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3. Biomedical Aspects of Physical Education and Sports.
4. Human health, physical rehabilitation and physical recreation.
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ALZIN HODOD¹, KOLESNICHENKO V.²

¹*Kharkiv State Academy of Physical Culture*

²*State Institution «Sytenko Institute of Spine and Joint Pathology National Academy of Medical Sciences of Ukraine»*

LOCOMOTORY SYSTEM FUNCTIONAL EVALUTION IN PATIENTS WITH LUMBAR DEGENERATIVE DISC DISEASE IN THE PREOPERATIVE PERIOD ACCORDING FORCEPLATE

Abstract. Purpose: to study preoperatively the functional properties of the musculoskeletal system in patients with lumbar osteochondrosis with different variants of myotonic reactions. **Materials and methods:** protocols of clinical and biomechanical examination of 70 patients with lumbar osteochondrosis aged 27–44 years. **Results:** according to forceplate a statistically significant displacement of the LG projections was identified: in the sagittal plane one was shifted anteriorly in all variants of myotonic reactions, as well as in the frontal plane an asymmetric position of the LG projections in patients with expressed antalgic scoliosis was observed. Intense pain is not correlated with forceplate parameters but strongly and directly impacts on the general disability level. **Conclusions:** preoperatively in patients with lumbar osteochondrosis vertical posture stability in all variants of myotonic reactions was impaired.

Keywords: lumbar osteochondrosis, myotonic reaction, forceplate, disability.

Introduction. In the retention mechanisms of the human body in an upright position when standing leading role belongs to gravity factor. Muscle activity and components supporting joints of the kinematic chain of the body caused by the action of gravity moment relative to the support, is mainly in the blocking or restricting the movements bearing segments and aims to achieve the most favorable mutual disposition of these segments while keeping the body center of gravity over an area of support. Ergonomic vertical posture assumes normal size of lumbar lordosis, neutral major joints of the lower extremities, passing projection general center of mass (GCM) through the disk L5–S1 [3]. On the bearing surface normal projection GCM located in the sagittal plane to 4 cm to front from center the ankle joint in the frontal plane – symmetrically between the footstep [1].

Osteochondrosis vertebralis characterized by the development of degenerative lumbar strain segments with front offset projection GCM for area of support [8]. At the same time osteochondrosis vertebralis accompany pain syndromes and myotonic muscle reaction lumbar-pelvic region, leading to functional deformations blocked segments [2; 10] and changing the location of the body parts of the kinematic chain relative to the line of gravity. Biomechanically inexpedient antalgic spinal deformity may significantly limit the functionality of osteomuscular system and cause the

formation of secondary outbreaks of painful irritation to the progression of the disease. However, the characteristics of the spine alignment in different variants myotonic reactions in patients with osteochondrosis in the available literature hardly studied. Also, do not examine the relationship between the biomechanical parameters of the vertical posture, pain syndrome intensity and indicators disabilities this category of patients in the preoperative period.

Connection with academic programs, plans, themes. Studies carried out in accordance with the research theme "Development of comprehensive physical rehabilitation of patients with lumbar osteochondrosis in the early postoperative period after stabilizing operations using metal structures", state registration number 0111U009692.

Goals of research: explore the functional properties of the musculoskeletal system of patients with lumbar osteochondrosis preoperatively with different variants of myotonic reactions.

Objectives of the research

1. Examine options stabilography in the frontal plane in patients with lumbar osteochondrosis in the preoperative period.
2. Elucidate options stabilography in the sagittal plane in patients with lumbar osteochondrosis in the preoperative period.
3. Form an estimate functionality musculoskeletal patients with lumbar osteochondrosis in the preoperative period.

Matter and methods of research. Research material included clinical protocols and biomechanical exploration 70 patients with lumbar osteochondrosis, which was subsequently performed the surgical treatment in the form of posterior spine fusion dorsolumbar segments with transpedicular fixation of metal structures.

Clinical examination included anthropometry, somatoscopy study of orthopedic status. Were conducted teacher supervision.

Biomechanical studies were conducted in a vertical position on the platform force plate. On stabilograms determined by:

1. In a static position at a convenient standing – position of projection GCM on area of support in the sagittal (GCMY) and frontal (GCMX) planes.
2. In the static state for 30 – amplitude of movement of GCMY projection (i.e., the amplitude of oscillation of the body of the subject in the sagittal plane) with doubly (AK_DO) singly and with a support standing on the foot bounce pain (AK_OOotr) and the contralateral lower extremity (AK_OO)) (Fig. 1)

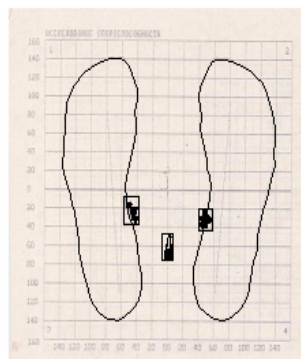


Fig.1. Stabilograms in the study of functional support ability in the sagittal and frontal planes in the norm

The intensity of lower back pain was evaluated on a 100-millimeter visual analog scale (VAS): 0 mm – no pain; 100 mm – unbearable pain. Disabilitatsii Index (ODI) due to lower back pain was evaluated by questionnaire Oswestry Disability Questionnaire, version 2,0 [6]. Level Kinesio phobia (KST) determined by on a scale of Tampa. [5] Level associated with the expectation of pain anxiety and worry (PASS) was evaluated on a scale Pain and Anxiety Symptoms Scale – 20 [5].

In statistical studies used methods of descriptive statistics, t-Student test to determine the degree of reliability of the differences between the compared attributes (confidence level of $p < 0.05$), correlation analysis by Spirman.

Patients were randomly assigned to a random sample into 2 subgroups: main (MG; $n=40$) and control group (CG; $n=30$). By sex, age, Quetelet index significant differences between groups not observed (Table 1).

Table 1

**Some statistics of patients with lumbar osteochondrosis
main and control groups before surgery**

Symptom	Main group $n=40$	Control group $n=30$
Sex		
Male	$n=23; 57,5\%$	$n=17; 56,7\%$
Female	$n=17; 42,5\%$	$n=13; 43,3\%$
The average age	$46,2 \pm 2,3$	$46,0 \pm 2,8$
$t=0,3; P>0,05$		
The average Quetelet index	$23,1 \pm 0,6$	$23,5 \pm 1,1$
$t=0,7; P>0,05$		
Level spondylodosis		
L4 – L5	$n=7; 17,5\%$	$n=5; 16,7\%$
L4 – L5 – S1	$n=33; 82,5\%$	$n=25; 83,3\%$
$t=0,3; P>0,05$		

Results of the research and its' discussion. By the nature of the configuration of the body, the patients divided in that way. Flattening of the lumbar lordosis with moderate voltage paravertebral muscles were registered on 9 observations in the MG (22.5%) and CG (30%); hidden antalgic scoliosis (scoliosis implementation in bending by asymmetric hyper deep short segmental muscle) – in 12 cases in the MG (30%) and in 11 (36.7%) in CG; explicit antalgic kyphoscoliosis (due to hyper surface long segmental muscle) – in 18 patients MG (45%) and 10 (33.3%) in CG.

In general, the groups – MG and CG before surgery averages location GCM projections in the frontal plane showed a clear trend to shift the projection GCMX from the midline of the body: $0,48 \pm 0,40$ cm and $0,49 \pm 0,38$ cm, respectively (Table. 2).

Table 2

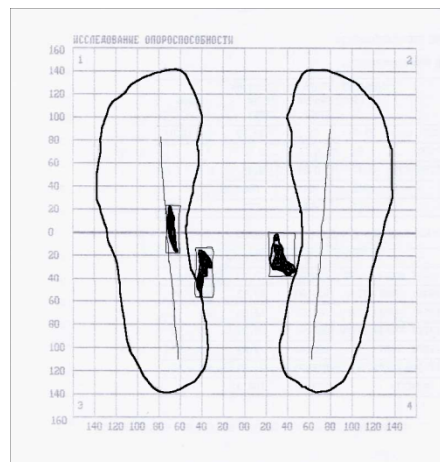
Some statistical parameters of the patients of main and control groups in the preoperative period

Groups	Indicators	Groups	Indicators
GCMX, cm		The intensity of the pain by VAS, mm	
MG	-0,49±0,38	MG	69±14
CG	-0,48±0,40	CG	70±12
GCMY, cm		ODI	
MG	-3,85±0,42	MG	70,7±9,8
CG	-3,87±0,44	CG	69,9±10,2
AK DO, cm		PASS	
MG	1,50±0,18	MG	69,8±10,1
CG	1,51±0,16	CG	70,3±10,7
AK OOotr_p, cm		KST	
MG	1,59±1,15	MG	48,3±4,3
CG	1,60±1,11	CG	48,7±4,1
AK OO, cm		Carpal dynamometry, kg	
MG	1,57±1,34	MG	39,0±4,5
CG	1,57±1,32	CG	39,2±4,1

To study the parameters stabilography in the frontal plane in the subgroups of patients with different types of antalgic spinal deformities revealed significant differences in the degree of displacement of the GCMX projection. The average patients with obvious antalgic scoliosis GCMX parameter reached 1,3±0,35 cm in the MG and 1,27±0,32 cm in the CG, exceeding significantly GCMX rate in the subgroup of patients with moderate to severe myotonic reactions (0,24±0,18 cm; $t=2,4$; $P < 0,01$ in the MG and 0,22±0,14 cm; $t=2,4$; $P < 0,01$ in the CG) and the median for the whole group ($t=1,8$; $P < 0,05$). Statistically significant differences in the GCMX parameter in subgroups of patients with overt and covert antalgic scoliosis was not observed (Fig. 2).



a)



b)

Fig. 2 photographic print of a patient with antalgic kyphoscoliosis (a) and its stabilogram (b)

In the sagittal plane before surgery in both groups of patients with doubly-standing there was a statistically significant (compared to the norm) anteversion GCMY projection ($-3,85 \pm 0,42$ in MG and $-3,87 \pm 0,44$ in the CG; $t=2,7$; $P<0,01$). Noteworthy is the fact that no statistically significant differences in the magnitude of the displacement of the gravity between subgroups with different versions of antalgic spinal deformities were observed.

