological aspects)], Zaporzhzhyia, 2003, 442 p. (ukr)
11. Tsos A. V. Differentsirovannyi podkhod v protsesse professionalnoy podgotovki uchitelya fizicheskoy kultury [Differentiated approach in the training of teachers of physical culture] : dis. ... kand. ped. nauk : 13.00.01, Kiyev, 1994, 179 p.
12. Chekhovska L. storichn aspekti rozvitku fzichnoi kulturi [Historical aspects of physical education: study guide], Lviv, 2005, 145 p. (rus)
13. Shiyani B. M. Teoretiko-metodichn osnovi pdgotovki vchitelv fzichnogo vikhovannya v pedagogchnikh navchalnikh zakladakh [Theoretical and methodological bases for training teachers of physical education in teacher education] : avtoref. dis. ... na zdobuttya nauk. stupenya d-ra ped. nauk : 13.00.04, Kyiv, 1997, 50 p. (ukr)

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## **CRITERIA FOR SPORT AND TECHNICAL PREPAREDNESS OF YOUNG PLUNGERS**

**Abstract. Goal:** *is to substantiate the level of fitness and the continued success of the athletes in favorites sport. Material and methods:* *the study involved as young athletes (no discharge) and qualified plungers (III, II, I, CMS, MS), including: 123 boys and 117 girls aged 9 to 13 years. In this study, the following methods were used: theoretical analysis; experimental studies; generalization of domestic and foreign experience, the methods of mathematical statistics. Results:* *found between the total complexity compulsory and jumps and skill level athletes. Found that at the age of 9 to 11 years there has been rapid growth in sportsmanship, increases the quantity, quality and complexity of the jumps. Conclusions:* *the main criterion for determining the sports suitability of the young plungers is developed by us assessment of sports-technical preparedness.*

**Keywords:** *suitability, qualification, projection, correlation, and stability.*

**Introduction.** Effectiveness of the process of athlete training in modern terms is largely due to the accuracy of determination of criteria for sport and technical preparedness in the early stages of long-term training. Methodology and organization of sports and technical training of athletes is based on the general principles of modern sports training, features of performance technique of sports program in the chosen sport and extensive practical experience of trainers [5]. According to V.M. Platonov, you should not plan large in volume and intensity of exertion when performing exercises most competitive orientation [1].

At the initial stage of sports specialization occurs laying the foundations for future skills of plunger – so-called "school", and laying a comprehensive database physically and technical training. Already at the stage of pre-selection, there is a need for determining the criteria for sport and technical preparedness of (suitability after 2–3 years of training) young plungers. The problem of determining the criteria for readiness athletes plunger has no scientific and methodological rationale, that is why namely to finding and substantiation of criteria our research is dedicated.

The question of selection criteria for identifying sports and technical preparedness of young athletes in many other sports is insufficient disclosed in the scientific literature. The special literature covers only some aspects of the problem. In this regard, the definition of criteria for sport and technical preparedness of young plungers is so important and needs further study [6; 7; 9; 10].

Work is carried out according to the plan of research in the field of physical culture and sports in 2011-2015 on the topic of 1.2. "The modern professional sport

and the ways of its development in Ukraine".

**Goal of the research:** to determine the criteria for sport and technical preparedness of young plungers aged 9–13 years.

**Tasks of the research:**

1. To make scientific foundation and to develop criteria for determining sports and technical preparedness of young plungers aged 9–13 years.

2. To analyze the selection of athletes – plunger by age and sports and technical characteristics.

3. To develop a regulatory assessment of sport and technical preparedness as the main criterion for determining the sport suitability of young plungers.

**Materials and methods of the research.** Five experimental groups of athletes – plungers with beginners' qualification – without category of CMS, who were divided into groups by age and sex characteristics were formed for the study. The research involved 123 boys and 117 girls aged from 9 to 13 years. Research conducted by analyzing sport and technical preparedness of athletes of experimental groups and materials of competitions for juniors in the period from 2007 to 2013.

We researched the level of learning and quality of individual elements as well as the entire program as a whole, depending on age, sex, and applications (bit) events, which were defined: CD (coefficient of difficulty) of entire program – the sum of the coefficients of difficulty for jumping of compulsory and arbitrary programs (program depending on the age group and the bit of competition included 8 to 12 jumps, from 4 to 5 of them are the mandatory and 5 or 6 the random program); CD of random jumps – the sum of coefficients of difficulty of random jumps in the program. Average CD of random jumps – the sum of coefficients of difficulty of random jumps divided into the number of random jumps.

We used the following methods of the research: theoretical analysis; generalization of domestic and international experience on defining criteria for sport and technical preparedness of young plungers; experimental researches (analysis of competition material), methods of mathematical statistics.

**Results of the research and its' discussion.** According to the results of the analysis of competition material, we can say that young athletes are characterized by the rapid growth of sport and technical preparedness (Table 1).

*Table 1*

**Results of sports and technical preparedness of young plungers aged 9-13 years,  $\bar{X} \pm \sigma$**

Indicator	Sex	Age, years				
		9	10	11	12	13
Number of athletes, n	B	n=18	n=27	n=26	n=28	n=24
	G	n=16	n=29	n=28	n=24	n=20
CD of entire program	B	8,2±4,8	9,7±3,8	12,1±3,1	13,9±2,1	16,9±3,1
	G	6,8±4,3	8,7±4,5	13,6±7,1	14,7±3,0	16,5±6,5
CD of random jumps	B	2,6±2,8	4,8±3,2	5,0±1,7	6,7±2,4	9,1±2,9
	G	1,6±2,5	3,2±2,8	6,3±3,1	7,3±3,5	7,9±2,6
Average CD of random jumps	B	1,0±0,7	1,5±0,7	1,7±0,6	1,9±0,3	2,1±0,3
	G	1,0±0,8	1,5±0,9	1,8±0,6	1,9±0,5	2,1±0,2
Sports result, points	B	125,8±73,0	179,9±80,0	190,5±51,0	224,4±54,0	293,6±50,0
	G	109,9±60,0	153,3±71,0	219,3±80,0	223,8±71,0	267,2±65,0

Due to the development of athletes-beginners are more complex, and therefore valuable (with a larger coefficient) jumps and improving the purity of their performance, especially the rapidly growing athletic performance in age from 9 to 11 years. From 11 years increase of sports and technical preparedness mostly associated with the further complication of the program jumps. Thus, there is a constant mastering every time more complex jumps and improvement of previously studied.

Analysis of sportsmanship growth showed that the main ability of young athletes that achieve high sports results, is the ability to learn, means how quickly and efficiently the young athlete learns the techniques of mandatory and random jumps. Children, who fall behind on indicators of sport and technical preparedness from the main group, are expelled from CYSS, as evidenced by the data presented in Table. 2.

Integral expression of sport and technical preparedness is sports qualification of young athletes (category). Analysis of the competition revealed that girls aged 9 years with experience sessions for more than two years should have qualified the second category, with experience sessions less than two years – from I junior category and to II adult category.

10-year-old girls, who have taken part in our research, were without sports category or attained II qualification. Girls, who have reached for 2–3 years of training qualifications no higher than the III category, were expelled from sports school. At this age, most gifted girls can learn and properly perform the program of candidate for master of sports. At 11 years most athletes are qualified from master of sport to II category. The girls, who have not reached qualification of II category up to this age, were expelled from sports school.

In 12 years, the girls had mostly II adult category. Expelled girls with the experience of training more than 3 years had qualifications not higher then III category. 13-year-old girls had qualification I category and Candidate Master of Sports, and only a few had II sports category, though they has already mastered the application of I sports category. These sports and technical preparedness of boys indicate that they meet the requirements of technical training programs for CYSS, SSHS.

Boys aged 9-10 years expelled from CYSS, generally were not able to assimilate training program of III category within 1-1.5 years. Expelled female-athletes aged 11-12 years also failed to comply with program requirements for technical preparedness.

To identify the parameters of sport and technical preparedness, on which is probably safer to orientate in the short termed projection, it was carried out a correlation between their initial and repeated values.

As we can see from the data presented in Table. 3, the maximum stability in all ages of boys and girls is at indicator of "average CD of random jumps".



Table 2

**Indicators of sports and technical preparedness of athletes aged 9-13 years, those who are expelled and those who continue training in plunging in CYSS**

Indicator	Sex	Age, years									
		9		10		11		12		13	
		Continue training	Expelled	Continue training	Expelled	Continue training	Expelled	Continue training	Expelled	Continue training	Expelled
Number of athletes	<b>B</b>	n=9	n=9	n=12	n=15	n=16	n=10	n=17	n=11	n=17	n=7
	<b>G</b>	n=11	n=5	n=17	n=12	n=21	n=7	n=18	n=6	n=14	n=6
Sum of CD of all jumps of the program	<b>B</b>	10,6	9,1	11,8	9,9	13,0	11,3	15,4	11,8	18,2	15,5
	<b>G</b>	8,0	1,6	12,1	5,8	14,6	10,3	15,9	11,8	16,9	13,4
Sum of CD of random jumps	<b>B</b>	4,2	1,8	5,3	3,6	5,4	4,3	7,3	5,2	9,7	7,3
	<b>G</b>	2,9	1,0	4,9	1,1	6,9	3,6	7,5	4,7	8,2	5,9
Average CD of random jumps	<b>B</b>	1,5	1,0	1,7	1,4	1,8	1,4	2,1	1,8	2,3	1,9
	<b>G</b>	1,3	1,0	1,7	1,4	1,9	1,2	2,0	1,8	2,1	1,9
Sports qualification, c.u.	<b>B</b>	2,6	2,1	3,0	2,1	3,8	3,6	4,5	4,2	5,5	4,7
	<b>G</b>	2,4	1,6	3,4	2,0	4,0	2,7	4,5	3,5	5,6	3,6

*Note.* Sports qualification is given in conventional units: 1,0 – without category; 2,0 – jun. category; 3,0 – jun. category; 4,0 – category; 5,0 – category; 6,0 – category; 7,0 – CMS; 8,0 – MS.

Table 3

**Correlation between redefinition of sports and technical preparedness of young athletes**

Indicator	Age, years									
	9		10		11		12		13	
	B	G	B	G	B	G	B	G	B	G
Number of athletes	n=18	n=16	n=27	n=29	n=26	n=28	n=28	n=24	n=24	n=20
Sum of CD of all jumps of the program	283	191	427	474	410	560	623	132	566	307
Sum of CD of random jumps	234	114	460	336	492	418	532	468	581	510
Average CD of random jumps	223	102	422	318	450	396	502	424	518	497
Average assessment for performing of mandatory jumps	136	244	159	220	267	283	550	666	788	744
Average assessment for performing of random jumps	219	570	688	208	565	635	704	680	750	710
Sports result	355	814	847	428	832	918	1254	1346	1538	1454
The critical value of the correlation coefficient at $p < 0,05$	0,47	0,47	0,47	0,47	0,44	0,44	0,51	0,51	0,51	0,51

Based on the carried out analysis results for sport and technical preparedness of young athletes of experimental groups and materials of competitions for juniors in the period from 2010 to 2013 was developed normative assessment of sport and technical preparedness of young plungers. Considering subjectivity of judicial assessment, we hadn't task to define normative assessment of quality of jump performing. As the main task of depth sports training stage is the development of jumps with medium and high coefficient of difficulty, the main criteria for sport and technical preparedness of young athletes at this stage were taken: the sum of the coefficients of difficulty ( $\Sigma CD$ ) of random jumps and the average coefficients of difficulty (aCD) of random jumps. The first indicator, besides the complexity of learned elements also characterize their number (Tables 4 and 5).

Table 4

**Assessment of the average coefficient of difficulty of jumps of young plungers aged 9–13 years, points**

Assessment Age, years	Excellent (point and more)	Good (max.–min.)	Satisfactory (max.–min.)	Unsatisfactory
9	2,0	1,9–1,7	1,6–1,4	1,3
10	2,1	2,0–1,8	1,7–1,5	1,4
11	2,3	2,2–2,0	1,9–1,7	1,6
12	2,54	2,4–2,2	2,1–1,9	1,8
13	2,6	2,5–2,4	2,3–2,1	2,0

Table 5

**Assessment of the sum of coefficient of difficulty of jumps of young plungers aged 9–13 years, points**

Assessment Age, years	Excellent (point and more)	Good (max.–min.)	Satisfactory (max.–min.)	Unsatisfactory
9	4,0	3,9–3,0	2,9–1,65	1,6
10	7,1	7,0–5,6	5,5–2,5	2,4
11	9,9	9,8–7,9	7,8–3,2	3,1
12	11	10,9–9,5	9,4–6,9	4,3
13	13,0	12,9–10,0	9,9–8,6	8,5

When you are using normative assessment you must take into account that assess of technical preparedness should be done only at the stage of advanced sports training, which involves exercises sports experience at least 2 years.

**Conclusions:**

1. Based on the carried out researches we have identified the main criteria for sport and technical preparedness of young plungers, namely the sum of coefficients of difficulty ( $\Sigma CD$ ) of random jumps and the average coefficient of difficulty (aCD) of random jumps.

2. We carried out the analysis of the selection of athletes in each of the five age groups and determined the required level of sport and technical preparedness to continue training in sport they have chosen.

3. One of the criteria for determining the sport suitability of young plungers can be developed by us assessment of their sport and technical preparedness.

**Prospects for further research.** This direction of researches is important and one that needs further investigation and scientific foundation.

**References:**

1. Platonov V., Bolshakova I. Nauka v Olimpijskom sporte [Science in the Olympic sport], 2013, vol. 2, pp. 37. (rus)
2. Shinkaruk O. Teorya metodika fizichnogo vikhovannya sportu [Theory and Methodology of Physical Education and Sport], 2013, vol.1, pp. 25. (ukr)
3. Zemtsova . . Olmpyska literatura [Olympic Books], 2008, pp. 367. (ukr)
4. Tovstonog O. F. Moloda sportivna nauka Ukraini [Young sports science Ukraine], Lviv, 2010, vol. 14, t. 1, pp. 322–327. (ukr)
5. Gaverdovskiy Yu. K. Obucheniye sportivnym uprazhneniyam. Biomekhanika. Metodologiya. Didaktika [Training Exercise. Biomechanics. Methodology. Didactics], Moscow, 2007, pp. 460–462. (rus)
6. Krasova . V., Mullagildina A. Ya., Krasova Ye. V. Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkv, 2012, vol. 5(2), p. 27–32. (rus)
7. Salamakha O. Ye. Vsnik Chernyngvskogo natsionalnogo pedagogchnogo universitetts m. T. G. Shevchenka [Journal of Chernigov universytetts National Pedagogical University named after T.G.Shevchenko], Chernyngv, 2013, Vol. 112, iss. 4, p. 218–220. (ukr)
8. Pravila zmagann z sribkv u vodu, Tablitsya koyefitsyentv skladnost sribkv [Rules of the competition in diving, Table complexity factor jumps], Kyiv, 29.01.2012. (ukr)
9. Nowakowska-Siuta R. Kształcenie zawodowe w krajach UE. – Warszawa: Centralna Komisja Ekzaminacyjna, 2006. – 32 s.
10. Niznikowska E. Kondycyjno-koordynazyjne uwarunkowania nauczania podstawowych cwiczen akrobatycznych na wszechstronnym etapie szkolenia: Autoref. pracy doktorskiej. – Warszawa: AWF, 2008. – 319 s.