Such offset character of GCMY parameter indicates the development of compensatory changes in the location of the links of the kinematic chain of gravity relative to the line connected, apparently, not only antalgic, but also to structural deformities degenerative lumbar spinal segments.

Degenerative flattening of the sagittal contour of the spine (lumbar straightening with a tendency to bend his kyphosation and verticalization of the sacrum) is offset by retroversion of the pelvis, trunk bent anteriorly, extensor units in hip flexion and – in the knee [11]. Hold a vertical posture requires excessive postural activity of the antigravity muscles (muscles – extensors of the spine and lower limbs), and the iliopsoas and quadriceps [12]. This posture is biomechanically inappropriate and energy-consuming, which may force patients to use additional support (cane) [7].

When singly-standing displacement amplitude projection GXMY while standing at the foot of a reflected pain ($1,59 \pm 1,15$ cm for MG and $1,60 \pm 1,11$ cm for CG) and while standing on the contralateral "healthy" foot ($1,57 \pm 1,34$ cm for MG and $1,57 \pm 1,34$ cm for CG) had no significant difference.

Rocking motion of the body in the sagittal plane due to the constant positional work the muscles surrounding the ankle joint, in fixing the latter [1]. Periodic activity of the gastrocnemius muscle and its antagonists – peroneal muscle groups in postural swing minimizes muscle effort to hold the vertical posture. Parameters rocking body (for doubly and singly-especially state) – speed, amplitude and frequency of oscillation, center of pressure excursions on foot stabilographic platform – is considered an indicator of stability of vertical posture [4; 9].

Increasing the scope of oscillation of the body constitutes a violation of the coordinated interaction of muscles – antagonists, as well as excessive muscular work while keeping the vertical position [9].

The obtained results reflect the decrease in the functional and support ability of the lower limbs in a vertical position with the violation of the stability of the latter, especially in the phase of singly-step while walking. Violation of postural stability may be due, primarily, to increased pain (both local in the lumbar spine, and reflected in the lower limb) by increasing the load on the compromised lumbar segments and, accordingly, increasing the load on the hyperactive muscles of the lumbar-pelvic region in a state of hyper. In addition, the violation of the stability of vertical posture may be associated with reduced endurance of the extensor muscles of the spine, the gluteal muscles and the extensor muscles of the hip and their biomechanical insufficiency for the closure of the hip joint of supporting leg. These static and functional changes of the musculoskeletal system, as a rule, are compounded by the dynamic processes that require additional muscular effort to rotate the pelvis and shoulder girdle and are accompanied by shocks with additional mechanical stresses of body segments during walking.

Should note a decline of indicators in the carpal dynamometry (right hand) in both groups during the preoperative period (Table. 2), which, in our opinion, is

relative and may be associated not so much with a decrease in muscle strength, but with the potential of this provocative test as muscular tension in the testing process causes an increase in intra-abdominal pressure with corresponding increase inside-disc pressure and painful syndrome reproduction.

The preoperative period at patients with lumbar osteochondrosis in both groups distinguished by a high intensity of pain syndrome and a high level of total disability due to a significant increase in indicators of Oswestry ODI disability index, the level associated with fear of pain expectation anxiety and worry (PASS) and the level of kinesiophobia KST (see. Table. 2).

Correlation analysis revealed no statistically significant relationship between the parameters of stabilography, on the one hand, and the intensity of pain syndrome and disability indicators, on the other, in both groups of patients surveyed – MG and CG. At the same time was confirmed a statistically significant effect of pain intensity on the value of the disability index (correlation coefficient k for the VAS and ODI $k=0,89$; $p < 0,001$), the level of anxiety and distress associated with the expectation of pain ($k=0,62$ for VAS and PASS; $p < 0,01$) and the level of kinesiophobia ($k=0,55$ for VAS and KST; $p < 0,01$). There are also strong direct correlation between PASS and KST ($k=0,71$; $p < 0,001$), whereas the ODI and PASS correlate directly and moderately: $k=0,46$; $p < 0,05$ (Fig. 3).

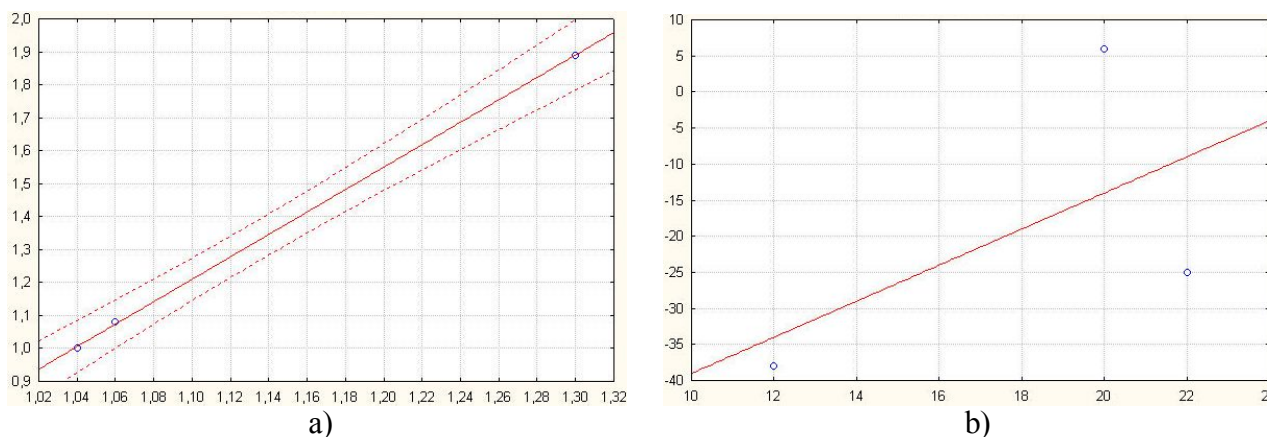


Fig. 3 The regression line of parameter ODI to VAS (a) and PASS (b) in the MG and CG groups during preoperative period – an approximated curve

In the absence of statistically significant differences between MG and CG groups according to studied indicators (see. Table. 2), the results of the correlation analysis in these groups of patients were identical.

Conclusions:

In the frontal plane, according to stabilography, in the preoperative period identified a statistically significant offset of GCM projections from the median line of the body and at patients with lumbar osteochondrosis with obvious antalgic scoliosis.

In the sagittal plane at patients with lumbar osteochondrosis in the preoperative period a statistically significant offset of the projection on the front of the GCM support area that indicates a change in the location of the body segments relative to the line of gravity at all variants of myotonic reactions.

Changing parameters of singly standing indicates a decrease of functional support ability of the lower limbs with impaired stability of vertical posture.

Significant pain syndrome intensity at patients with lumbar osteochondrosis in the preoperative period significantly affect the high level disability, kinesiophobia and fear of pain expectation.

Prospects for further research. Based on the obtained results, promising are further studies on the features of adaptive remodeling links of the kinematic chain of the body designed to hold upright posture, in different types of myotonic reactions at patients with lumbar osteochondrosis.

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Alzin Hodod: *Kharkiv State Academy of Physical Culture: Klochkovskaya str. 99, Kharkiv, 61058, Ukraine.*

E-mail: veakol@rambler.ru

Vera Kolesnichenko: *Doctor of Science (Medicine); State Institution «Sytenko Institute of Spine and Joint Pathology National Academy of Medical Sciences of Ukraine»: Pushkinskaya Str. 80, Kharkov, 61024, Ukraine.*

E-mail: veakol@rambler.ru

ARTEM'YEVA G.¹, NECHYTAILO M.²

¹*Kharkiv State Academy of Physical Culture*

²*Individual entrepreneur East dance school «Djaya»*

THE DEVELOPMENT OF COORDINATION ABILITIES OF CHILDREN OF 9-11 YEARS BY MEANS OF DANCE FITNESS INCLUDING THE ELEMENTS OF INDIAN DANCE

Abstract. *Purpose:* to investigate the influence of a methodology of development of coordination abilities of children of 9-11 years by means of dance fitness including the elements of Indian dance. **Material and methods:** a research was conducted at the premises of Kharkiv State Academy of Physical Culture and CE «Kharkiv Regional Palace of Children and Youth Creativity. The participants of the research were 22 children aged from 9 to 11 years. **Results:** a methodology for carrying out dance fitness classes with the elements of Indian dance with the children of 9-11 years was designed. A comparative analysis of the level of coordination abilities development in the control and experimental groups was conducted. **Conclusions:** the efficiency of an influence of a designed methodology for carrying out dance fitness classes with the elements of Indian dance on a development of coordination abilities of children of 9-11 years was proved.

Keywords: *indian dance, coordination abilities, dance fitness, children.*

Introduction. The analysis of literary sources regarding the definitions of a concept «coordination abilities», mentioned by specialists, showed that by this one the capacity for mastering new movements and ability to regulate and rebuild motor activity according to the conditions of motor circumstances are meant [1;2;5;7;10].

Lyakh V.I. (2001) singles out special, specific and general coordination abilities. As for the specific abilities, they are the most significant in many kinds of activity, thus they require the primary attention during a process of physical education of school children, and also demand development and improvement in the course of a school year.

The specific coordination abilities are defined as human capacities, which determine his preparedness for optimal management and regulation of separate specific coordination tasks. The following abilities are considered to be the most important ones: spatial reasoning ability, equilibrium, responsiveness, and differentiation of efforts, time, spatium and rhythm, rhythmicity of movements, voluntary relaxation of muscles, and coordination of movements [1; 2; 7; 10].

The analysis of publications revealed that a difference in opinions as for the sensitive periods of coordination abilities development is observed in research and methodology literature [1; 3; 7; 9; 10]. It may be connected with a variety of coordination manifestations, each of which has its own specific mechanisms of

physiological maintenance and several sensitive periods of development. Thus, Fomin M.A. and Vavilov Y.M. consider that the age from 7 to 10 years is characterized by high rates of coordination abilities development. A considerable contribution to it is made by central nervous system plasticity, intensive improvement of motor analyzer that is expressed particularly in enhancement of spatio-temporal characteristics of movement.

Lyakh V.I. mentions that the most favorable period for coordination abilities development is the age of 10-12 years, when it is possible to correct the defects, which were made during their development at primary school age [7].

The children at the age of 9-11 years show the highest interest in dance fitness classes that coincides with a sensitive period of coordination abilities development [6; 9; 11].

There is a great number of programs of dance orientation in recreational fitness, which are directed to coordination abilities development, together with improvement of functional capabilities of cardiorespiratory system [6; 11]. When analyzing the native and foreign sources concerning dance fitness, we came to a conclusion that enough attention is paid to coordination abilities development by means of various national dance styles [6; 11; 12].

The distinguishing feature of dance fitness with the elements of Indian dance is the presence of a wide range of hands gestures, which have the informative nature, and their combination with legs positions, which influence the improvement of coordination abilities and fine hands motor skills. It proves not only the recreational orientation of the given kind of dance fitness, but also the opportune laying a solid base for further sports activities.

The issues of an influence of dance fitness with the elements of Indian dance on a level of coordination abilities development are not developed to the full extent in research and methodology literature. That is why designing a methodology of coordination abilities development by means of dance fitness including the elements of Indian dance is actual nowadays in our country.

The goal of the research: to study the influence of a methodology of coordination abilities development by means of dance fitness including the elements of Indian dance.

The tasks of the research:

1. To ground theoretically a methodology of coordination abilities development by means of dance fitness with the elements of Indian dance.

2. To determine the initial level of a development of coordination abilities of children, aged from 9 to 11 years, which go in for dance fitness, and a change of coordination abilities level under the influence of authorial methodology of carrying out the classes by means of dance fitness with the elements of Indian dance.

Material and methods of research. The research was carried out at the premises of Kharkiv State Academy of Physical Culture and CE «Kharkiv Regional Palace of Children and Youth Creativity», where 30 children go in for dance fitness. The pedagogical observations and testing for determining a level of coordination abilities of children, which attend classes, were conducted; the average indicators of

test results were identified. According to homogeneity of the development of abilities under research, 22 children were chosen, and further they were divided into control (CG) and experimental (EG) groups, consisting correspondingly of 10 and 12 pupils. The pedagogical experiment was continuing for 6 months.

The following methods were used during the research: methods of theoretical analysis and generalization of scientific and methodological literature, pedagogical methods of research, and methods of mathematical statistics. Due to hardware and software system (HSS) «The sports psychophysicologist», a hard testing for determining the spatio-temporal characteristics and tests without usage of hardware system, testing for identifying static ataxia, sense of rhythm, coordination of movements in particular, were conducted.

The results of research and their discussion. The classes in CG were carried out according to common methodology of dance fitness. Without changing a timetable and duration of classes, the children had a practice according to our methodology for carrying out classes by means of dance fitness including the elements of Indian dance. The step method of loads increase in accordance with functional capabilities of children was applied.

In preparatory part of the developed methodology, the following exercises were added to combine developing exercises:

3. Hand movements with simple coordination, which complicated during all the experiment. A number of repetitions varied depending on individual abilities of a child and was from 6-8 to 12-14.

4. Rearranging in different directions with a background music. The children rearranged to each side with a help of various mudras (Indian gestures by each hand individually) and with different speed. A number of repetitions was equal to 8-12.

The main part of a workout lesson consisted of the following exercises:

4. Mastering the new mudras with complicated coordination and lingas (jumps, similar by structure to choreographic ones, which are called «sote»), ast (legs patting with a help of jingles) and adding to them the turns.

5. Mastering dance connections, which complicated gradually at each lesson. During the first three weeks, a time that was allowed for mastering a dance and dance connections, was 8-15 minutes. Further, it gradually ran up to 25 minutes. During the second month, composing a dance with a help of connections, which were learned before, took place. A difficulty level of a dance was initial, reasonable and interesting one for the children of 9-11 years.

Mastering a synchronism of the learned dance material was the important element of the main part. The main methodological techniques of mastering a synchronism were the following ones: a change of spatial boundaries, in which a dance was executed; adding or absence of background music during the execution; performing exercises under the conditions of health control limitation (during the first three months, dance movements with closed eyes were executed strictly at the same place, and further, during the last three months of the experiment, various dance arrangements and displacements were added); a repetition of the particular part of a dance for 5 minutes without intervals, executed according to high impact; a change of

a speed of one dance connection execution (maximum speed of a connection execution by sportsmen depended on fatigue level of children at the end of the main part), a number of repetitions gradually increased from one lesson to another and included 4-16 repetitions.

The obligatory exercises of the final part were the ones for breathing management, enhancement of emotional state of children and improvement of fine hands motor skills. At the same time, mastering mudras (the gestures of one hand) and samyutta hastini (the gestures with a help of both hands) took place in the final part. During the first 2 months, the children executed gestures in sitting position, and then – in standing one. An execution time varied from 2 to 5 minutes, depending on fatigue level of children.

It is necessary to point out that we also used a game like method, a constituent part of which was the elements of Indian dance.

The results of the initial tests of the children of CG and EG for identifying the level of their coordination abilities development are showed in Table 1.

Table 1

The level of coordination abilities of children in CG and EG before the experiment (n=22)

№	Testing	\bar{X}		σ		m		V, %	
		CG	EG	CG	EG	CG	EG	CG	EG
1	Romberg's test, s	15,2	16,9	4,0	3,5	1,3	1,0	26	18
2	Rhythmic hand tapping (Sergienko L.P.), a number of cycles	6,3	5,7	1,4	1,2	0,4	0,3	18	20
3	Coordination complex of exercises, points	15,3	14,4	3,2	2,7	1,0	0,8	21	19
4	Time determination of simple sensomotor light response, s	0,4	0,3	0,1	0,1	0,2	0,1	26	28
5	Time determination of simple sensomotor sound response, s	0,5	0,5	0,1	0,1	0,08	0,1	17	19
6	Time determination of moving object response, s	0,2	0,2	0,1	0,1	0,2	0,1	56	51
7	Time determination of choice reaction, s	0,5	0,5	0,1	0,1	0,1	0,2	24	31
8	Assessment of angular velocity of motion, %	30,1	31,7	6,1	7,4	1,9	2,1	20	23
9	Assessment of the introduced segments, %	49,6	47,9	14,0	18,9	4,4	5,5	28	40
10	Measure of segments, %	38,9	32,4	15,7	17,1	5,0	4,9	41	53
11	Recognition of the introduced angles, %	23,5	23,2	6,3	8,2	2,0	2,4	27	35

In ascertaining experiment, the groups showed a considerable inhomogeneity of indicators: coefficient of variation in CG varies from 17% (time determination of simple sensomotor sound response) to 56% (testing for time determination of moving

object response), and in EG – from 18% (Romberg's test) to 51% for testing for time determination of moving object response (ref. Table 1). According to test indicators, carried out with a help of HSS «The sports psychophysicologist», the standards of which are indicated in software, the groups received «below the average» assessments. We developed a comparative analysis to identify authenticity of differences of control and experimental groups according to Student's test ($t=2,086$) (Table 2)

Table 2

The comparative analysis of the results of testing a level of coordination abilities development of the children of CG and EG in the beginning of the experiment, (n=22)

Testing	CG		EG		t	p
	\bar{X}	m	\bar{X}	m		
Romberg's test, s	15,2	1,3	16,9	1,0	-1,050	p>0,05
Rhythmic hand tapping (Sergienko L.P.), a number of cycles	6,3	0,4	5,7	0,3	1,168	p>0,05
Coordination complex of exercises, points	15,3	1,0	14,4	0,8	0,705	p>0,05
Time determination of simple sensomotor light response, s	0,4	0,2	0,3	0,1	2,335	p<0,05
Time determination of simple sensomotor sound response, s	0,5	0,08	0,5	0,1	0	p>0,05
Time determination of moving object response, s	0,2	0,2	0,2	0,1	0	p>0,05
Time determination of choice reaction, s	0,5	0,1	0,2	0,2	7,006	p<0,05
Assessment of angular velocity of motion, %	30,1	1,9	31,7	2,1	-0,556	p>0,05
Assessment of the size of introduced segments, %	49,6	4,4	47,9	5,5	0,242	p>0,05
Measure of segments, %	38,9	5,0	32,4	4,9	0,928	p>0,05
Recognition of the introduced angles, %	23,5	23,2	23,2	2,4	0,097	p>0,05

According to Student's criterion, in the beginning of the experiment, the differences between tests results of CG and EG are not recognized to be statistically significant.

After implementing an experimental methodology of dance fitness with the elements of Indian dance into practice, we conducted a repeated testing of CG and EG and carried out the comparative analysis as for the adequacy of researched characteristics differences (Table 3).

Table 3

The comparative analysis of the results of testing a level of coordination abilities development of the children of CG and EG in the end of the experiment, (n=22)

Testing	CG		EG		t	p
	\bar{X}	m	\bar{X}	m		
Romberg's test, s	16	1,1	25, 3	0,5	-7,432	p<0,01
Rhythmic hand tapping (Sergienko L.P.), a number of cycles	6,9	0,2	8,6	0,2	-5,314	p<0,01
Coordination complex of exercises, points	6,8	0,4	8,4	0,2	-3,602	p<0,01
Time determination of simple sensomotor light response, s	0,4	0,1	0,2	0,1	4,671	p<0,01
Time determination of simple sensomotor sound response, s	0,5	0,2	0,3	0,1	6,325	p<0,01
Time determination of moving object response, s	0,3	0,1	0,1	0,1	5,432	p<0,01
Time determination of choice reaction, s	0,5	0,4	0,3	0,1	6,325	p<0,01
Assessment of angular velocity of motion, %	29,3	1,2	7,9	0,4	16,99 9	p<0,01
Assessment of the size of introduced segments, %	48,9	4,2	5,3	0,4	10,31 2	p<0,01
Measure of segments, %	39,6	4,9	13, 7	0,4	5,303	p<0,01
Recognition of the introduced angles, %	23,3	2,3	13, 1	0,4	4,411	p<0,01

The differences between CG and EG are recognized to be statistically significant according to Student's t-criterion (p<0,01).