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**THE MANAGEMENT OF PREPARATION OF YOUNG PLAYERS ON  
BASIS OF THE INDIVIDUAL CHARACTERISTICS  
OF THE CHILD'S ORGANISM**

**Abstract. Purpose:** *To review modern methods for assessing individual anatomical and physiological characteristics and motor abilities of the child's organism to determine the directions of their use in practice of coaches of youth football in Ukraine. Material and methods:* *the analysis of special literature, program and regulatory documents was carried out. Results:* *it was determined that the group form of learning, based on the calendar-average group evaluation, and not on registration of individual patterns of young football players development, prevails in the activity of children's coaches. Conclusions:* *the need for making changes in the management of sports activities of young football players, namely the use of individual differentiated system of training construction and development of new software and regulatory support of the sports schools activity.*

**Keywords:** *biological age, the intensity of development, motor abilities, the young footballers.*

**Introduction.** Currently, the children and youth football is at the stage of modernization and positive renovation. The development of new scientific and educational technologies, which contribute to the improvement of tactical and technical, physical, and psychological training of young football players, is ongoing. The experience of football reserve preparation in the leading countries of Western Europe points to the need for the involvement of coaches, which are experts on anatomico-physiological peculiarities of organization and development of children's organism, with the aim of ensuring the adequacy of response reactions to the load, volume and intensity, which increase sharply during the last years [19; 20].

The analysis of program and regulatory children football documents reflects the statistically average norm of evaluation of sports fitness of football players [14–16], which allows making the approximate evaluation, even considering the age, and can serve just as the known reference point in the diagnostics of the child's condition on the scale of its sports school [4].

The orientation to the «average» sportsman at the time of dosage of volume and intensity of training loads inevitably reduces the effectiveness of training process and leads to the appearance of health risk factors and chronic disorders of musculoskeletal system of children [3; 6; 11]. At the same time, the appearance of increasing number of publications, devoted to the individualization of training exercises on basis of the usage of objective, metric methods of evaluation of age

peculiarities of young sportsmen, is observed during the last years [2; 4; 6; 7; 9; 17].

The research was carried out according to the consolidated plan of research in the field of physical culture and sports for 2011-2015 of Ministry of Family, Youth Affairs and Sports on subject 2.3 «The scientific-methodological principles of the improvement of football training system of sportsmen with account of the peculiarities of competition activity» (state registration number is 0111U001722).

**The goal of the research:** to fulfil the complex analysis of modern methods of evaluation of individual anatomico-physiological peculiarities and motor abilities of child's organism in order to identify the directions of their usage in practical activity of coaches of children and youth football in Ukraine.

**The material and methods of the research:** the analysis of special literature, program and regulatory documents.

**The research results and their discussion.** The notion «biological age» appeared because of the fact that children and teenagers of the same chronological age often have 4 or 5-years difference according to the level of biological ripeness, possessing greater morphofunctional abilities, than their contemporaries [5]. Frequently physical and mental ripening of the child, functional capacity of musculoskeletal system and internal organs, general state of health, so all the characteristics of so-called biological age are not in accord with the chronological age, being in advance of it or appreciably falling behind. Such discrepancy can be more intensified by the acceleration, which is characterized by the following main peculiarities: the accelerated physical development, the earlier terms of pubescence, the increase of body size [8; 18].

It is necessary to mention that biological age, to a greater extent than chronological one, reflects the ontogenetic maturity of a child, provides the insight into unemployment, level of demonstration of motor qualities and the character of adaptive reactions to training loads, which differ in volume and intensity [4; 10]. The criteria for the evaluation of biological age can be morphological, functional and biochemical indicators, the diagnostic value of which varies according to the period of maturation of organism. Thus, the evaluation of overall variation level is made in accordance with body mass and length, which adequately characterize the physical condition of children. As for the changes of these values, it is possible to make conclusions about the intensity of growth processes and about the influence of training loads. On basis of these indicators, the following somatotypes (ST) can be identified: microsomal (MiS), mesosomal (MeS), and macrosomal (MaS) [1; 5].

It is determined that the orientation to the middle-age norm of the increase in the indicators of the body length without regard to somatotype, evaluated by the overall variation level, is able to reduce the effectiveness of training and learning process [7; 9]. The division into somatotypes reflects the level of spare capacities of organism regulation system, making it possible to realize more differentiated approach to the evaluation of motor abilities of young football players, and make conclusions about the effectiveness and orientation of learning and training process by means of comparison of normative and factual indicators (Table 1).

Table 1

**Statistical indicators of the body length of 8–12-years football players of different somatotypes [17]**

Age (years)	8	9	10	11	12
<b>Microsomal type (MS)</b>					
M (cm)	132,00	132,90	133,20	135,10	137,65
$\pm\sigma$	2,52	2,61	2,97	3,49	4,13
SU%	1,90	1,97	2,23	2,59	3,00
<b>Mesosomal type (MeS)</b>					
M (cm)	142,90	143,22	143,72	146,03	148,53
$\pm\sigma$	2,85	2,89	3,14	3,40	3,27
SU%	1,99	2,02	2,18	2,33	2,20
<b>Macrosomal type (MaS)</b>					
M (cm)	149,10	149,90	150,65	153,65	155,75
$\pm\sigma$	2,30	2,34	2,56	3,41	4,12
SU%	1,54	1,56	1,70	2,22	2,64
<b>Without division into somatotypes and variants of development</b>					
M (cm)	140,20	142,49	143,00	145,37	147,80
$\pm\sigma$	6,09	6,11	6,35	6,85	6,84
SU%	4,34	4,29	4,44	4,71	4,63

Moreover, it is necessary to take into consideration the fact that between ST, the type of hemodynamics and type of adaptive reactions there is the established dependence, which can be taken into account during the sports selection [10; 18].

The analysis of quantitative and qualitative characteristics of the increase in body mass and length of 8–15-years football players showed that the stages of initial and preliminary preparation take place under the conditions of rather small intensity of growth and development of organism. That is why these stages are the most favorable for the formation of football skills, but only on the assumption of wide use of various exercises of general physical and game orientation. The stage of specialized basic training coincides with the period of considerable increase in the indicators of body mass and length that is inevitably accompanied by breaking of fixed skills and abilities. In this case, many-sided motion base, formed at the stages of primary education, will provide the further harmonic adaptation of young football players to genetically determined changes in their organism.

The registration of primary and secondary sexual characters according to the scheme of N.T. Belyakova and T.I. Makova (1978) is usually used for the evaluation of biological age in the pubescence period. It is known that teenagers of the same chronological age, which have different tempos of pubescence, differ significantly by the level of morphofunctional indicators [1; 7].

It is possible to realize determination of biological age of children and teenagers, and evaluation of individual peculiarities of the development of young sportsmen according to the «dental formula», which takes into account the order, terms of eruption and change of teeth, and is the objective indicator of biological age

for the period from 5 to 13 years, but during the next years it loses its informative value [8]. The tooth maturity is defined by sight and is compared with the standards (Table 2).

Table 2

**The evaluation of the level of age development (according to «dental age»)  
(the number of permanent teeth)**

Age, years	Sex	Retarded development	The development corresponds to the age	Accelerated development
5,5	B	–	0–3	> 3
	G	–	0–4	> 4
6,0	B	0	1–5	> 5
	G	0	1–6	> 6
6,5	B	0–2	3–8	> 8
	G	0–2	3–9	> 9
7,0	B	<5	5–10	> 10
	G	<6	6–11	> 11
7,5	B	<8	8–12	> 12
	G	<8	9–13	> 13

The intensity of the growth (the developmental variation) may serve as the indicator of physical development. The developmental variation (DV) is individually-variable characteristic of a person, which reflects the rate of course (or duration) of growth processes. In contrast to «biological age» or «biological maturity», which are the evidence of the maturity of the organism at the moment of examination, the developmental variation give the possibility for forecasting the duration of growth periods and the age of the ending of organism growth [5].

There is the system of evaluation (in points) of biological age of sportsmen, worked out by T.S. Timakova (1988). The DV is evaluated in accordance with growth intensity (GI), which is calculated with a help of the following formula:

$$P=D2-D1:0,5(D1+D2)\times 100$$

Based on the results of measurements, it is possible to identify the percentage range from the average value and identify how the researched value has changed over a particular period of time. The received value is compared with the appropriate one. In that case if:

- the value GI is bigger than appropriate one, so the advanced development takes place – acceleration, DV is evaluated as the shortened one (DV «A»);
- the coincidence of calculation results and appropriate ones, so the correspondence to age group is observed – norm, DV is evaluated as the customary one (DV «B»);
- GI is lower than appropriate one, so the decelerating development takes place – retardation, the development variant is evaluated as the extended one (DV «C») [4].

Every child passes the same stages of development, however, considerable individual differences in terms and tempos of biological maturation are observed. The experience of performing works on the selection of children to Children and Youth's

Sports School shows that at the stage of initial preparation the children with accelerated tempos of development, which surpass their contemporaries with normal and retarded tempo of biological maturation, are the first ones who come in view of the coach. Nevertheless, before the beginning of the period of preparation for the high performances, the retardants already surpass other sportsmen in all main indicators of preparedness due to bigger overall growth [10]. In particular, the sportsmen with retarded type of biological maturation are characterized by the tendency to further increase of results even after 15-16 years, while accelerates and mediants of this age have a period of certain stabilization [13].

It is necessary to make a point of the moment that the accelerated growth in modern conditions of sports training is, in some specified sense, the limiting factor [10]. The confirmation of this view comes from the following thesis, existing in cytophysiology: «The cell, which functions, doesn't divide, and the cell, which divides, doesn't function» (L.M. Zhinkin). This regularity is related to the fact that cell division is realized only after suppression of functional demonstrations, typical for the particular cell, and destruction of corresponding intracellular structures (S. Y. Zalkind, 1966). Thus, the growth and development processes, which underlie the ontogenesis, are in contradictory relations, considering the fact that the realization of growth processes at the expense of the increase in cells number should lead to the suppression of cell differentiation, which determines the complication of structural and functional organization of developing organism [12].

In their time, I.I. Schmalhausen (1935), V.I. Makhinko and V.M. Nikitin (1975) pointed to the phase character of the course of ontogenesis processes, each of which begins with the outbreak of differentiations, which is followed by the phase of activation of growth processes. Reasoning from this fact, the one of the main contradictions of individual development is the contradiction between differentiation and growth, the temporal separation of these processes is allowed during the functional period of ontogenesis. This leads to the appearance of the periodicity of ontogenesis process. In that case, each period consists of the phase of differentiation with growth retardation and the following phase of activation of growth processes with the extension of functional abilities on basis of formed new quality cells [12].

The practice proves that children with various developmental variants differ in tempos of mastering the technique of sports movement performance. This is particularly important in sports with complex technique, to which the football undoubtedly belongs. The time of mastering the technique by the children of the DV «A» is shorter in comparison with the time of DV «C» [17]. It is clear why young footballers with decelerated development surpass the leaders later – they mature slower, but at the same time, they master the movements better and more deeply, practicing them for second nature.

It is established that the general growth period of the children of DV «A» covers 15-16 years, regardless of overall characteristics, the children of DV «B» – 18-19 years, and the children of DV «C» – 19-22 years. The longest period is the children's (puerile) period, which covers 50-55 per cent of the general increase. As



for the children of DV «C», this period, in absolute figures, is 2,5–3,5 years longer in comparison with the DV «A» [4].

The average annual body height gain, without considering the growth phases, is 5,5 cm in children of DV «A», 4,52 cm in DV «B» and 4,45 cm in children of DV «C». At the same time, the rates of coming of so-called morphological maturity are also different – that is not only the growth, but also other systems of organism – for instance, muscular and life-support systems. The children of DV «A» reach 75, 5 per cent level of morphological maturity till 8,5 years, and the children of DV «C» – till 12-12,5 years. The lead of the children of DV «A» by the children of DV «C» till 12-years age is 2,5-3 years, and according to height these indicators reach 15-20 cm [7].

Considering the abovementioned, it becomes clear why the players, which significantly outgrow the others, appear in teenage football teams. The coach has a temptation to orient the value of physical loads exactly to these boys, which he reasonably considers the most perspective players at the present moment. Besides, taking into account the fact that regular football championships are held since 9 years, the coach becomes to be ruled by the performance result of the team that affects the intensification of training process. Under such conditions of training, the danger of overtraining of children of DV «B» and, first of all, the children of DV «C» occurs. Primarily, it has a current importance during the pubertal period, when the differences between teenagers are the most noticeable.

It was found out that 13-14 aged children of DV «A» successfully bear the training, the children of DV «B» practically cope with loads, and as for the boys of DV «C», the vacillations in the direction of reduction [2]. In particular, it affects the quantity of fat mass and there are such cases, when the fat content in the organism of a child of DV «C» reached the critical values of 3-4 kg losses. It point at the necessity for the consideration of body mass components and their correlation as the markers of training effects orientation, and in case of individual variant of analysis it allows to evaluate indirectly the level of general physical preparedness and adequacy of the load balance – the renovation, orientation of priority physical effect [1; 11].

The following moment is that the children of the same overall type – micro-, meso- and other types, but different DV «A», «B», «C» cannot combine into one group for sports activities, because they need various physical loads [4].

During the practical activity, it is possible for the coach to keep to the following recommendations:

1. To identify the developmental variant of the child since the moment of the beginning of systematical football activities. The annual measurement of height and forecast of rate and duration of growth processes of a child according to the increase value are required.