According to research results, we conducted a comparative analysis of growth rates of indicators of the level of coordination abilities development of the children of 9-11 years under the influence of dance fitness classes in control and experimental groups (Fig.1).

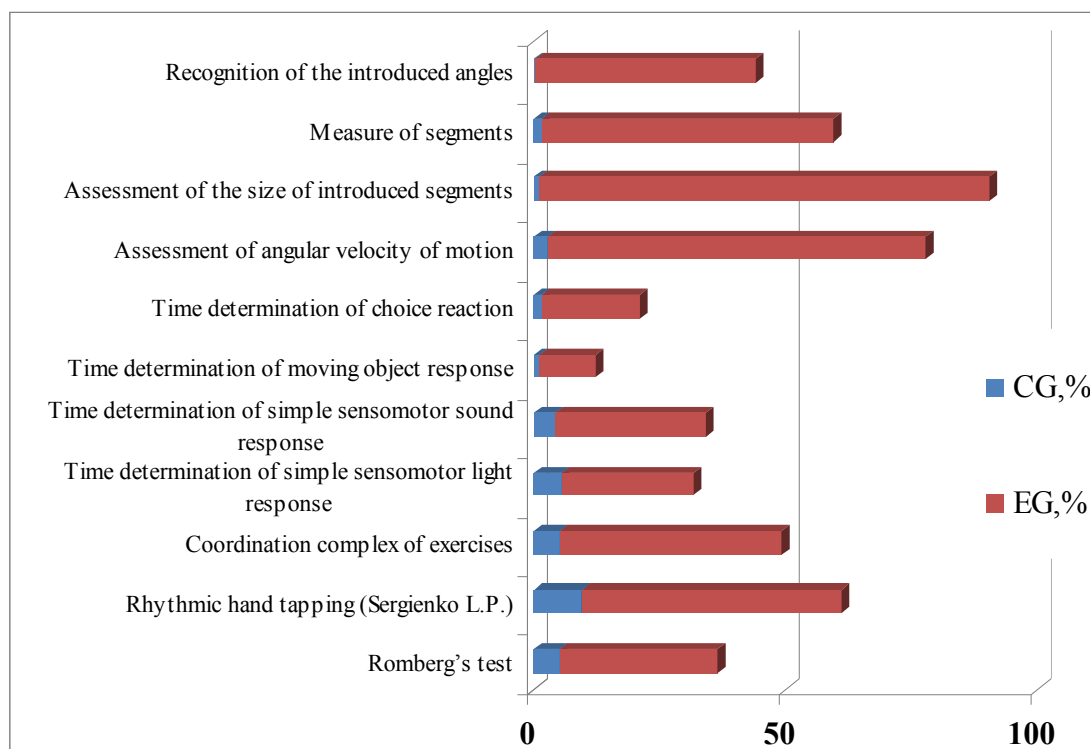


Fig. 1. A growth rate of indicators of the level of coordination abilities development of the children of 9-11 years of control and experimental groups (n=22)

In control group, a growth rate of indicators varies from 1,2% to 9,5%, in experimental group – from 11,3% to 88,9%. A growth rate of indicators of assessment of the introduced segments size has the best results in EG and is equal to 88,9%.

Conclusions:

1. After analyzing the theoretical aspects of dance fitness classes with the children of 9-11 years, it was concluded that there was a insufficient quantity of literature concerning the influence of dance fitness with the elements of Indian dance on coordination abilities development.

2. The level of coordination abilities development of children of 9-11 years, which go in for dance fitness including the elements of Indian dance. In ascertaining experiment, both groups showed a considerable inhomogeneity as for the indicators of spatiotemporal characteristics. In tests, carried out with a help of HSS «The sports psychophysicologist», the children received «below the average» assessment.

3. On the ground of obtained results of ascertaining experiment and taking into account physical development of children, who go in for dance fitness, the experimental methodology of coordination abilities development of the children with a help of dance fitness including the elements of Indian dance was designed. In consequence of implementation of the given methodology, it was revealed that a significant improvement of testing results with adequate probability equal to 99% was observed in CG. Thus, it is possible to suggest that experimental methodology

had an efficient influence on the level of coordination abilities development of the children of 9-11 years.

The perspectives for further researches. The developing and experimental checking a methodology of coordination abilities development and functional state of children of preschool age and primary school age by means of Indian dance are in perspectives of further researches.

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Galina Artem'yeva: *PhD (Physical Education and Sport), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkovskaya str. 99, Kharkiv, 61058, Ukraine.*

E-mail: art_gal.67@mail.ru

Mariia Nechytailo: *Individual entrepreneur / East dance school «Djaya»: Ivanova 12/16, Kharkiv, 61058, Ukraine.*

E-mail: tais_afinskaja_m@mail.ru

BATIEIEVA N.¹, KYZIM P.², TITKOVA I.², LUTSENKO L.³

¹*Kyiv national university of culture and arts*

²*Kharkiv state academy of physical training*

³*National university «Law academy of Ukraine named after Yaroslav the Wise»*

ENHANCEMENT OF TECHNIQUES OF ACCOMPLISHMENT OF TURNS BY YOUNG GYMNASTS BY MEANS OF CLASSICAL DANCE

Abstract. Objective: *theoretically to develop and experimentally to ground a technique of teaching of the classical dance, directed to enhancement of level of technical skill of accomplishment of turns by gymnasts at a stage of preliminary base preparation. A material:* seven gymnasts took part in research at the age of 8-9 years. **Results:** *it is established that increase of level of choreographic preparation of gymnasts by enhancement of accomplishment of base elements of classical dance provides reliability of execution of turns in rhythmic gymnastics at a stage of preliminary base preparation. The offered technique in enhancement of level of technical skill of accomplishment of turns had an effective influence on the development of coordination capabilities and technical readiness of gymnasts. Conclusions:* *matching of means of classical dance in an applied new technique has shown considerable results:* 1) *an indicator of the test turn « passé » on the right foot - changed by 40 %; 2) an indicator of the test turn « attitude » on the right foot - increased by 32 %; 3) an indicator of the test turn « a ring by means of hands » on the right foot - increased by 33 %.*

Keywords: *enhancement, gymnasts, choreography, turns, preparation, art.*

Introduction. In modern rhythmic gymnastics one of the important requirements to the competitive program is technical skill of sportsmen where there is a necessity for enhancement of techniques of accomplishment of difficulties of a body (jumps, turns, balance) and expressiveness of execution. Influence of choreographic preparation on improvement of sports results state F. Morel (1971); T.S. Lisitsky (1984); I.A. Shipilina (2004). Increase of mastery of gymnasts on the basis of enhancement of choreographic preparation are considered in S.I. Borisenko's researches (2000). It has shown that the priority of domestic gymnastics is caused not only high sports-technical skill, but also special aesthetics which is reflected in performances. Application of means of a choreography in preparation of gymnasts in 70s years became those «rational grain» which has allowed to allocate them on mastery level.

But during the same time methodical positions of application of means of a choreography in rhythmic gymnastics are formulated on an empirical basis and demand an experimental research and the logic justification. In this connection search

of new approaches to application of means of choreography is actual for increase of technical skill of gymnasts.

Research objective: theoretically to develop and experimentally to prove a technique of teaching of the classical dance directed to enhancement of level of technical skill of accomplishment of turns by gymnasts at a stage of preliminary base preparation.

Material and research methods. Throughout half a year from August 2013 till January 2014 on the basis of sports schools in Feodosiya among sportswomen of rhythmic gymnastics the experiment on enhancement of level of technical skill of accomplishment of turns with use of a purposeful complex of choreographic exercises was carried out. Three times a week throughout 6 months in the researched group consisting of 7 sportswomen in age of 8-9 years lessons were conducted on the classical dance, directed to development of technical skill of accomplishment of turns.

Following methods of research were used: the analysis of the scientifically-methodical literature, pedagogical methods of research, pedagogical experiment, a method of an expert estimation (qualimetry), a method of mathematical statistics.

Results of research and their discussion. The stage of preliminary base preparation in rhythmic gymnastics is necessary on sensitive age of 7-9 years for the development of coordination capabilities, dexterity, speed. As a result of work at this stage of the gymnast should master techniques of 10s specially - preparatory exercises which in the subsequent will give the chance to master in short time techniques of exercises of rhythmic gymnastics. As at this stage the techniques of classical dance demanding mastery by certain rotations and bases of small, average and high jumps is improved.

Technical training of gymnasts was estimated under tests which represented the turns often included in competitive programs. In all turns quality of accomplishment of exercises was estimated, technical errors of movement of a body also being estimated in aggregate. Testing was performed by a experts consisting of coaches in rhythmic gymnastics. The maximum estimation constituted from 10 points for correctly executed turn, and also were applied deducts for technical errors according to the international rules of competitions.

Before use of the offered technique we have compared the received results of accomplishment of test turns to results of accomplishment of the same test turns on the experiment termination, in the same age group (fig. 1, fig. 2, fig. 3).

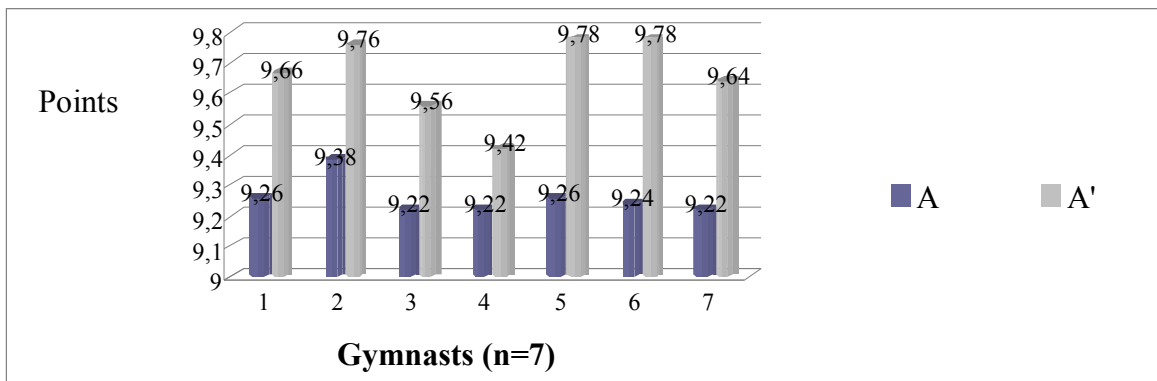


Fig. 1. The comparative characteristic of turn « passé»:
A - an estimation of accomplishment of turn « passé» before application of an experimental technique of classical dance; A' - an estimation of accomplishment of turn « passé» after application of an experimental technique of classical dance

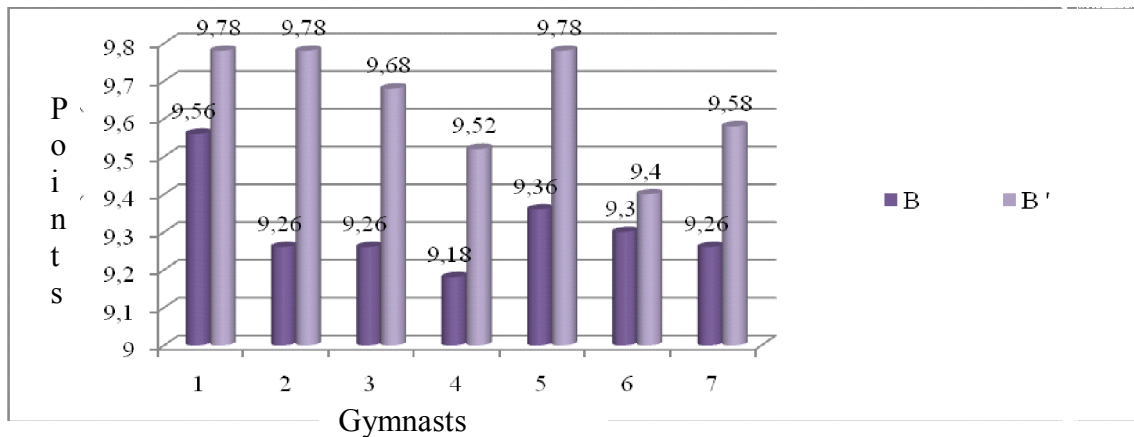


Fig. 2. The comparative characteristic of turn « attitude»:
B - an estimation of accomplishment of turn « attitude» before application of an experimental technique of classical dance; B' - an estimation of accomplishment of turn « attitude» after application of an experimental technique of classical dance

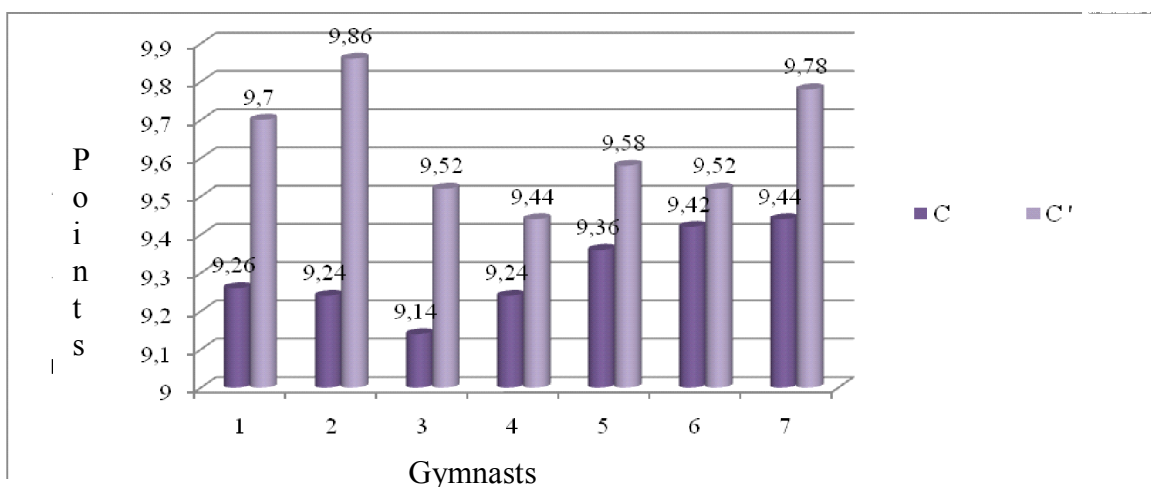


Fig. 3. The comparative characteristic of turn «a ring by means of hands»:

B - an estimation of accomplishment of turn «a ring by means of hands» before application of an experimental technique of classical dance; B ' - an estimation of accomplishment of turn «a ring by means of hands» after application of an experimental technique of classical dance.

It is established that increase of level of choreographic preparation of gymnasts by enhancement of accomplishment of base elements of classical dance provides reliability of execution of turns in rhythmic gymnastics at a stage of preliminary base preparation.

The analysis of the obtained results after application of an experimental technique in training process of the researched group has shown that level of technical skill of accomplishment of turns at gymnasts has grown (tab. 1).

Table 1

Comparative results of testing before and after pedagogical experiment

№	Tests	\bar{X}		σ		m		V		Criterion of Student T
		Before	After	Before	After	Before	After	Before	After	
1	Turn « passé » - on the right foot (point)	9,26	9,66	0,05	0,13	0,02	0,05	0,53	1,3	7,29
2	Turn « attitude » - on the right foot (point)	9,33	9,65	0,12	0,15	0,04	0,05	1,2	1,5	4,56
3	Turn «a ring by means of hands» - on the right foot (point)	9,3	9,63	0,1	0,15	0,04	0,06	1,07	1,5	4,59

The offered technique on enhancement of level of technical skill of accomplishment of turns promoted effective influence on development of coordination capabilities and technical readiness of gymnasts.

As a result of an applied technique of means of the classical dance, influencing techniques of accomplishment of turns in rhythmic gymnastics at a stage of preliminary base preparation it has been specified that:

1. Average value of accomplishment of test turns on all group increased by 3,4%.
2. An indicator of the test turn « passé » on the right foot changed by 40%.
3. An indicator of the test turn « attitude » on the right foot increased by 32%.
4. An indicator of the test turn «a ring by means of hands» on the right foot increased by 33 %.

The criterion of Student has shown that distinction between results of tests before experiment and after its termination is authentic ($p < 0,05$).

Conclusions:

1. The analysis of references indicated that in educational-training process of sportsmen of rhythmic gymnastics the application of means of classical dance is insufficiently represented in the special literature.

2. The maintenance of the educational-training process directed to enhancement of technical readiness of sportsmen of rhythmic gymnastics is developed.

3. The technique of accomplishment of means of the classical dance, influencing techniques of turns in rhythmic gymnastics at a stage of preliminary base preparation is developed. Matching of means of the classical dance, an applied new technique has shown considerable results: 1) an indicator of the test turn « passé » on the right foot has changed by 40 %; 2) an indicator of the test turn « attitude » on the right foot has increased by 32 %; 3) an indicator of the test turn « a ring by means of hands » on the right foot has grown by 30 %.

Prospects of researches in the given direction. It is supposed to ground enhancement of techniques of accomplishment of exercises without a gym. article by gymnasts of 7-8 years by means of special physical preparation.

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Nataliya Batieieva: *Kiev National University of Culture and Arts: Shchorsa 36, Kiev, 01133, Ukraine.*

ORCID.ORG/0000-0001-8575-5506

E-mail: kyzim@mail.ru

Petr Kyzim: *Kharkov State Academy of Physical Culture: Klochkovskaya 99, Kharkov, 61058, Ukraine.*

E-mail: kyzim@mail.ru

Irina Titkova: *Kharkov State Academy of Physical Culture: Klochkovskaya 99, Kharkov, 61058, Ukraine.*

E-mail: kyzim@mail.ru

Larisa Lutsenko: *National University "Yaroslav the Wise Lav Academy of Ukraine": Pushkinskaya Str. 77, Kharkov, 61000, Ukraine.*

E-mail: kyzim@mail.ru

BEZYAZYCHNAYA O.

Kharkiv State Academy of Physical Culture

THE APPLICATION OF A MASSAGE AND PHYSIOTHERAPY AFTER ARTHROSCOPIC SURGERY ON THE KNEE JOINT

Abstract. Purpose: to determine the characteristics of a massage and physiotherapy application in physical rehabilitation after arthroscopic surgery on the knee joint. **Material and methods of the research:** the theoretical analysis, the generalization of special scientific and methodical literature. **Results:** the peculiarities of a massage and physiotherapy application after operations on the knee joint are considered. The tasks and the major approaches to the prescription of a therapeutic massage and physiotherapy with account of the early, late postoperative, training and recovering periods of the course of a disease are presented. **Conclusions:** it is proved that a therapeutic massage and physiotherapy are the effective means of physical rehabilitation after arthroscopic surgery on the knee joint.

Keywords: arthroscopic surgery, knee joint, massage, physiotherapy.

Introduction. The World Health Organization (WHO) proclaimed the first decade of the twenty-first century the one of the control of musculoskeletal system diseases. The joints injuries and diseases, which lead to disability among all the age groups of a population, make a significant contribution to diseases of musculoskeletal system. The knee joint is a complex functioning system, the primary function of which is resistance. It is a large weight-bearing joint, which sometimes bears excessive loads. The knee joint, among all large ones, is usually damaged most often. The point is that its anatomic features (insufficient muscular defense, the absence of the fixative bone formation) and increased demands of sportsmen and people of other professions cause this [4]. The meniscus damage is considered the most frequent kind of the knee joint injuries, but this pathology occurs more often in sportsmen.

The second place belongs to the injuries of ligamentous apparatus of the joint. During the last decades, the surgeons consider arthroscopic surgery to be «the gold standard» of the treatment of the above-mentioned injuries. The introduction of arthroscopy considerably reduced the traumaticity of surgical interference. The minimally invasive approaches through the skin puncture reduce the pain syndrome; contribute to quicker muscles mobilization, renewal of passive and active movements in the joint. The timely and well-organized application of such postoperative rehabilitation methods as therapeutic physical training, therapeutic massage, physiotherapy, play an important role in rehabilitation treatment of traumatized patients after arthroscopic surgery on the knee joint [4; 6].

The connection of the work with scientific programs, plans and subjects.