2. To avoid overtraining of a child. In order to fulfill this recommendation, it is necessary to control the child's weight for it to have neither reduction, no sharp increase. If there is an opportunity, the periodical determination of the organization of the body of young footballer starting with 12-13 years is possible.

3. The children, especially those of DV «A», need more time for the recreation than their contemporaries with DV «A».

Regarding the group of young football players, formed according to the developmental variant, without considering their overall variation, it is possible to plan the identical training routines. At the initial stages of education, such variant of training is the predominant one, but it requires the correction later. At sports orientation it is reasonable to form groups, relying on two criteria – overall and temporal (Table 1 and 3). In other words, to form groups, which are homogeneous in the body length and mass and developmental variant [4].

*Table 3*

**Statistical indicators of the body length of 8–12-years football players of different developmental variants of biological development [17]**

Age	8 years	9 years	10 years	11 years	12 years
<b>Developmental variant «A»</b>					
M (cm)	142	142,59	143,08	145,47	148,02
$\pm\sigma$	5,15	5,29	5,49	5,92	5,73
SU%	3,63	3,71	3,84	4,07	3,87
<b>Developmental variant «B»</b>					
M (cm)	141	141,50	142,86	146,57	150,86
$\pm\sigma$	7,98	8,11	8,73	9,62	8,98
SU%	5,66	5,73	6,11	6,56	5,95
<b>Developmental variant «C»</b>					
M (cm)	142,7	142,85	142,85	144,20	144,95
$\pm\sigma$	7,06	7,29	7,40	7,65	7,79
SU%	4,95	5,10	5,18	5,31	5,37

It is necessary to mention the moment that the differentiation of young football players according to somatypes leads to the formation of more homogeneous groups, than in case of division according to the variants of biological development. It does not contradict the statements that for those children, which are in juvenile and prepubertal phases of development, the orientation to somatic type during the organization of training process is the most appropriate. For the children in pubertal phase of development, it is advisable to orient to the variant of biological development [5].

Thus, the combination of growth process and biological maturity give the complete idea of current and further perspective of a sportsman [1]. The each of these processes can pass in different ways under the following variants of combination:

1. The acceleration of growth and acceleration of development.
2. The acceleration of growth and norm of development.
3. The acceleration of growth and retardation of development.
4. The norm of growth and acceleration of development.
5. The norm of growth and norm of development.
6. The norm of growth and retardation of development.
7. The retardation of growth and acceleration of development.
8. The retardation of growth and norm of development.

## 9. The retardation of growth and retardation of development.

The level of physical preparedness can be the next moment of the evaluation of individual abilities of child's organism. The existing practice of testing the conditioned motor abilities, in addition to the fact that it orients to average data, it is also carried out without regard to the peculiarities of organization of the body and biological age of young football players that considerably reduces the informative value of the mentioned facts, as well as their prognostic value. It is necessary to discuss the notion «physical preparedness» and its evaluation in more detail. With a help of the range of the tests, the power, speed and speed-power abilities of a child and his endurance are identified. The each of conditioned motor qualities characterizes the maturity of separate morphological structures, which determine this quality, and one of the sides of motor abilities in the whole [12]. At the same time, it is known that the most significant role in achievement of the highest results in modern sport and saving the state of health belongs not to absolute abilities of one or another system, but to the coordination of systems and functions, the ability of the systems of organism to save the harmony of the activity in extreme conditions [3; 13].

Hence, it is necessary to make the integrated assessment of conditioned motor qualities, considering the ST of a child. The obtained results are summarized in the evaluation table of age and somatodynamic norms [17], with a help of which it is possible to state, for instance, that a child, according to one test, corresponds to 6-years age of a certain ST, and according to another test – to 7,5-years one. The following formula can be used for it:

$$N=(M1+M2+\dots+Mn),$$

where: N – the general result, indicated in testing; M – the leading movement indicators, which are included into the definition of a «portrait» both of one examined child and the whole group [4]. Thus, the registration of the motor activity indicators creates the opportunity to evaluate individual and age motor abilities of a child, to forecast and model the result of motor skill, to determine the parameters of movements, which allow reaching the needed model level.

In order to determine the individual indicator of many-sided physical preparedness of young football players, it is possible to use the method of M. Y. Nabatnikova and her co-author (1986), which recommend the orientation to the target result in the basic exercise, for instance – 30 m run (Table 4).

*Table 4*

**The target results of young sportsmen of different somatotypes in 30 m (sec) run**

Somatotype	Age				
	5	6	7	8	9
MaS	7,18	7,05	6,55	6,23	6,09
MeS	7,24	7,11	6,59	6,24	6,01
MS	7,39	7,28	6,73	6,59	6,49

When examining the structural peculiarities of physical preparedness of children, the consistency of changes under the influence of purposeful physical loads, it is essential to note that living organism is a complicated system, which resists the environment and changes under its influence by means of activation of adaptation mechanisms. Such conception of organism existed in the works of representatives of «classic» mechanism in physiology. Later this point of view transformed considerably due to the works of N. A. Bernstein (1966), P. K. Anokhin (1973, 1975, and 1980) and other researchers.

It is known that the organism can achieve the same final motor goal in different ways, using the set of the same reactions in response. The coach is interested in motor abilities of a child, and, consequently, mainly in the structure of his locomotor apparatus and the system of movements regulation. It is necessary to conduct the evaluation of the state of these systems with a help of testing exercises, which do not demand special motor skill. Otherwise, the motor qualities with the acquired skill in this motor action performance, including individual skills, rather than motor qualities of a child will be evaluated, that is unacceptable in most cases [4; 11].

The motor activity of a child is changing with the increase of years, so the active change of the organism takes place. There is no need to put the question: what is initial – function or morphology? These are two sides of the single process of ontogenetic development of a child. In particular, the morphological characteristics, the integral representative of which is the body length, is just the indicator of potential qualification of a sportsman. The present efficiency is mostly determined by the level of preparedness [1; 4].

Hence, the training process make the significant corrections to the result of motor activity, activating the processes of reparative regeneration, but strictly within the limits of individual corresponding norm of reaction, because every child has his own ceiling, norm and course speed of the same processes. The speed of the processes is different, but their sequence is strictly programmed and can change under the influence neither external, nor internal factors [12; 18]. Some children have faster course of the same processes (the stages of development), the others – the slower one; for some children double (sometimes triple) trainings are acceptable, and for others it is the way to overtraining, incomplete recreation etc. [3; 6; 13].

**The conclusions and the perspectives of further researches.** The adoption of modern innovative approaches of diagnostics makes it possible to increase the quality of preparedness of football talents for high performance sport and, thereby, bring it in correspondence with development needs of national football and approximate it to the standards of the development of children and youth professional football in the world.

The materials of the present research can be used in practical activity for increasing the competency of children's trainer; reorientation of training process from the uniform methodic approach to the individually differentiated system of training organization; during the development of new software and regulatory support of sports schools activity.

**References:**

1. Abramova T. F., Nikitina T. M., Kochetkova N. I. Morfologicheskiye kriterii – pokazateli prigodnosti, obshchey fizicheskoy podgotovlennosti i kontrolya tekushchey i dolgovroyemnoy adaptatsii k trenirovochnym nagruzkam [Morphological criteria – indicators of fitness, general physical preparedness and control current and dolgovroemnoy adaptation to training loads], Moscow, 2010, 104 p.
2. Antipov A. B. Formirovaniye spetsialnykh skorostno-silovykh sposobnostey 12–14-letnikh futbolistov v period polovogo sozrevaniya: avtoref. kand. ped. nauk [Formation of special speed-strength abilities 12-14-year-old players in puberty: Authors thesis], M., 2002, 22 p.
3. Batti M. D. Funktsionalnoye sostoyaniye organizma yunykhsportsmenov: endogennyye faktory riska i tekushchiy mediko-biologicheskyy kontrol (na primere futbola): avtoref. kand. Biolog. nauk [Functional state of health of young athletes: endogenous risk factors and current medical and biological control (for example, football): Authors thesis], Krasnodar, 2005, 19 p.
4. Guba V. P., Kvashuk P. V., Nikitushkin V. G. Individualizatsiya podgotovki yunykhsportsmenov [Individualization of training young athletes], Moscow, 2009, 276 p.
5. Dorokhov R. N., Guba V. P., Petrukhin V. G. Metodika rannego otbora i oriyentatsii v sporte [Method of early selection and orientation in sports], Smolensk, 1994, 80 p.
6. Kvashuk P. V. Differentsirovannyy podkhod k postroyeniyu trenirovochnogo protsessa yunykhsportsmenov na etapakh mnogoletney podgotovki: avtoref. doktora. ped. nauk [Differentiated approach to the construction of the training process of young athletes at the stages of long-term training: Authors thesis], Moscow, 2003, 49 s.
7. Kuzmin A. A. Vliyaniye sportivnykh fizicheskikh nagruzok na morfofunktsionalnoye razvitiye i regularno-adaptivnyye vozmozhnosti yunykhsportsmenov i basketbolistov: avtoref. kand. biol. nauk [Effect of physical activity on sports development and morphology and regularly – adaptive capabilities of young football players and basketball players: Authors thesis], Maykop, 2011, 21 p.
8. Kuramshin Yu. F. Diagnostika i prognozirovaniye sposobnostey pri sportivnoy oriyentatsii i otbore [Diagnostics and forecasting abilities in sports orientation and selection], Saint Petersburg, 2006, 85 p.
9. Lyamar A. O. Tekhnicheskaya podgotovka kvalifitsirovannykh futbolistov razlichnykh somatotipov: avtoref. kand. ped. nauk [Technical training of skilled players of different somatotype: Authors thesis], Krasnodar, 2010, 25 p.
10. Mikhaylova T. V. Sotsialno-pedagogicheskiye osnovy deyatel'nosti trenera [Socio-pedagogical bases of activity of the trainer], Moscow, 2009, 288 p.
11. Seluyanov V. N., Sarsaniya K. S., Zaborov V. A. Futbol: problemy fizicheskoy i tekhnicheskoy podgotovki [Football: problems of physical and technical training], Dolgoprudnyy, 2012, 160 p.
12. Sonkin V. D., Tambovtseva R. V. Razvitiye myshechnoy energetiki i rabosposobnosti v ontogeneze [Development of muscle and energy efficiency in ontogenesis], Moscow, 2011, 368 p.
13. Fedotova Ye. V. Osnovy upravleniya mnogoletney podgotovkoy yunykhsportsmenov v komandnykh igrovyykh vidakh sporta [Fundamentals of management of long-term training of young athletes in team sports gaming], Moscow, 2003, 224 p.
14. Nkolayenko V. V., Avramenko V. G., Bobariko O. YE. Futbol: Navchalna programa dlya dityacho-yunatskikh sportivnykh shk'l, spetsialzovanykh dityacho-yunatskikh shk'l olimpiyskogo rezervu ta shk'l vishchoi sportivnoi maysternost [Football: Training program for youth sports schools, specialized youth school of Olympic reserve school and high sportsmanship], Kyiv, 2003, 106 p.
15. Guba V. P., Kvashuk V. P., Krasnoshchekov G. V. Futbol: primernaya programma dlya detsko-yunosheskikh sportivnykh shk'ol, spetsializirovannykh detsko-yunosheskikh shk'ol olimpiyskogo rezerva [Football: sample program for youth sports schools, specialized youth school of Olympic reserve], Moscow, 2010, 128 p.

16. Godik M. A., Boroznov G. L., Kotenko N. V. Futbol: tipovaya uchebno-trenirovochnaya programma sportivnoy podgotovki dlya detsko-yunosheskikh sportivnykh shkol, spetsializirovannykh detsko-yunosheskikh shkol olimpiyskogo rezerva [Football: typical educational training program of sports training for youth sports schools, speized youth schools of Olympic reserve], Moscow, 2011, 160 p.

17. Chernetsov M. M. Individualizatsiya protsessa fizicheskoy podgotovki yunych futbolistov 8–12 let na osnove differentsiatsii somaticheskikh tipov: avtoref. kand. ped. nauk [Individualization process of physical training young players aged 8-12 years based on the differentiation of somatic types], Smolensk, 2010, 20 p.

18. Shchedrina A. G., Marin V. F. Biologicheskiye osnovy sportivnogo otbora [Biological bases of sports selection], Novosibirsk, 2000, 163 p.

19. Guida Tecnica Per Le Scuole Di Calcio / Federazione Italiana Giuoco Calcio: Settore Giovanile e Scolastico. – Roma, 2008. – 572 p.

20. Talentförderprogramm: Leitfaden für die Ausbildung / Deutscher Fussball-Bund. – Munster: Philippka-Sportverlag, 2002. – 289 p.

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## **FEATURES, PROBLEMS AND PROSPECTS DEVELOPMENT EXTREME TYPE BICYCLE SPORT (BMX)**

**Abstract. Goal:** identify particular problems and prospects of development of an extreme form of cycling. **Material:** an analysis is conducted over 25 literary sources, magazines motorcycling, bicycle sport with the exposure of historical facts of development of extreme type of the cycle racing (BMX) in such countries as America, Latvia, France, Netherlands, Russia, Ukraine. **Results:** statistics of infrastructure and periodicity of the conducted competitions is analyzed on BMX in the countries of Europe. Organizational and practical work assignments are certain, both with sportsmen and with trainers on BMX-sport in Kharkov and area. **Conclusions:** increased interest youngsters to take BMX sports in Kharkov region in the future may form traditions and motivation that will be an important factor in ensuring a healthy lifestyle.

**Keywords:** history, BMX, prospects development.

**Introduction.** Social and economic and political transformation in different countries affected and the scope of extreme kind of cycling (hereinafter BMX), which is currently being developed further. The reasons for this were both external and internal factors. First, in some countries noted overcoming crisis phenomena associated previously with insufficient funding, lack of funds for construction of specialized facilities, falling of the profession prestige, etc. [4]. Second, for several years have significantly intensified scientific research works in the field of sports, especially in cyclic kinds, which include cycling [5–8].

Therefore, of particular interest at this stage is the study of the problems and prospects of this kind of sport, recently became an Olympic sport program (2008, Beijing), since they are a reflection of the main steps in the process of formation and development of cycling, thereby defining a circle of problems and major achievements.

**Goal of the research:** to identify particularity, problems and prospects of development of an extreme kind of cycling.

**Tasks of the research:**

1. To analyze scientific and technical information of foreign and Ukrainian publications.
2. Identify ways to improve and develop extreme kind of cycling as a means of physical education and sport.

**Methods of research.** Comparative-historical method, causative-consecutive analysis of the relationship between historical events, historical and systematic

analysis.

**Results of the research.** History and development of the bicycle for extreme cycling, connected with the history of bicycles at all, since the first imperfect model of BMX-bicycle attracted interest and immediately raised the natural questions: Is it possible to use a bicycle to perform tricks, jumping on trampolines, jumping on the railing, etc. Since the inception of BMX-bicycle there is a need to prove its right to exist in countries such as the United States of America, Latvia, France, Netherlands, Belgium, Russia, Ukraine.

In the 1960s in the United States rapidly developing motocross. European stars such as Roger De Coster and Joel Robert and American riders Harry Bailey and Brad Lucky became idols of almost all teenagers in the United States. Extraordinary performing stunts on a motorcycle, riders conquered the imagination of almost every boy in America [2].

In 1963 American company Schwinn under the direction of Al Fritz has developed a new model of bicycle called Sting-Ray. By 1968, 70% of all bicycles sold in the United States, were Schwinn Sting-Ray. Steering geometry of Sting-Ray combined with the short wheelbase and 20-inch wheels, is perfectly suited for all kinds of cycling.

In November 1970, in Long Beach (California), a young motorcycle racer Scot Breithaupt (Scot Breithaupt) saw a group of teenagers on bicycles with 20-inch wheels, who performed something like motocross, and invited them to make a real race with prizes. On the first day in the race involving more than 20 teenagers, and the next week there were already more than 100. Several months later, Scot founded the first racing organization called BUMS (Bicycle United Motocross Society).

In the middle of 80-s in America began the rapid development of BMX-sport (bicycle-moto-extreme). Evidence of this – the creation of the first bicycle companies (1975-1980 years), specializing in the production BMX-bikes and one of the first competitions, dated 1976-78 years. It should be noted that they were very different from today's models. At first it was a small bicycle for cycling, not intended for any tricks.

Soon "unhitch" guys who are tired of just cycling began to career about on the streets and jump on everything that has been possible. Such aggressive cycling style rather quickly attracted attention and gained many fans. Bicycle manufacturers began to remodel the old and develop new design of BMX-bikes designed directly under the abnormal operating conditions. Among the first manufacturers were firms: HARO, GT, HUTCH, SKYWAY, MONGOOSE.

In 1981 the International Federation IBMXF is created and BMX became an official sport direction, and later organized the world championships and a series of national competitions in the USA «Bicycle Stunt». Athletes gradually master the most difficult stunts with using BMX-bike.

One of the lawmakers of BMX sport is considered to be Dave Mirra (Dave Mirra), who was born on April 4, 1974 in Chittenango New York, USA. For several years he was a leading professional BMX-rider and car-racer. Nicknamed Miracle Boy (Miracle Boy), was the first who performed a double backflip during



competition, has won more than 20 medals at the X Games (14 of them are gold). Has died in a car crash in 2012 (Fig. 1).



**Fig.1. Dave Mirra**

Increasing level of development of a new sport for that time in the future supported the American Freestyle Association (AFA). It joined hundreds of riders, racers, flatlanders and fans VERT.

*The first direction* in BMX is considered to be Racing, where riders-racers take part in race. Competitions are held on a dirt track with a common finish. Racers start from a slope height of 1.5 to 4 meters. The track usually consists of four lines (with springboards) and three turns. Simultaneously eight athletes start in one race (Fig. 1a).



a)



b)

**Fig. 1. BMX:**  
*a – Racing; b – Flatland*

*The second direction* is considered to be flatland (Flatland), in which the rider performs a "dancing on the bicycle". The essence of discipline is to perform a variety of tricks on a flat surface (Fig. 1b). This direction is the least traumatic among others.

*The third direction* is freestyle (Freestyle), which combines several branches.

Vert (Eng. abbr. Vertical – prone) – the direction in which the rider cycles in a U-shaped structure (ramp) (Fig. 2a). Rider rolls down from the top edge, and flying

high out the other end, performing various tricks. After completing his maneuver, he again fly on the ramp and out the other end, etc.



a)

b)

**Fig. 2. BMX:**  
*a – Vert; b – Dirt*

Dirt (Eng. Dirt – dirt, soil) – the direction in which they perform tricks on a dirt track with high hills. Gathering maximum speed, rider can fly very high and perform quite complex tricks (Fig. 2b).

Street (Eng. Street) – the direction in which they perform tricks in an urban environment with obstacles inherent the city (eg., stairs, face, railings, etc.) (Fig. 3a).

Park (Eng. Park) – the direction is between the Street and Vert. Cycling takes place in a special place (park, square). It is a place where there are various obstacles designed to perform tricks (face, relegation, drops, rails, ramps, etc.) (Fig. 3b).



a)

b)



**Fig. 3. BMX:**  
*a – Street; b – Park*

BMX quickly spreaded as a unique sports bicycle discipline and after a few years in January 1993 BMX has been accepted by the Union of International Cycling (UCI) [5]. To date, the BMX in UCI is:

- 75 joined national federations of racing BMX in program UCI;
- annual world championship UCI BMX, whose founder is the only UCI;
- UCI is the organizer of premium racing series of BMX in the world – UCI

BMX Supercross;

- more than 70 international BMX events and activities are presented in the international calendar of UCI, spanning four continents;
- UCI holds more than 40 races – UCI BMX Continental World Ranking, with annual prize fund of 30 thousand Swiss francs;
- in addition, UCI organizes official training BMX courses and trainings, both for the organizers of the competition, and for trainers and riders.

In the middle of 1990-s. themed media appeared, covering trends of BMX, as well as membership clubs. In the second half of 1990-s, the huge popularity gets the dangerous trend called "vert" (vert). Riding is also developed in the style of "street" (street) – spectacular cycling with obstacles.

In October 2003, at the next congress of the Union of International Cycling announced that the International Olympic Committee (IOC) will include BMX-Racing in the program of Summer Olympic Games 2008 in Beijing (China). In these games, it was represented by one male and one female disciplines. First Olympic champion became Maris Strombergs from Latvia and Anne-Caroline Chausson from France. At the Summer Olympics games in 2012, which were held in London (England) champions became the same Maris Strombergs from Latvia and Marian Pazhon from Colombia.

The year 2008, when Maris Strombergs won the first gold medal in the new Olympic sport – BMX, will remain the memorable one in the history of Latvian cycle racing. The first BMX competitions (bicycle motocross) in Latvia took place in the autumn of 1988, and Ivo Lakučs, one of the main participants, was the racer and the coach of Latvian Olympic team after 20 years at the Olympic Games in Beijing. The history of the development of BMX illustrates the Latvians' love of sport. Although neither state, nor local government provided almost any assistance for many years, the sportsmen and their parents produced bicycles and routed by themselves, thus they got experience and professionalism in this concrete sport.

Ivo Lakučs won the gold medal at the World Championship of 2001 and became the champion of Europe in 2003. When it was decided to include the BMX into the program of Beijing Olympic Games, Latvia had already had the new team, which was able to achieve a success. In 2006, the Latvians occupied the whole pedestal at the European Championship. In February 2008, Arthurs Matisons won the world cup in supercross in Madrid, and in the beginning of June Maris Strombergs became the world champion. The Latvians arrived at the Olympic Games in Beijing, having hopes of winning two medals. They won only one medal, but the most shining one. Maris Strombergs won six of seven races and became the first Olympic champion in the history of this sport.

In 2005, according to the statistic data, more than 350 different BMX tracks were built in France, 10 per cent of them are the modern ones; more than 20 similar tracks – in Netherlands; more than 6 modern tracks – in Belgium.

In 2007, BMX-sport took the lead and more than 12500 licences were bought back by that time in France, in Netherlands – more than 9700 licences, in the USA – more than 100000 ones. The sportsmen had an opportunity to take part in the competitions of various scales practically weekly in the course of the year.

At the time the following sports events were held annually in the countries of Central Europe: 12 stages (6 competitions, each one of which consists of 2 stages) of

the European Championship (from the end of April and until the mid-July, every second week – a race); the traditional European indoor races (3 competitions for two days in January-February); World Cups, held in Europe (2 competitions, each one of which lasts for 2 days); multistage National Cups, and an opportunity to start in any competitions in the nearest European country.

The European racers had an opportunity to start in different national or international competitions practically every week.

In October 2009, the magazine «BMX News» reported about the plans of the British sports tops, which consisted in allocating 19,5 million pounds sterling for the building of covered BMX racetrack and the training-center. After one and a half of a year the project was carried out in Manchester, its bottom-line price was 24 million pounds sterling (the area is 9 290 square meters), it is already called the BMX-heaven on earth. Besides, the British Cycling offices, bicycle shops, cafes, changing rooms, a bicycle school for children are situated in the territory of the complex. There are also 2 thousand seats for the spectators around the track. The world competitions are carried out in the center – it is the best place for the races of any level now. On 28 May 2011, Jed Milton, 24-aged BMX-rider, set a world record by making a triple-back somersault.

In 2012, UCI BMX World Championships and London Summer Games took place in England.

Currently, BMX-sport in Europe, and in America in particular, is very popular, that is proved by the abundance of competitions. Among the competitions, carried out on an annual basis, the following ones can be singled out: X-Games, Beach Bash (the discipline Vert), the tournament King of Dirt, and the tournaments for Red Bull Cup, Urban Games. Each state or a city abounds in skate parks that provides daily trainings for people, gives an opportunity to the youth for self-actualization and letting the wild energy out for peaceful purposes.

The modern tracks (BMX) also make it possible to create the efficient training programs and to carry out the trainings at higher technical level. Repeatedly overcoming the difficult obstacles at top speed, the sportsmen get a high technical potential, which lets compete effectively at other similar tracks in future.

When continuing the historical statistics of the development of BMX sport, it is appropriate to write about the Russian Federation. The history of the development of BMX sport began in 1991. The first clubs and BMX tracks appeared in Saransk – «Cross-BMX»; in Moscow – «Diocles» and «Vnukovo»; in the settlement Issa, the Penza region – «The Jumping Tiger Cubs»; in Omsk – «The Pro»; in Moscow satellite towns: Dmitrov and Kolomna. Each of these clubs made a positive contribution to the development of BMX in Russia. Firstly, they became the centers of popularization of one of the new bicycle sports, the creation of Russian regulatory documents for holding the first official competitions.

On February 26, 1993, «The open committee» was created under the Union of bicyclists of Russia (by the example of UCI), and its task was to develop BMX sport. The development of BMX was rather active until 1995. The specificity of BMX, attracting by its extreme character (special tracks, bicycles and sports uniform) and the influx of the youth and children aged 5-10 in particular contributed to that.

During the 1990s, when the balanced Soviet system of physical education of children was being broken down, the sections were closed, and the most experienced coaches became the businessmen in search of means of subsistence, the enthusiasts of BMX built tracks, founded and improved clubs, searched funds for competition trips not only across Russia, but also abroad.

In 1996-1998, because of total absence of financing, coaches, programs for sports schools, special bicycles and sports uniform, the achieved level of the development of BMX began to decrease. At the time, there were only several clubs, which continued not only fighting the difficulties in Russia (default 1998), but also taking active part in official international competitions. Mainly, the perspective racers' parents provided the support of Russian BMX [1; 8], and at this stage the successful performances at the European and World Championships are the prove of it.

What is happening with Ukrainian BMX sport, which increasingly troubles us? In Ukraine, the development of BMX began since 1993 in the west regions. The opportunity of leaving abroad for habitants of boundary regions offered great opportunities for both the coaches and the racers. The first clubs and two constructed BMX-tracks were in Novoselitsa (Chernovitskiy region) and in Chernovtsy.

In the eastern region, the founder of BMX center was A.A. Eudokimov, who founded a bicycle club «Alev» in Kupyansk of the Kharkov region. During several years, under the auspices of local government and patrons of Kupyansk, the open BMX track (a dirt) was built, where currently the Championships and Cups of Ukraine in such disciplines as racing, individual race, and multi-stage tour are held.

In Kharkov and Kharkov region, in the context of restrained financial support of Bicycling Federation of Ukraine, it is necessary to systemize and realize the gathered experience for Kharkov (Ukrainian) BMX to enter the international arena in the main age categories: «the elite» men and women, juniors (80 per cent of the members of the Ukrainian team are the racers of Kupyansk), to do a considerable volume of organizational and practical work both with sportsmen and coaches.

The most important issues of the organizational work are the following:

- establishing the program of the development of the infrastructure of BMX-sport;
- establishing the program of advanced training of the coaches;
- including the new kinds of the races in the program of the regional (All-Ukrainian) competitions: «a cruiser» – the official kind of the European and World Championships program; «a relay race» – the exciting kind of the team fight, which is absent in UCI order yet, but, as well as in MTB, the information and the experience of carrying out this kind is in the process of gathering for it to be included in the international competitions program;
- the improvement of the system of judging of regional (All-Ukrainian) competitions;
- the organization of regional (All-Ukrainian) competitions with the use of special technical equipment;
- the correction of the calendar of regional (All-Ukrainian) competitions in accordance with international calendar UCI (annually).

The important issues of practical activity are the following:

- the formation of a system of the selection to the team of the Kharkov region;
- the creation of the material and technical basis for functioning of the Kharkov region team;
- the systematization of the available materials and the new information for the creation of the most effective methodics of the training of the Kharkov region (Ukraine) team.

**Conclusions:**

1. According to the data of the scientific and methodical literature, the extreme form of the cycle racing gains momentum in different countries of the world, the proof of which is the extended infrastructure, what cannot be observed in Ukraine.
2. The increased interest of teenagers to taking BMX sport in the Kharkov region can contribute to further formation of traditions and motivation that will be the important factor in providing the healthy lifestyle.
3. The building of the new specialized objects in Kharkov and Kharkov region will give an opportunity for the development of children sport system, improving the quality of the selection of gifted children and teenagers into the system of the reserve sport.

**The perspectives of further researches.** The researches will be oriented to the identification of the physical fitness level of 10-12 aged bicyclists of BMX specialization.