The work was executed in accordance with the priority direction, indicated by the Law of Ukraine «On priority directions of science and technology development» № 3.5. «Life sciences, new preventive technologies and the treatment of the most common diseases» within the priority thematic direction 3.5.29. «The creation of the standards and the technology of a healthy lifestyle establishment, the technology of food products quality and safety improvement».

The goal of the research: the determination of the peculiarities of a therapeutic massage and physiotherapy application in physical rehabilitation of the patients after arthroscopic operations on the knee joint.

The material and methods of the research. Such methods as the theoretical analysis, the generalization of special scientific and methodical literature were used during the research.

The research results and their discussion. The majority of orthopedic traumatologists consider that a therapeutic massage after arthroscopic surgery on the knee joint is a constituent part of complex treatment and rehabilitation. It is also used as the effective individual procedure.

The therapeutic action of a massage appears mostly at the expense of mechanical and neuroreflectory mechanisms. A massage has a positive effect on functions of central nervous system, improves the mood and state of health of a patient. Under the influence of a massage, the improvement of blood supply in the joints and other anatomical formations of musculoskeletal system takes place and it contributes to resorption of residual effects of the inflammatory process (the tissues edema) and hemorrhage in the joint cavity. The massage, taking analgesic effect, improves and restores support and motor functions of the joint and ligamentous apparatus faster, accelerates angiogenesis process, prevents the development of connective tissue adhesions, contractures and myatropy [3; 5].

A massage is prescribed according to three periods of the course of a disease: early postoperative, late postoperative, training and recovering ones.

M.A. Eremushkin [2] indicates that, in early postoperative period, it is recommended to give a massage according several techniques for improving blood supply in the affected limb:

- a massage of reflex zone (at knee joint injuries – a reflexosegmental massage of paravertebral zones – cerebrospinal segments S₅ – S₁ i L₅ – L₁);
- a massage of the collateral limb (the healthy and symmetrical) using all the techniques;
- a massage of proximal surfaces of the operated limb (the suction one) starting with 10-12 day after surgery.

The procedure duration is 10 minutes.

In the second, late postoperative period, L.A. Kunichev [5] and A.A. Biryukov [1] recommend prescribing a massage of hip, lower leg and knee joint, passive and active movements in the joint of the affected limb. All the massage techniques are used. In order to liquidate the atrophy of quadriceps muscle of hip, the hip muscles,

which adduct and extend the lower limb, are selectively massaged. The procedure duration is 10-15 minutes daily.

In the third, training and recovering period, after the meniscus and ligamentous injury, a massage is prescribed in case of residual effects after the injury in the form of joint stiffness or joint contractures and atrophy of hip muscles. It is recommended to continue a massage of paravertebral zones – cerebrospinal segments S₅ – S₁, L₅ – L₁, and a massage of the knee joint – circular effleurage, rubbing, lower vibrations, shift and stretch of soft tissues, soldered with callus. For the patients with muscles atrophy, such stimulation techniques as passive stretching and contraction of muscles and tendons at a quick rate, joggling and quilting. If the knee joint contracture is apparent, it is necessary to use effleurage and rubbing of periarticular tissues, massage of capsular ligamentous apparatus – with a help of fingertips and pinch-like effleurage of short-cut and relaxed ligaments, rubbing and constant vibration. At the end of a massage, the general wide stroked effleurage of the affected limb, passive and active movements take place at the end of a massage. In case of contractures and joint stiffness, redressing movements are used. The procedure duration is 10-15 minutes [3; 5].

P.B. Efimenko recommends giving a hip massage and gluteal region one firstly, and then a massage of the knee joint (using all the massage techniques) [3].

When it comes to complex rehabilitation of the patients after arthroscopic surgery because of the knee joint injury, physiotherapeutic procedures, which take powerful trophic, anti-inflammatory and analgesic effect during the first period, are of great concern, and some of them contribute to fast regeneration of cartilaginous tissue [7; 9]. During the further periods, physiotherapeutic activities contribute to the enhancement of redox and trophic processes in the joints, the increase of movement amplitude, stretching and improvement of elasticity of muscles and ligaments, renewal of muscles strength and the joint function.

The therapeutic action of physical factors on human organism after injuries and surgery manifests itself as neuroreflectory and humoral mechanisms, but each of the factors has its peculiarities as for the ways of the therapeutic effect realization.

In the first, early postoperative period after the injuries of meniscus and ligaments of the knee joint, the physiotherapists recommend using the methods of phototherapy with application of infrared and ultraviolet radiation of paravertebral spine zones and symmetric healthy lower limb by sub-erythema and erythema radiation doses (from 2-3 doses with further exposition increase) [7; 8].

In order to remove a pain syndrome after the injuries, diadynamic therapy is used. The analgesic effect of diadynamic currents appears immediately after the procedure. It is connected with the development of temporary inhibition in nerve endings and reducing their lability. At the same time, they have antispasmodic influence, dilate the vessels, fasten blood and lymph circulation, and intensify metabolic and regenerative processes. Hereafter, the resorbing property of diadynamic therapy is used in cases of cicatrices and muscular contractures treatment, limitation of joints mobility after their long-lasting immobilization.

The magnetotherapy and electrophoresis with novocain and other anesthetic pharmaceuticals are also recommended for injured patients.

In the second, late postoperative period, the apparatus methods, which are able to cause warm in tissues by means of noncontact method, are used: inductothermy, infrared radiation, and microwave therapy, paraffin and ozokerite baths [7]. In case of pain reduction, it is advisable to include the methods of ultrasonic and laser therapy of paravertebral zone and the knee joint area.

In the third, recovering period, together with electrical, laser and magnetic therapy, the physiotherapists recommend wide using of fangotherapy and balneotherapy – radon, hydrogen sulfide and sodium chloride baths [8; 9].

The hydrotherapy is carried out mostly by way of warm local foot or full baths. The warm water uniformly warms the affected limb tissues up, which results in activation of hemodynamics and metabolic processes, relaxation of muscles, improvement of elasticity of tendinous capsular apparatus of the joints, reducing the oxcinesia. Due to each of these improvements, it is possible to increase movement amplitude and accelerate the liquidation of the injury consequences [8].

During this period, electrophoresis, iontophoresis with absorbable pharmaceuticals, galvanic mud treatment; sand and clay treatment, paraffin and ozokerite therapy, the treatment by means of muds, which warm the tissues up properly, increase movement amplitude in the joints. The amplipulse therapy, which has an excitatory influence on neuromuscular apparatus and increases contractility of muscles, facilitates this process.

Conclusions:

1. A therapeutical massage is the effective method of physical rehabilitation, which is used during all periods of the treatment of patients after arthroscopic surgery on the knee joint in the form of classic, reflexosegmental, and suction massage, including self-massage.

2. The application of physiotherapeutic treatment methods is aimed at analgesic and anti-inflammatory effect, the enhancement of metabolic processes at the site of injury; counteraction of adhesions and contractures formation, muscle atrophy and limitation of joints mobility; improvement of body system functioning and the general state of the patient. After arthroscopic surgery on the knee joint, the wide range of physical therapy treatment is used: phototherapy, electrical therapy, laser and magnetic therapy, fangotherapy and balneotherapy.

The perspectives are the researches of the massage and physiotherapy application effectiveness after arthroscopic surgery on the knee joint.

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Olga Bezyazychnaya: *Kharkiv State Academy of Physical Culture: Klochkovskaya str. 99, Kharkov, 61058, Ukraine.*

E-mail: obezyazychnaya@mail.ru

CHEREDNICHENKO A.*Simon Kuznets Kharkiv National University of Economics***ANALYSIS OF TERMINAL VALUES IN LIFE GROUPS OF STUDENTS OF KHARKOV UNIVERSITIES**

Abstract. Objective: *to determine the features of the system of values of students of Kharkov universities. Material and methods:* research was conducted in September-October 2013, in Simon Kuznets Kharkiv National University of Economics, Kharkiv national University of construction and architecture (KNUBA) and G. Skovoroda Kharkov national pedagogical University (KNPU). In research took part 523 students. For the analysis of value orientations of students' personalities was used morphological test values V.F. Sopov and L.V. Karpushina.

Results: *the analysis of scientific literature on the problem of investigation; conducted: a comparative analysis of terminal values in life of students of the first and second courses, boys and girls, students and teachers, students of different faculties, and analysis of terminal values in life of students of KNEU them. The Simon Kuznets, who said the high value of the sphere of physical activity, and students of Kharkov universities of different profile of education; comparative analysis of the orientation of the individual groups of students KNEU, KNUBA, KNPU in certain life values. Conclusions:* different contingency students have different attitudes to certain life values. Some differences were observed on the grounds of age as u guys and girls, and between teachers and students, KNEU name Simon Kuznets. However, between guys and girls of reliable differences in attitude it is not educed toward certain vital values. In directed groups of students of Kharkov universities in certain life values, almost no differences among students of different training profile; most students who are active in the field of physical education, strive to realize the spiritual and moral values than selfishly-prestige (pragmatic).

Keywords: *terminal values, physical education, comparative analysis, significant differences.*

The entry. The formation of personal value system is quite complicated and long process. Basis of the system of values is made by the valued orientations – major elements of underlying structure personalities that are based on her vital experience.. It is obvious that the system of values of a personality is being formed gradually in the course of life, starting from an early age, roots in the family, school, secondary special and higher educational institutions [5].

Modern concepts of development of higher education says that education should not only provide future specialists with deep knowledge, but also to contribute to the development of the personal position of students, to form a clear direction of

life, the ability to distinguish true value. Before the education, system is facing the necessity of search of new and modernization of existing approaches to the organization and contents of the educational process.

The task of higher education is the formation of a sustainable interest in their own lives and health. Given this, the question remains relevant analysis of the values that now offers us life and system of values and norms of the structures of the young generation, in order to determine, on the development of any of them should be oriented system of physical education.

According to different authors, a stable system of value orientations causes such personality traits as honesty, reliability, loyalty to certain principles and ideals, the ability to strong-willed efforts in the name of these ideals and values, active life position [2].

The value is a concept that is accepted in philosophy, sociology, psychology, pedagogy, ethics, aesthetics, etc. with which characterize the socio-historical, psychological, educational or personal meaning for individuals of certain phenomena of reality [7;8;9]. In theory and methodology of physical education, really pay attention to the value of a person engaged in physical self-improvement. The identification of the causes of action, actions, human activity is a procedure that requires painstaking study. The study of human values is one of the most important directions in identifying these reasons. A number of studies [1; 4; 6] have shown that the strength of the motive and efficiency of human activities depend on how well the person is fully aware of the purpose, the meaning of work. The value is a specific form of semantic units in personality structures"[3,99], and therefore are directly related to meaningful motivation of activity. Upon the value of the motivational structure of students in the sphere of physical culture and sports of the influence of external factors, in particular, living conditions, material security, conditions of education, the mode and type of motor activity. These factors refracted through consciousness, significantly affect the value orientation in terms of the motives, interests, orientation of the individual, the level of aspirations, ideals, goals, self-assessment of the physical self. [7]

Cardinal changes in political, economic, spiritual spheres of our society pull radical changes in the valued orientations and acts of people that especially brightly expressed for modern students. The problem of research of value orientations of students remains relevant, and therefore became the subject of our study.

The relationship work with academic programs, plans, themes. Work is executed according to the plan SRW of research work of the Department of physical training of Simon Kuznets Kharkiv National University of Economics on "Managerial aspects of functioning of the Department of physical education".

Objective: to determine the specifics of the system of values the students of Kharkov universities.

Research objectives:

- to carry out the analysis of scientific literature on the subject of the research;
- to determine the peculiarities of value orientations of the various study groups;

- to draw conclusions in a recent study.

Methods and organization studies. To achieve the goal of the research were used the following methods: theoretical analysis and generalization of literary sources; psych diagnostic experiment to determine the value of the peculiarities of the students of Kharkov universities; the mathematical processing of the experimental data on the computer using methods of mathematical statistics.

The study was conducted in September-October 2013, in Simon Kuznets Kharkiv National University of Economics (KNEU), Kharkiv national University of construction and architecture (KNUBA) and Grigoriy Skovoroda Kharkov national pedagogical University (KNPU) them. In research took part 523 students. For the analysis of value orientations of students ' personalities, we used morphological test values V.F. Sopov and L.V. Karpushina. Methodology of passing of test was given without seeing and conducted remotely. The materials were pals on the website of the Department of physical education and sports, KNEU name Simon Kuznets. For its passage was necessary to answer 112 questions automated program "PSY LAB" and send the file by e-mail. Then the data was transported into the stans, according to tentative standards for scales of human values by age.

Short description of morphological test values (MTV).

Main diagnostic construct MTV there terminal values.

The term "value" is defined as a relation of the subject to the phenomena of life of fact, the object and the subject, and its recognition as important, which is of vital importance.

The list of values includes:

1. Self-development (SD), that is, knowledge of their individual characteristics, the continuous development of their abilities and other personal characteristics.
2. Spiritual satisfaction (SS), i.e. the management of moral-ethical principles, the advantage of spiritual needs over the material.
3. Creativity (CR), that is, the realization of their creative abilities, the desire to change the surrounding reality.
4. Active social contacts (ASC), that is, the establishment of favorable relations in various spheres of social interaction, expansion of their interpersonal relations, the implementation of its social role.
5. Own prestige (OP), i.e. a gain of recognition in society by following certain social requirements.
6. High financial position (HFP), applying to factors of material well-being as the main content of existence.
7. Achievements (A), that is, setting and solution of certain problems of life as the main vital factors.
8. The preservation of our own identity (ZVI), that is, the dominance of their own thoughts, attitudes, beliefs over the conventional and the protection of their originality and independence.

The proposed values belong to the different groups: spiritual-moral values and selfish prestigious (pragmatic). This is conceptually important for determining the focus of the individual or group. The former include self-development, spiritual

satisfaction, creativity and active social contacts, reflecting the moral and business focus. Accordingly, the second subgroup values are prestige, achievements, financial status and the preservation of identity. They, in turn, reflect selfish prestigious personal orientation.

In all low – personal orientation uncertain, without Express the desired goal. When all the high points – personal orientation contradictory, internal conflict. At high points of values of the first group personal orientation is humanistic, second group – pragmatic (V.F. Sopov and L.V. Karpushina).

Table №1. Comparative analysis of the attitude to life values of different study groups

Terminal life values	SD	SS	KR	ASC	OP	HFP	A	ZVI	tb.
The studied group	Students (Guys) of KNEU name Simon Kuznets								
I year students	0,01	0,58	0,04	0,58	0,69	2,27	0,53	0,14	1,98
II year students									
Students(Girls) of KNEU name Simon Kuznets									
I year students	0,99	1,31	1,21	2,10	0,64	1,04	1,25	0,47	1,97
II year students									
Students of KNEU name Simon Kuznets									
Guys	0,62	1,27	0,50	0,70	1,20	0,21	1,30	0,16	1,98
Girls									
Students (KNEU)	2,42	0,37	0,63	0,91	2,24	1,76	1,55	1,69	2,10
Teachers (KNEU)									
Students of Kharkiv universities									
KNEU	0,20	0,65	1,04	0,82	0,25	0,84	0,08	0,71	2,04
KNPU									
KNEU	1,47	2,32	1,16	0,34	0,69	0,41	1,69	0,85	2,14
KNUBA									
KNPU	1,36	1,53	0,23	0,24	0,51	0,04	1,40	1,15	2,07
KNUBA									

Comment: P=0,95

Comparative analysis of terminal values in life (t-criterion of Student) students (boys) first and second courses KNEU name Simon Kuznets, revealed significant difference in values "High financial position"(HFP) ($t_r=2,27; t_b=1,98; P=0,95$), applying to factors of material well-being as the main meaning of existence. Freshmen give more preference than second-year students. According to the author, this is different reasons, namely:

- Students who received state scholarships for the first year are less need for cash (first-year students in the school did not receive it). In connection with this money needs are different, and therefore value attitude to them different;

- Students of the second course, during the first course of studied disciplines, which include axiological component, such as philosophy, life safety, physical

education and others. According to the author, these disciplines have influenced the attitude to the values of students.

The girls of the first and second courses significant difference detected in the terminal values "Active social contacts" (ASC) ($t_r.=2,10; t_b.=1,96; P=0,95$). That is, the establishment of favorable relations in various spheres of social interaction, expansion of their interpersonal relations, the implementation of its social role. For first year students (girls), it is more important than for second year students (girls). The author believes that this is because girls are getting into a new learning environment need successfully to integrate, so the value of this value is increased, and in the second year after adaptation, the value of this value for them is decreasing.

Comparative analysis of the attitude to life values boys and girls; we can make conclusion that significant differences were not found. Comparative analysis of terminal life between students and teachers of the Department of physical education and sports, KNEU name Simon Kuznets, has revealed significant differences in the values of the "Self-development" (SD) ($t_r.=2,42; t_b.=2,10; P=0,95$). That is, knowledge of their individual characteristics, the continuous development of their abilities and other personal characteristics, and "personal prestige" (OP) ($t_r.=2,24; t_b.=2,10; P=0,95$), i.e. a gain of recognition in society by following certain social requirements.

Both values average performance of students is higher than teachers. The need for self-development of the students, in the opinion of the author, due to the age and educational environment. For teachers also provided official duties professional growth and self-development, but in the students the value above. Analyzing the value of "personal prestige", you can see that for students is of high importance, because in this age, a person takes his place "under the sun" and establishes social relations, creates its image.

Comparative analysis of the attitude to life values students of different profile training, has revealed significant differences in the values of the "Spiritual satisfaction" (SS) ($t_r.=2,32; t_b.=2,14; P=0,95$) between the students of KNEU and KNUBA, that is, the leadership of the moral-ethical principles, the advantage of spiritual needs over the material. For students KNUBA this value is more important than for students of KNEU.

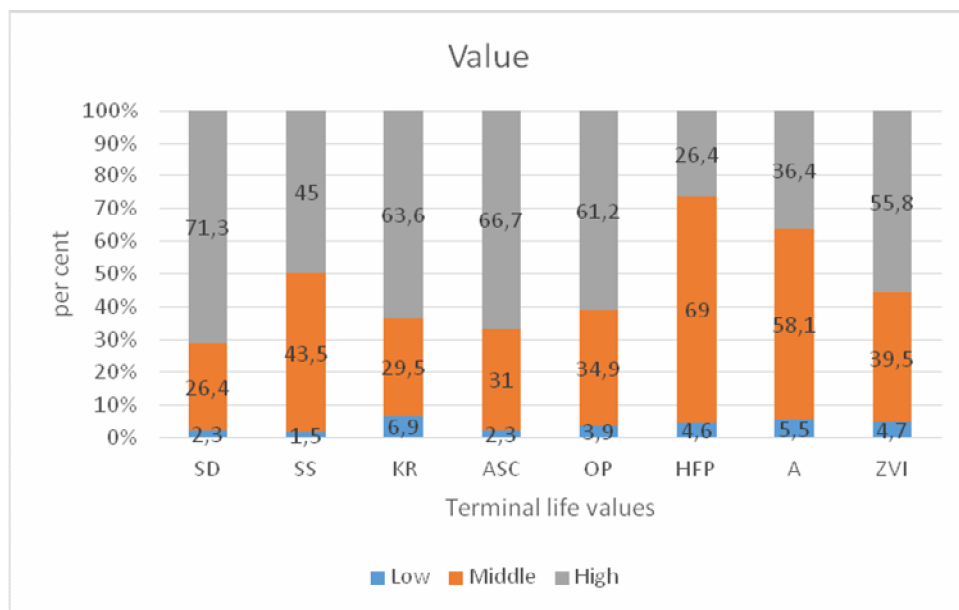
Table №2. Comparative analysis of the orientation of the individual groups of students of Kharkov universities in certain life values (in per cent by the Fisher test).