**References:**

1. Anvayer A. Velikiye momenty velikikh Igr s 1896 goda do nashikh dney [Great moments of great games from 1896 to the present day], Moscow, 2013, 564 p. (rus)
2. Zhurnal Moto, ID Za rulem 2013 [Moto Journal. Behind the wheel 2013], vol. 6/201, 138 p. (rus)
3. Nilin A. XX vek – vek sporta [XX century – the century of sport], 2005, 560 p. (rus)
4. Platonov V. N., Sakhnovskiy K. P. Podgotovka yunogo sportsmena [Preparing young athlete], Kyiv, 1988, 288 p. (rus)
5. Prudnikova M. S. Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkv, 2012, vol. 4, pp. 91–96. (ukr)
6. Prudnikova M. S. Materialy konferentsii kafedry fiziologii FGBOU VPO «RGUFKSMiT» [Proceedings of the conference, Department of Physiology VPO "RGUFKSMiT"], Moskva, 2012, pp. 123. (rus)
7. Prudnikova M. S. Postroyeniye trenirovochnogo protsessa yunykh velosipedistok 12–15 let s uchetom stanovleniya spetsificheskogo biologicheskogo tsikla: dis. ... kand. n. f. v. s: 24.00.01 [Construction of training process of young cyclists 12-15 years with regard to the formation of specific biological cycle], Kharkov, 2011, 282 p. (rus)
8. Solovyev A. Strasti po sportu [Passion for Sports], 2012, 354 p. (rus)
9. Fomina L. D., Kuznetsov A. A., Melikhov Yu. I. Velosipednyy sport [Cycle Sport], Sankt-Peterburg: 2004, 248 p. (rus)

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## **THE RESEARCH OF COMPETITION ACTIVITY OF TOP-LEVEL FEMALE SPRINTERS IN THE 4x100-METRE RELAYS**

**Abstract. Purpose:** *to analyze indicators of competition performance of highly skilled female sprinters in the 4x100-metre relay race. Material and methods:* *analysis and generalization of literary sources, analysis and treatment of video data, time-keeping. In research the members of the national team of Ukraine took part in the 4x100-metre relay race. Results: described are the coefficients of technical efficiency of performance of the relay teams- prizewinners of World cup in track-and-field in town of Tegu (2011). Kinematic features of technical skills of the relay pairs are described at a time of receiving and passing of relay baton in the "area of relaying". Conclusions:* *results of the 4x100- metre relay race do not depend only on speed possibilities of the team participants, but also on the method of passing baton.*

**Keywords:** *relay race, coefficient of technical efficiency, kinematic descriptions.*

**Introduction.** Steadily increasing level of sporting results in a sprint, hard competition in this type of track-and-field on a world sporting arena more and more strictly puts a question on the enhancing of sporting-technical skills, reliability and stability of appearances of the Ukrainian athletes in the competitions of different grade, particularly, in a relay race.

The 4x100- metre and the 4x400 – metre relay races for men and women are a component part of the track-and-field programs for all competitions, including the Olympic games, World and European championships. The most complicated is considered the 4x100-metre relay races of all these kinds. It is explained by many reasons, but the main one consists of what, that the passing of relay baton takes place on a high speed at run of both sprinters in the limited area (20 m)[3].

Many examples are known when teams, composed of sprinters, showing very high personal results in the 100-metre run, yielded to the teams, participants of which, have more subzero individual achievements. It testifies that the final outcome in the 4x100-m. relay depends not so much on speed possibilities of separate runners, but on correct and clear co-operation of them at the passing of relay baton in the area set by rules. Thus, in our view, further perfection of technique of co-operation of runners in the "area of relaying " and development of methods of training of sprinters in the 4x100- metre relay race will allow to attain high sporting results in this type of the track-and-field program.

The numerous advanced and methodical studies in this kind of sprint to which the 4x100- metre relay race is pertained, concern mainly a technique and

development of the special skills of sprinters [1; 2; 4; 6]. Thus, the most crucial problems of technical perfection are not examined in relay race, and, in particular, questions related to the passing of relay baton at the 20-metre area. At the same time, practice testifies, that exactly the passing of a baton in the 4x100-metre relay race either assist high achievements in this type of track-and-field or the efforts of the most talented sprinters come to nil [3].

Thus, today the questions of technique of relay race are not enough reflected in accessible to us literature, that shows actuality of theme of research selected by us.

**Research connection with the scientific programs, plans, themes.** Research is conducted according to priority thematic direction of scientific researches of Kharkiv state academy of physical culture on the topic "Design of technique- tactic actions of skilled sportsmen in swimming and speed-power disciplines of track-and-field".

**Research purpose:** to analyze the competitive performance indicators of highly skilled female –sprinters in the 4x100- metre relay race.

**Research methods:** analysis and generalization of literary sources, analysis and treatment of video data, time-study.

**Research results and their discussion.** Considering of the technique and training methods in the relay race does not give complete image on a number of questions, touching perfection of technique of co-operation of runners in the "area of relaying " on the pre-contest stage. Such questions are followed by, foremost, the absence of exact methods of distance-finding from the beginning of "area of acceleration" to the control mark.

In this plan of interest for the practical specialists are works of research of V. Krivozubov, in which factors, qualifying technical skill of sportsmen and their preparation to the 4x100-metre relay race are offered[1]. One of such factors, as the author thinks, is the moment of passing a baton. Confirmation of that is the results of the 2003-2011 world cups and the 2004 and 2008 Olympic games, where out of 125 woman relay teams, participating altogether at the 181th heat, 27 participants (14,9%) did not make it and were disqualified for violation of rules of competitions while passing the baton. For determination of technical skill of sportsmen, both for separate passing and relay race, on the whole, there are two methods of estimation [3].

**The first method** is characterized by the fact, that from the total time for the 100-m run of all participants of relay team, the result, shown in the 4x100- metre relay race, is subtracted. Most authors meet in opinion, that with the effective technique to pass baton is a result in relay race, which can be 2,50-2,70sec. better than a summary of results in the 100-m. run, shown by each of participants of relay race. Thus, this index, adopted as the coefficient of technical efficiency (CTE), can be used for control of quality of passing a baton.

Meaningfulness of technique of co-operation of runners in the area of relaying is illustrated by the results of final heat of the 4x100- m. relay race among the woman teams of the XIIIth World cup on track-and-field (town of Tegu, 2011). It is possible to assert on the basis of the conducted video analysis, that placing on a pedestal was decided by the last passing of relay baton at a time from the third to the fourth run.



Below are the coefficients of technical efficiency of teams, the prize winners, in the Tegu world cup (table. 1).

Table 1

**Indexes of efficiency of technical trade of teams in the 4x100metre relay race (world cup in Tegu of South Korea, 2011)**

Place	TEAM	Name of sportswomen	The best result of season	Sum of the best results	Result in relay race on WC.	Coefficient of technical efficiency
1	THE USA	B. Nait	11,10	43,98	41,56	2,42
		A. Felix	11,01			
		M. Maers	10,95			
		K. Djeters	10,92			
2	Jamaica	S. Price	10,95	43,92	41,70	2,22
		K. Stert	11,00			
		S. Simpson	11,05			
		V.. Kembell	10,92			
3	Ukraine	L. Povkh	11,30	45,16	42,51	2,65
		N. Pogrebnyak	11,34			
		M. Remen	11,20			
		K. Stuiy	11,32			

So, on a World cup in Tegu (2011), where sportswomen of the USA showed the best result of season in the world (41,56 s), each of participants had high individual results in the 100-m. run. Coefficient of technical efficiency of relay team was 2,42 sec.

Winning the second place the Jamaica representatives, had a sum of the best results, though insignificantly, but exceeding the sum of sportswomen of the USA, however, lost. In our view, poor technical preparedness for the relay race (CTE=2,22) did not allow the sportswomen of Jamaica to win World Cup.

The sportswomen of Ukraine, yielding to the runners of the USA and Jamaica, showed a result of 42,51sec. Thus their achievements in the 100- m. run were considerably below. A coefficient of technical efficiency of the Ukrainian national team was 2,65sec, i.e. considerably exceeded its showing of the teams of the USA and Jamaica. However, even that fact did not compensate considerably more poor speed possibilities of sportswomen (table. 1), but allowed to win the third step of the honor pedestal.

**The second method** of estimation of technical skill of the relay race is the account of a time of relay baton being in the 20-meter "area of relaying".

Advantage in time in a relay race takes place not only due to moving run but also because of presence of free space (1,20-1,30 m), conditioned by that, when a sportsman, passing a baton, draws out a hand forward, and a athlete accepting it pull his hand back. In this case appears a "reserve of space" which makes distance shorter, i.e. equal to 3,5-4,0m. during three passes. Thus, that is insignificantly, that the pass of the baton on every stage took place in a 20-meter area on maximally possible speed of two participants of the team. For prevention of loss of "a speed of baton ", its passing is recommended to produce on the 16th – 18th meters away an area of

relaying, that enables the runners to accept a baton,, taking into account the area of acceleration (10 m), and in a greater degree to use the 30-meter distance abided by the rules of competitions for gain the sub- limited speed.

Efficiency of technique of passing of relay baton can be defined also after time of covering the 30-m. run by a participant, accepting a relay baton, that being considerably simpler. So, while training it is possible to define the best time of starting acceleration (30 m) of runner, accepting a relay baton on the stage, and to compare it with the time, which he will show running of a 30-m. segment with the reception of baton. The less these results differ, the more effective was the passing [3].

For successful co-operation of runners in the limited "area of relaying " of race it is important to establish an optimal size of " odds" of which the other indexes depend on substantially and make an influence on efficiency of passing a baton.

Analysis of data in table 2 allows to estimate the level of preparedness of female national team of Ukraine in the 4x100- metre relay race.

Table 2

**Kinematic descriptions of technical skill of relay pairs during a reception and passing of relay stick in the "area of relaying "**

№	Passing-accepting sportsmen ("odds") Length of passer acceleration –60 m	Place of passing, m	Parameters			
			Time of difference of entry in the "area of relaying" acceptor and passer	Time of relay stick in the "area of relaying",	Time of overrun of "area of relaying" in run while receiving of relay baton by an accepting sportsman, sec.	Distance between acceptor and passer during the passing of relay baton, m
1	O. Povkh – N. Pogrebnyak (28-30 feet)	16	0,35	2,05	2,40	1,0
2	N. Pogrebnyak – M. Remen (28-30 feet)	16	0,28	2.04	2,32	1,0
3	M. Remen – Pyatachenko V. (29-30 feet)	12	0,30	2,07	2,37	0,5
4	M. Remen – N. Pogrebnyak (29-30 feet)	15	0,39	2,01	2,40	0,5
5	O. Povkh – V. Pyatachenko (29-30 feet)	12	0,34	2,02	2,36	0,5

Results, presented in a table, testify the difference in time of entry to the "area of relaying" between runners, accepting a baton and passing it, is in optimal limits with the second, third and the fifth pair. The most unsuccessful pair according to this parameter is the fourth one (M. Remen – V. Pyatachenko), of which index considerably exceeds the possible limits, that does not allow a runner to pass a baton, to maintain high rate at run to the place of relaying, and accepting runner to gain sub-

limited speed. It is known that by the indexes of the time difference of an entry in the "area of relaying" between runners are mostly determined the location of passing of relay baton, which is optimal for the first and the second pair (the 16<sup>th</sup>- meter of "area of relaying").

Comparison of time of relay baton being in the "area of relaying" with norm, offered by the Czech specialists [3], showed that in all presented pairs it corresponds to the estimation of "above" average. Optimal distance between acceptor and transmitter sportswomen during the passing of relay baton is observed with the first and the second pair.

Thus, the conducted research showed that out of the offered relay pairs only one corresponds to all criteria of technical preparedness – N. Pogrebnyak – M. Remen. It should be noted that, possibly, change of "odds" between passing and accepting sportswomen will promote the technical indexes of their co-operation in the "area of relaying".

### **Conclusions:**

1. The study of scientific and methodical literature showed that, in spite of plenty of publications, devoted to the sprint, the questions of relay race, as to its constituent, are considered insufficiently.

2. The analyses of results of the World cup in Tegu allowed to establish that the national team of Ukraine was among the most prepared to relay race in a technical plan, that the high index of coefficient of technical efficiency (2,65) testifies to.

3. The parameters of technical skill of relay pairs during accepting and passing of relay baton in the "area of relaying" for the sportswomen of the national team of Ukraine are high enough, but only one pair of them fully corresponds to the criteria of technical preparedness – N. Pogrebnyak – M. Remen.

**Prospects of further researches:** studying of problems of technical perfection of sportswomen in the 4x100-metre relay race on the stage of preparation to the major competitions.

### **References:**

1. Voprosy podgotovki begunov na korotkiye distantsii k estafetnomu begu 4x100 m [Questions preparation sprinter to run a relay 4x100 m], Minsk, 1988, 21 p. (rus)
2. Maslakov V. M. Legkaya atletika [Athletics], 2002, vol. 3–4, P. 24–27. (rus)
3. Maslakov V. M., Vrublevskiy Ye. P., Mirzoyev O. M. Estafetnyy beg: istoriya, tekhnika, obucheniye, trenirovka [Relay race: history, technology, education and training], 2009, 144 p. (rus)
4. Mirzoyev O. M. Teoriya i praktika fizicheskoy kultury [Theory and Practice of Physical Culture], 2009, vol. 2, P. 66–72. (rus)
1. Dostal E. Stafetove behy. An.: Sprinty. – Praga, 1985. – S. 124–133. (rus)
2. Fukashiros S. The biomechanical study the baton passing in 4x100 m relay / S. Fukashiros, A. Matsio, K. Kobayashi, A. Wakayama, Y. Sugiura // Track and Field Magazine. – 1992. – № 42(12). – P. 203–206. (rus)

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**ANALYSIS OF TECHNICAL AND TACTICAL PREPAREDNESS OF  
HIGHLY SKILLED WRESTLERS OF GRECO-ROMAN STYLE AFTER  
CHANGE OF THE COMPETITION'S RULES**

**Abstract. Goal:** *determine the level of technical and tactical training of highly Greco-Roman style after a change in the rules. Material and methods:* analyzed 60 fights fighters winning the finals of the competition in Greco-Roman wrestling: Universiade 2013, the World Cup 2013 and Final Golden Grand Prix 2013. **Results:** 12 basic technical actions that is most more often used by wrestlers on international competitions are distinguished. It is certain that technical actions are conducted by wrestlers as in a bar – 70 receptions, so in an orchestra – 56 receptions. Three gravimetric groups are exposed: small; middle; heavy. **Conclusions:** it is certain that wrestlers must conduct a fight in a high rate, using moving, captures, jerks, shoves, shvungi. The modern trend "spectacular" offensive power struggle addition to the advantages identified a number of shortcomings, namely simplification of tactical wrestlers installations. As a rule, they are intended to achieve a small advantage and hold it until the end of the bout.

**Key words:** *competition actions, efficiency, effectiveness, gravimetric groups.*

**Introduction.** Analyzing the tendency of development of wrestling in recent years, most experts agree on the fact that for its development, including, as an element of the program of the Olympic Games, efforts should be made to improve the efficiency of wrestling fights with maintaining of high-intensity struggle throughout the fight [2; 3; 10].

Level of technical and tactical actions of athlete mainly determines its success in the fight [1; 8]. Scientific and methodological support of the training of qualified wrestlers requires, above all, to choose the most effective TTA and further improving them. This is caused by that the composition and structure of resultive TTA changing rapidly in sports practice. Therefore, for the preparation of high-class athletes is important to promptly inform athletes and coaches on promising areas of struggle development. When this is the actual analysis of competitive actions of leading fighters of nowadays [6; 7; 9].

**Connection of the research with academic programs, plans and themes.** The research is done according to plan of researches of Kharkiv State Academy of Physical Culture.

**Goal of the research:** to determine the level of technical and tactical training of highly qualified fighters of Greco-Roman style after a change in the rules.

**Tasks of the research:**

- to analyze competitive activity of fighters of high qualification after the changes in the rules;
- to determine the level of technical and tactical training of high qualification fighters after a change in the rules;
- to identify differences of technical and tactical training of highly qualified fighters of different weight groups.

**Material and Methods of the research.** We have conducted pedagogical observations for competitive activity of high qualification wrestlers. Object of observation was competition in Greco-Roman struggle: World Universiade (WU) in 2013, the World Cup (WC) in 2013 and Final Golden Grand Prix (GP) 2013. We have analyzed 60 fights of fighters winning the finals of the competition (fighting for the first and third places). For convenience of analysis wrestlers were divided into three weight groups: low (55 kg, 60 kg); average (66 kg, 74 kg, 84 kg); heavy (96 kg, 120 kg).

Following methods were used: analysis of scientific and methodological literature, pedagogical observation, analysis of video with competitive activity of wrestlers, timing, mathematical statistics.

**Results of the research.** Analysis of the technical arsenal of competitive activity of highly qualified fighters allowed to identify 12 major technical actions which are most commonly used: lift-overs with rolling – 29 times (23%), lift-overs with reverse suspension belt – 2 (1.6%), dashes with rear belt – 10 (7.7%), dashes with reverse belt – 1 (0.8%), counter-holds in par terre – 9 (6.9%), pin – 5 (4%), repositions – 13 (10.5%), dashes with span – 12 (9.5%), dashes with token turn – 8 (6.5%), stretching by churning body – 12 (9.5%), pushing out the mat – 18 (14.5%), counter-holds in stance – 7 (5, 5%) (Table 1).

*Table 1*

**Analysis of the impact of technology applied by wrestlers-winners in international competitions**

Competitions	WU-2013			WC-2013			GP-2013			Σ	%
	Weight groups*										
Technical actions	Low	Av.	Heav	Low	Av.	Heav	Low	Av.	Heav		
<b>Par terre:</b>											
1. Lift-overs with rolling	1	6	2	7	3	3	2	3	2	29	23
2. Lift-overs with reverse suspension belt					2					2	1,6
3. Dashes with rear belt	3	1	2		1			2	1	10	7,7
4. Dashes with reverse belt	1									1	0,8
5. Counter-holds		1		2	2		1	2	1	9	6,9
6. Pins	2	2						1		5	4
<b>Total in par terre:</b>	7	10	4	9	8	3	3	8	4	56	44
<b>Stance:</b>											
7. Repositions	1	2		1	2	1	1	4	1	13	10,5
8. Dashes with span	4	2	2	3					1	12	9,5
9. Dashes with token turn	2	1	1			2			2	8	6,5
10. Stretching by churning			1	2	2	2	2	2	1	12	9,5

11. Pushing out the mat		1	5		1	6		3	2	18	14,5
12. Counter-holds				2	2		1	1	1	7	5,5
<b>Total in stance:</b>	7	6	9	8	7	11	4	10	8	70	56
<b>Total in stance and par terre:</b>	14	16	13	17	15	14	7	18	12	126	100
<b>%</b>	11	13	10	14	12	11	6	14	9	100	
Preschedule won battles	5	4	3	1	2			2	3	20	33

*Note.* Low weight group – 55 kg, 60 kg; average – 66 kg, 74 kg, 84 kg; heavy – 96 kg, 120 kg.

The results obtained allow to state that the aforementioned technical actions are the most commonly used techniques of Greco-Roman wrestling. Preschedule won battles – 20 (33%), including 5 of meetings to "pinfall", 11 fights with a clear advantage on points, 4 match – three points for liability.

Analysis of technical and tactical actions athletes at WU-2013 revealed the most effective techniques performed wrestlers-winners: lift-overs with rolling – 9 times, dashes with span – 8 times, dashes with reverse belt – 6, pushing out the mat – 6, pin – 4, dashes with token turn – 4, repositions – 3 times. At WC 2013: lift-overs with rolling – 13 times, pushing out the mat – 7, stretching by churning body – 6 times, counter-holds in par terre – 4, repositions – 4, counter-holds in stance – 4, dashes with span – 3 times. On the GP-2013: lift-overs with rolling – 7, repositions – 6, pushing out the mat – 5, stretching by churning body – 5, counter-holds in par terre – 4, counter-holds in stance – 3, dashes with reverse belt – 3 times.

The analysis showed that changing the rules significantly influenced the structure of the match. After change of the rules five and three-point dashes rarely had been held. Arsenal of fighters began to lose dashes and lift-overs with reverse belt.

As you know, fighters of "conditionally" low, average and heavy weight categories use approximately the same techniques [7; 8]. Analysis, which was executed, shows that fighters of low weight groups most frequently and effectively perform: lift-overs with rolling – 10 times, dashes with span – 7, stretching by churning body – 4 times. Fighters of average weight groups use: lift-overs with rolling – 12, repositions – 8, counter-holds in par terre – 5, pushing out the mat – 5, dashes with reverse belt – 4, stretching by churning body – 4 times. Fighters of heavy weight groups perform: pushing out the mat – 13 times, lift-overs with rolling – 7, dashes with token turn – 5, dashes with reverse belt – 4, stretching by churning body – 4 times. It should be noted that preschedule won battles mostly fighters of average weight groups – eight, while the low and heavy weight groups – six fights.

Very important indicator of competitive activity is the efficiency and effectiveness of the applied technique [4; 5]. The results of these indicators for the fighter-winners at WU – 2013, WC – 2013, GP – 2013 are presented in Table. 2. These data made it possible to establish the following: the highest effectiveness was observed at WU – 2013 – 5.3 points per person, with an efficiency of 66%; at WC – 2013 effectiveness was 4.6 points per person, efficiency – 64%; at GP – 2013 effectiveness was 4.3 points per person, efficiency – 63%.

Analysis of competitive techniques of fighters by weight groups showed the following: the most productive offensive actions occur in low weight groups of fighters – 5.5 points per person, with an efficiency of 54%; heavy weight groups effectiveness – 4.5 points per person, with an efficiency of 76%. In average weight groups effectiveness was – 4.3 points per person, with an efficiency of 64%.

Table 2

**Efficiency and effectiveness of fighters-winners' attack actions in the final battles (for the first and third places)**

International competitions		WU-2013		WC-2013		GP-2013		$\bar{X}$ at all weight groups	
Weight categories		<i>IE-cy</i> *	<i>IE-ss</i> *	<i>IE-cy</i>	<i>IE-ss</i>	<i>IE-cy</i>	<i>IE-ss</i>	<i>IE-cy</i>	<i>IE-ss</i>
Low	55 kg	58	6,67	44	6	45	5	54	5,5
	60 kg	60	6	69	7,67	50	2		
Average	66 kg	60	5,33	46	4,33	57	3,5	64	4,3
	74 kg	75	4,33	50	4	83	4,5		
	84 kg	57	4	80	3	67	5,67		
Heavy	96 kg	89	7,33	71	3	70	4,67	76	4,5
	120 kg	67	3,67	89	4	70	4,67		
$\bar{X}$		66	5,3	64	4,6	63	4,3	64	4,7

**Note:** *IE-cy* – indicator of efficiency, %, *IE-ss* – indicator of effectiveness, points.

By analysis of competitive technical actions established that the composition of competitive technique offensive actions dominate, the fight is ongoing at a fast pace, tricks are performed after prior training and if the athlete is sure that the trick will be performed. High class fighters have high efficiency of performance of tricks throughout all battle (during two periods).

**Conclusions:**

1. Research of technique at international competitions made it possible to determine the technical actions that effectively are used in highly competitive battles of Greco-Roman style: lift-overs with rolling and reverse suspension belt; dashes with reverse and rear belt; pins; counter-holds in par terre and stance; repositions; dashes with crunching, span, token turn; stretching by churning; pushing out the mat.

2. It is established that in competitive activity of Greco-Roman style technical actions carried out both in stance – 70 tricks (56%) and in par terre – 56 tricks (44%).

3. It is established that fighters of heavy weight groups most frequently use simple technical actions in stance – pushing out the mat – 13 times. At fighters of low weight groups there are less technical actions than in average and heavy weight groups, but they more commonly use high-amplitude techniques in stance: dashes with span – 7 times. Fighters of average weight groups do more lift-overs with rolling in par terre – 12 times and repositions in stance – 8 times.

4. The modern trend of "spectacular" offensive power struggle in addition to the advantages identified a number of disadvantages, namely simplification of tactical fighters' installations. As a rule, they are intended to achieve a small advantage and hold it until the end of the battle.



**Further research** will be aimed at determining the correlation relationship technical and tactical training and special physical qualities of Greco-Roman style fighters.

**References:**

1. Ananchenko K. V. Slobozhanskiy naukovo-sportivniy vsnik [Slobozhanskiy scientific sports Herald], Kharkv, 2003, vol. 6, P. 74–76. (rus)
2. Kashevko V. A. Moloda sportivna nauka Ukraini [Young sports science Ukraine], 2008, vol. 1, P. 150–154. (ukr)
3. Petrushinskiy B. B. Moloda sportivna nauka Ukraini [Young sports science Ukraine], 2008, vol. 1, P. 244–249. (ukr)
4. Teoreticheskiye aspekty tekhniki i taktiki sportivnoy borby [Theoretical aspects of the techniques and tactics of wrestling], Moscow, 2006, 168 p. (rus)
5. Tekhniko-takticheskiye kharakteristiki poyedinka v sportivnykh yedinoborstvakh [Technical and tactical characteristics of the fight in combat sports], Moscow, 2007, 224 p. (rus)
6. Tropin Yu. N. Fizicheskoye vospitaniye studentov [Physical Education students], 2013, vol. 4, P. 92–96. (rus)
7. Tropin Yu. N. Fizicheskoye vospitaniye studentov [Physical Education students], 2013, vol. 2, P. 59–63. (rus)
8. Tumanyan G. S. Strategiya podgotovki chempionov: nastolnaya kniga trenera [Training Strategy Champions: handbook coach], Moscow, 2006, 494 p. (rus)
9. Schmidt, W. D. Effects of competitive wrestling season on body composition, strength, and power in national collegiate athletic association division III college wrestlers / W. D. Schmidt, C. L. Piencikowski, R. E. Vandervest // Journal of Strength and Conditioning Research, 2005. – vol. 19. – P. 505–508.
10. Vardar S. A., Tezel S., Ozturk L., Kaya O. The relationship between body composition and anaerobic performance of elite young wrestlers // Journal of Sports Science and Medicine, 2007, vol. 6, P. 34–38.

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## THE ASSESSMENT OF A BODY MASS INDEX OF STUDENTS OF SPECIAL MEDICAL GROUP IN PHYSICAL EDUCATION

**Abstract. Purpose:** *assessment of indicators of body weight and body length of special medical group students of different professions learning to make corrections in the process of physical education. Material and methods:* anthropometric indices studied 410 first-year students of the National Aviation University. **Results:** *found that 38% of boys and 48% of girls are underweight, overweight was observed in 21% of boys and 7% of girls. Analyzed results from a gender perspective, and depending on the specialty training. Provides recommendations for correcting the physical education process. Conclusions:* *there is a need for a differentiated approach in the preparation of self-employment programs for physical education.*

**Keywords:** *students, physical education, underweight, overweight.*

**Introduction.** The state of health of youth is a necessary condition of the progressive development of the society. However today the steady tendency to the increase in number of students is observed in higher education institutions of Ukraine, having deviations in a state of health that leaves a mark on quality of the assimilation of knowledge of specialist subjects by them [5].

Optimization of classes by physical exercises is necessary for the improvement of health and the increase of the level of physical preparedness of student's youth [2; 5]. Thus the increase of the intensity and the volume of physical activities, demands a special attention to individual opportunities of an organism of the engaged, especially when planning classes with students of special medical groups [1; 6].

It is known that one of the indicators of health of a person is the ratio of weight and body length both as overweight, and underweight are equally hazardous to health, being the reason of many diseases [3]. In our opinion, the assessment of the ratio of weight and length of a body of students of special medical group will give the chance to differentiate an orientation of exercises in the course of physical training depending on specific features of the engaged that is very actual.

**The connection of the work with scientific programs, plans, subjects.** The work is performed according to the research subject of National aviation university "The improvement of pedagogical technologies of the formation of fitness culture of students in the course of physical training" (the number of the state registration is 0113U000586).

**The aim of the researches:** the assessment of indicators of body weight and body length of students of special medical group of different specialties of training for entering corrections into the process of physical training.

**The material and research methods.** For the achievement of a goal the following methods of researches were used: analysis of data of scientific and methodical literature, anthropometrical measurements, method of indexes, questioning, methods of mathematical statistics. During the anthropometrical measurements the indicators of length and body weight of students were defined. The ratio of body weight in kilograms to body length in meters in a square were counted by the method of indexes by means of a body mass index (BMI):  $BMI = m \cdot L^{-2}$ , where BMI – a body mass index,  $kg \cdot m^{-2}$ ; m – body weight, kg; L – length of a body,  $m^2$ . The assessment of results of BMI: at values less than  $20 kg \cdot m^{-2}$  – thin, at  $20-25 kg \cdot m^{-2}$  – normal, at  $25,1-29,9 kg \cdot m^{-2}$  – full,  $30-40 kg \cdot m^{-2}$  – corpulent, more than  $40 kg \cdot m^{-2}$  – overcorpulent [4].

410 first-year students of National aviation university of different directions of the preparation took part in researches. According to the classification of the directions of training of specialists offered by L. P. Pilipey [7], specialties of training of students at National aviation university are distributed by us on groups: technical specialties, datalogical, creative and figurative and natural and agrarian. Technical specialties are mastered by the students who are training at Aerospace institute, Air navigation institute, Institute of airports. Specialties of students of Institute of informational-diagnostic systems, faculties of computer sciences and computer systems are referred to datalogical group. Specialties of Institute of economy and management, Legal institute, Humanitarian institute, Institute of international relations, Institute of ecological safety belong to creative and figurative and natural and agrarian group. All surveyed students are engaged in physical training in special medical group. The method of questioning was used for the definition of the relation of students to own appearance. 62 students took part in questioning, from them 38 girls and 24 boys.

**Results of the research and their discussion.** The analysis of average sizes of the studied indicators showed that values of body mass indexes are in norm at students of all specialties of training (tab. 1).

Table 1

**Anthropometrical indicators of students of different specialties,  $\bar{X} \pm m$** 

Indicators	Specialties of training					
	Datalogical		Technical		Creative and figurative and natural and agrarian	
	boys*	girls	boys	girls	boys	girls
Body length, sm	180±0,8	165,2±1	180,1±0,9	168,8±0,8	180,4±1,2	167,2±0,4
Body weight, kg	72,05±1,72	55,83±0,12	70,73±1,57	58,76±1,28	72,65±2,66	57,58±0,68
Body mass index, $kg \cdot m^2$	22,2±0,5	20,5±0,4	21,8±0,5	20,6±0,4	22,3±0,8	20,6±0,2

*Note.* \* Boys – 24; girls – 38.

However the detailed analysis of individual anthropometrical data allowed to establish that deviations from standard values of the defined indicators of body

weight and body length have a significant amount of students. So, within standard of values of index are at 41% of boys and 45% of girls while the majority of students have either underweight, or overweight. A significant amount of students with indicators of body weight and body length index of below norm (tab. 2) attracts attention in the analysis of the received results.

Table 2

**Ratio of the students having deviations from standard values of a body mass index, %**

Sex	Norm	Lower than norm	Higher than norm	
			Full	Corpulent
Boys (n=149)	41	38	15	6
Girls (n=261)	45	48	6	1

Table 3

**Ratio of the students of different specialties of training having deviations from standard values of a body mass index, %**

Specialties of training	Sex	Norm	Lower than norm	Higher than norm	
				full	corpulent
Datalogical	Boys (n=60)	38	37	22	3
	Girls (n=41)	39	51	10	-
Technical	Boys (n=50)	46	38	10	6
	Girls (n=43)	42	49	9	-
Creative and figurative and natural and agrarian	Boys (n=39)	41	39	10	10
	Girls (n=177)	48	46	4	2

The greatest percent of the students having deviations from indicators of norm, is established among the studied of datalogical specialty of training – with the underweight of 51% of girls, with overweight – 25% of boys. Indicators of a body mass index which are above norm meet much more often among boys in comparison with identical indicators at girls irrespectively of specifics of future profession (tab. 3).

Thus, the results of the conducted researches testify to the high percent of students having underweight, especially among girls.

During the further researches, we were interested in the question of the subjective relation of students to the appearance and the body weight in particular. By results of the questioning carried out for this purpose it is established that 58% of the interrogated girls express satisfaction to their appearance, however only 10% of all interrogated students are satisfied with their weight, and other 90% note the desire to grow thin. It is remarkable that the desire to recover wasn't expressed by any student. 60% of wishing to grow thin girls use a diet and physical exercises for the purpose of the correction of figure, 27% use only a diet, and 23% apply only physical exercises. Among the interrogated boys the satisfaction of their appearance is expressed by 58% of students, however 60% of respondents express their desire of the correction of a

body weight. Thus unlike girls, the majority of boys (88%) express their desire to recover, having increased the volume of muscular weight, however only 25% of boys apply physical exercises for this purpose.

In our opinion, a big percent of cases of underweight at students, and their readiness thus to subject themselves to diets and starvations can be caused by aspiration of girls to the general standards, differing slim parameters of a body. However it is necessary to consider that with underweight, though the probability of the development of the diseases accompanying the obesity sharply decreases, there is a risk of the development of other frustration. So, the considerable deficiency of body weight is the main prerequisite of the development of dystrophy, the inability to acquire some nutrients, the emergence of diseases of various bodies and systems of an organism [3]. The wearisome diets adjoining on starvation, brake all reproductive system, detaining puberty, and loss of 10% of fatty tissue leads to the termination of menstrual function (amenorrhoea) during the puberty. In addition, underweight at women can lead to problems with a child-bearing, to osteoporosis [8].

Not to exchange and sharp from the point of view of the preservation of health is the problem of overweight of the population, characteristic for many developed countries of the world is significant. It is known that people having the obesity are exposed substantially to risk of diseases of diabetes of the 2<sup>nd</sup> type, diseases of cardiovascular system, the musculoskeletal device and other diseases [3]. In the researches conducted by the American scientists more than at 100 thousand people, the close interrelation between the size of a body mass index and the risk of the development of cardiovascular diseases was established. The minimum risk was characteristic for women with a body weight index less than  $21 \text{ kg}\cdot\text{m}^{-2}$ , for men – with an index less than  $22 \text{ kg}\cdot\text{m}^{-2}$ . With the growth of an index the risk of diseases increases. So, for women with BMI of equal  $21\text{--}25 \text{ kg}\cdot\text{m}^{-2}$  the degree of risk was higher for 30%, with BMI of equal  $25\text{--}29 \text{ kg}\cdot\text{m}^{-2}$  – for 80%, with BMI, exceeding  $29 \text{ kg}\cdot\text{m}^{-2}$  – is higher for 230%. However for the forecast of the risk of the development of cardiovascular diseases this index can be used if to estimate it in combination with the percent of fatty weight and the relation of a grasp of a waist to a grasp of a basin [4].

The received results testify to need of use of the differentiated approach by drawing up programs of the independent classes in physical training. For this purpose we recommend:

- to use results of calculation of an index of body weight as control method and self-checking in the course of classes on physical training for early diagnostics of possible violations of health of students;

- at BMI indicators which are less than  $20 \text{ kg}\cdot\text{m}^{-2}$  (thin) – carrying out conversations with students about risk factors of accompanying diseases, application of a complex of the exercises directed on the accumulation of muscular weight and the program of their performance within independent classes;

- at BMI indicators which are in the range of  $20\text{--}25 \text{ kg}\cdot\text{m}^{-2}$  (normal) – not apply purposeful actions to increase or decrease in body weight, however small corrections of weight in the esthetic purposes are possible. In this case physical

exercises can be directed on the reduction of excess fatty deposits in places of their congestion at girls and the increase in volume of muscular weight at boys. For the forecast of risk of the development of cardiovascular diseases this index needs to be estimated in combination with the percent of fatty weight and the relation of a grasp of a waist to a basin grasp;

– at BMI indicators in the ranges of 25,1-29,9 kg•m<sup>-2</sup> (full) and 30–40 kg•m<sup>-2</sup> (corpulent) – in addition to estimate the percent of fatty weight and the relation of a grasp of a waist to a basin grasp for the forecast of risk of the development of cardiovascular diseases; carrying out conversations about risk factors of accompanying diseases; application of the complex of exercises and fitness of the programs directed on the reduction of weight for independent classes by physical training.

### **Conclusions:**

1. A significant amount of students of special medical group of the first course of National aviation university have deviations from standard values of an index of body weight. 38% of boys and 48% of girls have underweight, overweight is noted at 21% of boys and 7% of girls.

2. The greatest percent of the students having deviations from indicators of norm, is established among pupils of datological specialty of training – with underweight of 51% of girls, with overweight – 25% of boys.

3. According to questionnaire, 90% of the surveyed students express desire to reduce their body weight, and 88% of boys – to increase their muscular weight.

4. The received results testify to need of use of the differential approach by drawing up programs of the independent classes in physical training.

**Prospects of the subsequent researches in this direction.** Further the development of programs of independent classes in physical training for students of the special medical group with the use of the recommendations provided in the work is planned.

### **References:**

1. Biletskaya V. V. Naukoviy chasopis Natsionalnogo pedagogchnogo unversitetu men M. P. Dragomanova. Serya 15. Naukovo-pedagogchni problemi fizichnoi kulturi (Fzichna kultura sport) [Scientific Journal of the National Pedagogical University MPDragomanov. Series 15. Scientific and pedagogical problems of physical culture (physical culture and sports)], 2013, vol. 10(37), P. 13–18. (rus)

2. Dubogay O. D., Zavidvska N. N., Khankyants O. V. et al. Fzichne vikhovannya zdorov'ya [Physical education and health], Kyiv, 2012, 272 p. (ukr)

3. Dubrovskiy V. I. Valeologiya. Zdorovy obraz zhizivskiy [Valeology . Healthy way zhizi], 2001, 560 p. (rus)

4. Ivashchenko L. Ya., Blagiy A. L., Usachev Yu. A. Programirovaniye zanyatiy ozdorovitelnyim fitnessom [Programming fitness and wellness classes], Kyiv, 2008, 198 p. (rus)

5. Krutsevich T. Yu., Vorobyev M. I. Kontrol v fizicheskom vospitanii detey, podrostkov i yunoshey [control in the physical education of children, teenagers and young men], Kyiv, 2005, 196 p. (rus)

6. Malakhova Zh. V. Zdorovyeformiruyushchiye tekhnologii v protsesse fizicheskogo vospitaniya studentov spetsialnykh meditsinskikh grupp [Shape health technology in physical education students of special medical groups], Kyiv, 2013, 205 p. (rus)

7. Pilipey L. P. Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin], Kharkv, 2008, vol. 3, pp. 31–36. (rus)
8. Shakhlina L. G. Mediko-biologicheskiye osnovy sportivnoy podgotovki zhenshchin [Biomedical basis of sports training women], Kyiv, 2001, 326 p. (rus)

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## **THE USE OF THERAPEUTIC PHYSICAL CULTURE IN COMPLEX REHABILITATION OF PEOPLE WITH GALLBLADDER DISEASE**

**Abstract. Purpose:** *to elucidate modern principles of the use of complex therapeutic physical culture methods in the treatment of patients with cholelithiasis. Material and methods* compiled and analyzed are over 15 sources of specialized scientific and methodical literature. **Results:** *the main causes of cholelithiasis, its tendency of being increased the number of patients with this pathology in Ukraine and its symptoms are defined. The modern methods of therapeutic physical culture in the treatment of patients are elucidated based on the analysis of scientific and methodical literature; the most favorable starting positions for the flow of bile in the performance of physical exercises depending on the selected motor regime; the use of different kinds of complexes of therapeutic physical culture as an integral component in the conservative treatment of patients with cholelithiasis are analyzed. Conclusions:* *feasibility of physical therapy in cholelithiasis is motivated and positive effects of special physical exercises on the state of the biliary system in this pathology are determined.*

**Key words:** *gallbladder, bile ducts, physical rehabilitation, therapeutic physical culture, physical exercises.*

**Introduction.** In the conditions of contemporaneity there is an increase of amount of the digestion organs diseases. Cholelithiasis (GBD) – one of the most widespread diseases, that yields by the rates of occurrence only to atherosclerosis and the diabetes mellitus (N. V. Kharchenko, 2000; Ye. P. Yakovenko, 2003; U. O. Flpov, . U. Skirda, L. M. Petrechuk, 2004). In Ukraine a part of patients who suffer from cholelithiasis, according to data of different authors, numbers from 17 to 22%. This number is doubled (M. B Golubchikov, 2000; A, V, Pidaev 2003; A. A. lchenko, 2004) every ten years.

So in 2001 the level of expansion of GBD was 452,3 per 100 thousands of adult population of Ukraine, and yet in 2010 – 602,8, that raised by 32,7%. Such tendency to the increase of number of patients with this pathology is kept and by this time [2; 11; 17].

The global epidemic of obesity and metabolic syndrome results in the further increase of rate of cases of choleliphiasis. The social aspect of diseases of biliary tract is underlined by also data of statistics about a considerable general "rejuvenation", increase of pathology among children and change of generic correlation due to the increase of amount of population [1; 18; 19].



A therapeutic physical culture (TPC), as a main mean of physical rehabilitation, uses facilities, methods and principles of physical culture for treatment of diseases, prevention of their exacerbation and complications, renewal of health and working capacity of patients. The basic means of TPC are physical exercises, basis of which is muscular work, which is in close intercommunication and dependence on functions of internals, normal functioning of central nervous system. The correctly selected special exercises purposefully influence and change the certain functions of organism by renovation of the damaged system, adapting a patient to the physical loading. The systematic physical loading, in its turn, stipulate generally training volume of organism, and it shortens the terms of treatment, renovate the capacity of patient. That is why, TPC is an obligatory and inalienable mean in the complex rehabilitation of patients, in particular, with pathology of the hepatocystic system [13]. Facilities of therapeutic physical culture can be used in therapy of diseases of liver and biliary ducts, first of all in connection with the trophic action of physical exercises through possibility to improve the conditions of lymphoid and blood supply of the abdominal region organs, tone of smooth musculature of walls of gall-bladder and biliary tracts. In addition, physical exercises normalize activity of CNS, put in order kortico-subcortical correlations, perfect the reflex- adjusting of the biliary system [7; 15].

Thus, analysing the above-mentioned material, it is possible to consider, that subjects selected by us for present time is actual enough. The article is directed to the study of problem of the application of therapeutic physical culture in complex therapy for patients suffering from choleliphiasis, and also an influence of physical exercises on the organism of human with this pathology.

**Research Connection with scientific plans, programs.** A research theme is included in the plan of scientifically-research work of department of health of man and physical rehabilitation of the Drogobitsky state pedagogical university named after Ivan Franco: "Innovative technologies of the use of natural and pre-forming physical factors and other means of physical rehabilitation in the health-improving complex of people".

**Research purpose:** on the basis of analysis of scientifically-methodical literature to light up the modern approaches to application of therapeutic physical culture as a mean of physical rehabilitation at the choleliphiasis.

**Task of research:** 1. to learn and analyse the special scientific literary sources on issue of prescribing medical physical culture as a mean of physical rehabilitation at the choleliphiasis. 2. To define a task, facilities, methods, forms of application of therapeutic physical culture at the choleliphiasis.

**Material and research methods.** For solution of the formulated tasks we used method of analysis and synthesis of the special scientifically-methodical literature. Selected and analysed are over 15 scientifically-methodical literary sources. **Results of research and their discussion.** Cholelithiasis is a disease which is characterized by formation of gallstones in a gall-bladder, hepatic biliary ducts (intrahepatic cholelithiasis) and in the general biliary duct(choledocholithiasis)[6].

Principal reasons of development of this disease is a factor of nutrition (excessive use of meal rich in fats), different diseases of metabolism (obesity, diabetes mellitus), stagnation of bile and violation of its normal composition, heredity, infection, sedentary way of life, excessive physical loading, supercooling and others. As hypokinesia is not far off the last place in the list of factors, which assist the origin of this disease, the use of therapeutic physical culture is justified as a necessary mean of physical rehabilitation of patients with pathology of biliary duct [3; 5; 6; 9; 10; 12; 14].

While picking up facilities and forms of therapeutic physical culture it is important to use individual approach, taking into account the state of the cardiovascular, nervous system, and also general state of patient. Physical drills, sports-applied exercises and games are mostly widely used. Also, a positive factor is possibility of the use absolutely all forms of TPC: motor hygienical gymnastics, medical gymnastics, independent exercising, curative walking [12].

At the choice of methods of TPC it is necessary also to take into account the anatomic and topographic location of liver, gall-bladder and duct. A gall-bladder lies between right and square parts of liver, its bottom a bit comes forward and is palpated in right hypochondrium in the so-called "bladder" point. Bladder duct is a continuation of neck of gall-bladder and is connected with a general hepatic duct, forming a general biliary duct which passes behind after horizontal part of duodenum and enter into its descending part from top to bottom and from left to right. Through such anatomic topography many authors consider, that the most advantageous initial positions at practicing physical exercises are positions on left side and positions standing upright on four extremities. It assists better outflow of bile from a gall-bladder due to reduction of walls of gall-bladder and the ducts and a gravity of bile secretion. For the best curative effect the exercises include initial positions on a right side. It facilitates an influence of diaphragm on circulation of blood in a liver at implementation by the patients of respiratory exercises. By means of respiratory exercises there is a possibility alternatively to increase and diminish intra-abdominal pressure and to improve circulation of blood and chologogic function of liver [the same 15].

The typical symptom of choleliphiasis is an attack of megalgia in the right hypochondrium (biliary or hepatic colic). Sharp pain lasts from a few minutes to a few hours, sometimes up to two days, and accompanied by nausea, vomit and by an icterus [4; 5; 8].

Physical exercises are subscribed in the period of calming down of sharp displays of a disease, normal temperature, improvement of general state [3; 16].

TPC is applied at in-patient establishment at a bed rest and ward regimen, and in sanatoriums – by the spare –training motor routine [12].

Task of TPC: diminishing and liquidation of inflammatory process; removal of stagnation and dysfunctions of outflow of bile, assistance to the removal of fine stones; an improvement of circulation of blood in a liver and gall-bladder, diminishing of inflammatory process, stimulation of metabolism; strengthening of abdominal muscles, activation of functions of the digestive system; increase of tone

of CNS and normalization of activity of the vegetative nervous system; increase of resistance of organism, renovation of adaptation to the physical loading [8; 12].

In the bed rest (severe, extended) regimen the individual or little-group methods are used, taking into account clinical course of disease, concomitant diseases and physical readiness of patient. Complexes include conditioning for an overhead humeral belt and lower limbs, motions are executed gradually in small and large joints. Exercises for a trunk are performed with a small amplitude, fluently. Tempo is slow. Contra-indicated are the exercises, which lead to the sharp increase of intra-abdominal pressure. The diaphragmatic breathing provides the better outflow of bile from a gall-bladder, improves hepatic circulation of blood, and respiratory exercises with deceleration of respiratory motions of inhalation and exhalation diminish the dyspeptic phenomena (belch, nausea) and the pain feeling. During performing exercises it is recommended to use frequent pauses for a rest [15].

If a patient has an improvement of general state and adaptation to loading, he is transferred on the ward regimen. For that such means of TPC are used: morning hygienical gymnastics and remedial gymnastics. Most authors suggest at this time for previous initial positions to add position upright, sitting and lying on a gymnastic bench, lying on a stomach. It is possible to use exercises for an abdominal press, respiratory moves of diaphragm. Provided a patient has a pain in the right hypochondrium at doing of these exercises, it is necessary to decrease the rate of their implementation and amount of reiterations. A free movement is recommended in a ward, walking in a corridor. For achievement of good therapeutic effect, diminishing of the stagnant phenomena and the removal of cramps of sphincters it is expedient to include massage, namely methods of stroking and elements of vibration [12].

When improving of general state of patient, his (her) transferring on the free motor regimen, and also in the sanatorium conditions the exercises are executed by using more various initial positions: lying on a stomach and his back, in support on knees, in hang swing on a gymnastic wall, upright at a gymnastic wall, sitting on a gymnastic bench, sitting on a chair. The amount of exercises increases for large muscular groups. As well are widely used exercises for the abdominal muscles, inclinations and turns of trunk, respiratory exercises, exercises on relaxation of muscles, independent exercises prescribing for the individual tasks to be accomplished. Rate of performance of exercises – average, with complete amplitude of motions and muscular tension. The pauses of rest are diminished between exercises. Exercises with objects and with a small weight (balls, sticks, dumb-bells), games are used. All above enumerated exercises promote tone of gall-bladder, tone up the musculature of biliary ducts and Oddi's sphincters, accelerate the bile outflow, prevent stagnation of bile secretion. Recommended is also curative walking along a certain route, excursions, sports games, volley-ball, rowing, swimming, skiing and others. Due to including to the treatment complexes of playing elements an improvement and normalization of emotional tone of patients become healthy, their nervous-psychological sphere being in combination with active movements is the extraordinarily important factor of renovation. PTC strengthens the action of bile-extracting preparations and antispasmodics. After completion of exercises one should

have a rest abed in position of lying on his back (knees slightly upward) about 30 min, or on a left side. To improve the outflow of bile secretion before taking up PTC it is recommended to warm up an area of right hypochondrium [6; 12; 15].

V. S. Sokolovsky presents the approximate chart of remedial gymnastics for patients suffering from choleliphiasis who are on a spare-training sanatorium routine (table).

**A chart of remedial gymnastics for patients suffering from choleliphiasis who are on a spare-training sanatorium routine [15]**

Contents of exercises	Task	Dosage (min)
<b>Introductory part</b>		
Walking and at brief run in combination with moves by hands, feet and trunk	Preparation of organism to the further loading	4–5
<b>Basic part</b>		
Exercises for all muscular groups using initial positions, sitting and standing. Complete diaphragmatic and "counter" breathing. In position, lying on a back, on the left and right side, in support upright on knees, respiratory exercises, exercises for an abdominal press and pelvic bottom (possibility to use gymnastic flails, dumb-bells, inflated and volley-ball balls)	General and roborant acts. A periodic increase of intra-abdominal pressure with the purpose of increasing of bile secretion	8–10
	Strengthening of muscles of abdominal press and pelvic bottom. An improvement of circulation of blood in the organs of abdominal region and pelvis. Increasing of bile secretion	15–20
<b>Final part</b>		
Walking in a slow pace. Exercises on attention, respiratory exercises, exercises on relaxing of muscles.	Decreasing of the general loading. Training of ability to relax muscles	3–5
<b>Total 30–40 min</b>		

The approximate complex of exercises to cure choleliphiasis is offered also by S. . P risyazhnik. A complex is intended for implementation in training regimen. But it can be executed not only in sanatoriums but also in educational establishments with students of specific medical groups and independently at home. This complex comprises exercises to be executed from initial positions, standing and lying on a back in combination with the trunk bends, movements in a circle, lunges and swings. Such combination of initial positions is carried out by press actions on a gall-bladder which regulates the outflow of the bile. At the beginning and at the end of complex walking as moderate type of the physical loading is executed[14].

V. M. Mukhin offers the complex of exercises from initial position, sitting on a chair, applying turns and bends of trunk in combination with motions by extremities, and also using exercises for the abdominal muscles and breathing. When executing

this complex, it is possible to empty a gall-bladder due to the press actions on it, that is the consequence of increase of pressure on an abdominal region. Besides the TPC the other means of physical rehabilitation in the complex for patients with choleliphiasis is used. They are a massotherapy, physiotherapy, occupational therapy and the like. For such patients the sanatorium-resort treatment is offered on balneologic and climatic spars [12].

**Conclusions:** Complex rehabilitation of patients suffering from the choleliphiasis foresees expediency of application of therapeutic physical culture on all stages of rehabilitation. In the process of restoration treatment of patients with choleliphiasis all forms of TPC are used: morning hygienical gymnastics, remedial gymnastics with the use of general and special exercises, independent practice, curative walking, terencur, which due to trophic and restorative effect improve circulation of blood in a liver and gall-bladder, diminish inflammatory processes, stimulate exchange processes, to prevent stagnation of bile, promote tone of CNS and normalize corticovisceral ligaments, directed to normalization of tone of biliary tracts. Special physical exercises and correctly selected initial positions assist to the better outflow of bile and exert positive influence upon the state of the biliary system as to this pathology.

**The prospects of further researches** are related to the development of the scientifically reasonable complex program of physical rehabilitation in order to cure choleliphiasis.

#### References:

1. Alekseyenko S. A., Naumova L. A., Ageyeva Ye. A., Shatskova T. M. Sovremennyye podkhody k litoliticheskoy terapii profilaktike zhelchnokamennoy bolezni [Modern approaches to therapy litholytic prevention of gallstone disease], 2006, vol. 1, pp. 14–17. (rus)
2. Goyda S. M. Ukranskiy medichniy chasopis [Ukrainian Medical Journal], 2011, vol. 4 (84), pp. 112–113. (ukr)
3. Dedishina L. Farmatsevt praktik [Pharmacist practitioner], 2011, vol. 6 (94), pp. 32–33. (ukr)
4. Dmitriyev A. Ye., Marinchenko A. L. Lechebnaya fizkultura pri operatsiyakh na organakh pishchevareniya [Therapeutic exercise during operations on the digestive organs], Lviv, 1990, 160 p. (rus)
5. Dubrovskiy V. I. Lechebnaya fizicheskaya kultura (kinezoterapiya) [Therapeutic physical training (kinesitherapy), Moscow, 2001, 608 p. (rus)
6. Zarembi E. Kh., Kiyak Yu. G., Blyayeva O. O., Perederya V. G., Zarembi E. Kh. Entsiklopedya. Smeyna meditsina. Vnutrshn khvorobi. Khvorobi organv travlennya. Khvorobi nirok sechovikh shlyakhv. Khvorobi organv krovotvorennya. Yekspertiza pratsezdatsnost pri patolog vnutrshnkh organv [Encyclopedia. Family Medicine. Internal Medicine. Diseases of the digestive system. Diseases of the kidney and urinary tract. Diseases of the blood. Examination performance in the pathology of internal organs], Kyv, 2006, 568 p. (ukr)
7. Epifanov V. A. Lechebnaya fizicheskaya kultura i sportivnaya meditsina [Therapeutic physical culture and sports medicine], Moscow, 1999, 304 p. (rus)
8. Yepifanova V. A., Apanasenko G. L. Lechebnaya fizkultura i vrachebnyy kontrol [Physical therapy and medical supervision], Moscow, 1990, 368 p. (rus)
9. Matroshiln O. G., Belnskiy M. Yu., Slmakovskiy O. V. «V Mzhnarodna naukovopraktichna konferentsiya «Realzatsiya zdorovogo sposobu zhittya – suchasn pdkhodi» [“IV

International Scientific and Practical Conference" Implementing a healthy lifestyle – modern approaches"], Drohobich, 2007, p. 403–405. (ukr)

10. Matroshiln O. G., Kuzan M. M., Arzyutova G. M. Naukoviy chasopis Natsonalnogo pedagogchnogo unversitetu men M. P. Dragomanova. «Naukovo-pedagogchni problemi fizichno kulturi / Fzichna kultura sport» [Scientific Journal of the National Pedagogical University M.P.Dragomanov. "Scientific and pedagogical problems of Physical Education / Physical Education and Sports"], Kyiv, 2011, vol. 13, pp. 366–369. (ukr)

11. Matsegora N. A. Diferentsyovane zastosuvannya fzichnikh chinnikv u kompleksnomu vdnovlennomu lkuvann khvorikh na zhovchnokam'yanu khvorobu pslya udarno-khvilovo ltotrips abo kholetsistektom: Avtoref. Dis ... doktora med. nauk [Differential use of physical factors in the complex restoration treatment of cholelithiasis after shock wave lithotripsy or cholecystectomy: Authors thesis], Odesa, 2005, 38 p. (ukr)

12. Mukhn V. M. Fzichna reabltatsya [Physical rehabilitation], Kyiv, 2009, 488 p. (ukr)

13. Porada A. M., Solodovnik O. V., Prokopchuk N. E., Porada A. M. Osnovi fzichno reabltats [Fundamentals of Physical Rehabilitation], Kyiv, 2008, 248 p. (ukr)

14. Prisyazhnyuk S. . Fzichne vikhovannya [Physical Education], Kyiv, 2008, 504 p. (ukr)

15. Sokolovskiy V. S., Romanova N. O., Yushkovska O. G. Lkuvalna fzichna kultura [Therapeutic exercise], Odesa, 2005, 234 p. (ukr)

16. Dobrovolskiy V. K. Uchebnik instruktora po lechebnoy fizicheskoy kulture. Uchebnik dlya institutov fizicheskoy kultury [Tutorial Instructor medical physical culture. Textbook for Institutes of Physical Culture], Moscow, 1974, 480 p. (rus)

17. Shcherbinna M. B., Babets M. . Okhorona zdorov'ya Ukrani [Health Care of Ukraine], 2008, vol. 1(29), pp. 67–71. (ukr)

18. Shcherbinna M. B., Gladun V. M., Burenko A. M. Smeyna meditsina [Family Medicine], 2010, vol. 2, pp. 102–106. (ukr)

19. Tsai C. J., Leitzmann M. F., Willett W. C., Giovannucci E. L. Long-term effect of magnesium consumption on the risk of symptomatic gallstone disease among men // Am. J. Gastroenterol. – 2008. – № 103(2). – P. 375–382.

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