Personal orientation	KNEU	KNUBA	Fr.	KNEU	KNPU	Fr.	KNUBA	KNPU	Fr.
Humanist	12%	12%	0,152	12%	8%	0,786	12%	8%	0,61
Pragmatic	8%	12%	0,674	8%	12%	0,549	12%	12%	0,21
Controversial-conflict	2%	24%	0,604	2%	15%	0,68	24%	15%	1,936
Undefined	3%	0%	-	3%	4%	0,166	0%	4%	-
Not have a clear focus	57%	52%	0,289	57%	61%	0,609	52%	61%	0,61

Comment: $F_b.=1,64; P=0,95$

Analyzing the data given in the table, it should be noted that in KNUBA significantly more students ($Fr.=1,936$; $P=0,95$) are contradictory-conflict orientation in certain life values, that is highly developed spiritual and moral values, and selfish prestigious than in KNPU. This suggests that these people have not yet formed a specific set of values in life, so they often have internal conflicts. From 50-61 percent of the students, do not have a clearly defined direction in life. This suggests that at this age (17-19 years) students still formed worldview.

Fig 1. The desire students KNEU name Simon Kuznets who said (MTV) highest value in the sphere of physical activity, implement terminal values for levels of value, %



Analyzing the histograms, you will notice that most of the students who reported a high value sphere of physical activity, strive to realize the spiritual and moral values (62% on average) than selfishly-prestige (45% on average). This should be considered in the work with this group of students.

We established (MTV), 117 (28,06%) students said the high importance of the sphere of physical activity (8-10 Stan scale).

However, after analysis of progress on discipline "Physical education" these students, it was found that:

- 12 students (10,26%)- not attended classes in the discipline;
- 24 student to 20.52%) was rated "unsatisfactory";
- 6 students (5,13%)- were rated "satisfactory";
- 52 student (44,44%)-was rated "good";
- 23 students (19,65%)-was rated "excellent" (national scale).

From this we can make the assumption that only 69,22% of the students were able to implement its values in the framework of discipline "Physical education". Almost a third of students (30,78%) failed to implement its values.

Conclusions:

1. Various contingency students have different attitudes to certain life values. Some differences were observed on the grounds of age as u guys and girls, and between teachers and students, KNEU name Simon Kuznets. However, between males and females significant differences in respect of certain life values not found.

2. Analysis of orientation of groups of students of Kharkov universities in certain life values enables to conclude that there are almost no differences among students of different training profile.

3. Most students who are active in the field of physical education strive to realize the spiritual and moral values than selfishly-prestige (pragmatic). This shell be considered in the work with students.

Further researches will be sent to the analysis of other components of physical culture of students KNEU name Simon Kuznets.

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Artem Cherednichenko: *Semen Kuznets Kharkiv National University of Economics: Lenin Avenue 9, Kharkov, 61166, Ukraine.*

E-mail: surz@ukr.net

ORCID.ORG/0000-0003-2517-3170

FILENKO L., POLTORATSKA G., SADOVYI A.

Kharkiv State Academy of Physical Culture

Algorithmic foundations of creation computer program of analysis of physical training of students of 5–11 grades evaluations

Abstract. Goal: development of information tools of physical training estimates fixation of 5-11 grades students. **Materials and methods:** *Theoretical analysis and generalization of literary sources; pedagogical observation; information modeling; pedagogical experiment; methods of mathematical statistics.* **Results:** it was made a computer program to account for student's performance and to help in physical culture teachers' work. The informational development on managing of accounting systems optimization processes at physical culture of 5-11 grades students was represented. **Conclusions:** *Experimental implementation of development in the learning process of physical culture confirmed the effectiveness of using computer programs to improve teachers' work.*

Keywords: *computer, program, physical culture, student, estimations.*

Introduction. Problems with attracting of information technologies in the field of training students in physical culture is the need to control the level of child health and increase the positive impact of physical training on the level of development based on health indicators.

Modern students are growing up in a social environment, with congested information flows. The child get knowledge at the lessons, get skills on practical courses, in clubs and sections, information from television, Internet. Besides, students are admired with modern technologies, computer games, have a large amount of homework. These factors, according to T.Yu. Krutsevych have both positive aspects - the child becomes intelligent and knowledgeable and negative - no time for physical work, few engaged in physical culture and sports [3, p. 85–92].

The intensity of the modern student life, supersaturation of information is so high that according to G.L. Apanasenko it needs to raise additional energy resources of the body. These resources should be systematically replenish and restore to maintain health. As pointed out by the author the child spends a lot of time trying to degrade health and does little to restore and strengthen [1, p. 56–74].

On the problem of childhood protection and a healthy lifestyle as noted by N.M. Terent'eva have to connect especially parents who indirectly influence the planning sessions of the child; environment and friends that promote a healthy lifestyle, have no bad habits and make sports, as well as school teachers, where the child spends almost a third of their time [8, p. 8–12].

The teacher should possess technologies of maintaining the health of the child and manipulate them for each student individually. L.P. Sergienko indicates that

physical culture teacher on whom in high school is shifted responsibility for strengthening the health of children he should provide to both students and other teachers modern information tools of fixing, monitoring and recommendations for improving the health of students [7, c. 25–32].

According to V.S. Ashanin and other scientists, information technology allows optimizing interaction between the teacher and medico, systematically adjusting the level of physical development of children and their health. For example, a teacher of physical culture through computer programs knows information about children who come to class: which of them was ill recently and how those who have a chronic illness, injury or surgery postponed, contraindications for classes. This information, which promptly is adjudged to the teacher before the lesson, gives him the opportunity to plan exercise for each child individually, pick up a set of exercises and the necessary technical equipment [2, p. 131–137].

Modern expert in physical culture should have not only a basic set of knowledge, but as A. S. Rovnyi says, understand the biomedical basis of preserving the health of children, to be able to use modern information technology to improve his control and [6, p. 162-167].

Connection of the research with themes "Research and Methodological Foundations of using technology in the preparation of specialists of physical culture and sports» (№ 0113U001207) and "Theoretical and applied aspects of physical development monitoring, physical preparedness and physical state of different groups» (№ 011U001206) is to develop information provide a means of monitoring the level of knowledge in physical education of students at 5-11 grades.

Goal of the research: development of information means for assessments fixation on physical training at students at 5-11 grades, followed by mathematical and statistical processing of results.

Tasks of the research:

6. Analyze the information support of physical education for students at 5-11 grades.
7. Develop an accounting computer program and mathematical and statistical analysis of assessments of physical culture at students 5-11 grades.
8. To prove the feasibility of using information means assessment of physical training in the educational process at high school.

Materials and methods of the research. In accordance with the goal and research tasks, we have used the following research methods: a theoretical analysis and synthesis of the literature; pedagogical supervision; Information modeling method; pedagogical experiment; methods of mathematical statistics. Pedagogical observation was conducted in the process of physical training of students, indicators fixed level of their knowledge and skills in physical culture. Computer program was developed to optimize accounting of student's achievement and assist in the work of physical culture teachers. Presented development was implemented in the educational process of physical culture at school № 6 in Kupyansk city Kharkov region (n = 96) and gymnasium №172 in Kharkiv city (n = 79).

Results of the research and its' discussion. Nowadays modern society is going through scientific and technological revolution, which is the material basis of electronic computers. On the basis of this technology new perspective on information technologies are developing. When teaching the subject "Physical education in schools" information technologies are used not enough active. There are several problems implementation of information technologies in the educational process in secondary school:

5. absence of system of training and retraining, which would develop and implement information technologies;

6. poor equipment of facilities or lack thereof for using information technologies;

7. absence of ready-to-use training programs and multimedia products.

To solve these problems it was created a computer program that helps teachers of physical culture to calculate evaluation put during the semester or the whole year. Thanks to this program teachers do not have to spend time on semester evaluations counting, the element of subjective attitude of the teacher to student is deleted, automated maintenance of a common database of student 5-11 grades of physical education evaluations, access to information on the Internet is opened. To calculate the average score of students per semester need to apply algorithm of work with the program.

Fig. 1 shows how to open the program for assisting in calculating estimates. On the home page of the program is presented for grades 5 to 11. One click of the mouse to open the selected class. A table will appear, it outlines a field called "Surname." To this field you enter surnames of pupils of the average secondary school. After you entered the name, you should put marks which students have got throughout the semester. These estimates should be put in the fields under the names (1,2,3,4,5 ... 20). After filling the table with surnames and corresponding estimates you can proceed to the next stage - "Calculate". To do this you should click on the "Calculate", which is on the top of the table.

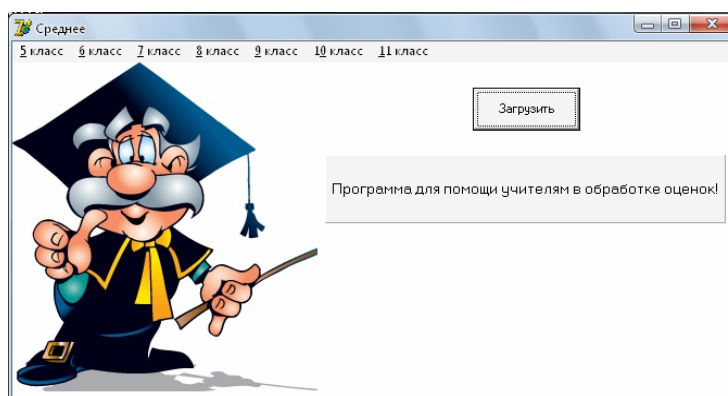


Figure. 1 The main window of the program for assisting in calculating estimates

After you click "Calculate" will appear a last field of the table, which will contain the results of calculations "Average rating" (Fig. 2).

№	Фамилия	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Среднее	
1	Босак	9	10	11	9	11	11	10	10														10,13
2	Вилетов	8	9	9	11	8	7	10	10														9
3	Головин	8	9	10	8	11	10	9	8														9,13
4	Гузеник	7	7	9	7	8	9	9	7														7,88
5	Давиденко	10	8	10	10	11	11	10	11														10,13
6	Дарки	9	8	9	9	9	10	8	8														8,76
7	Дарков	10	8	8	9	10	11	8	9														9,13
8	Живка	11	11	12	10	12	12	11	11														11,3
9	Колосов	9	8	9	10	10	10	9	9														9,11

Fig. 2. Average rating on physical culture of 7 grade pupils

It is described a procedure of calculating estimates repeated several times for each student. These results are the average objective assessment of the student during the semester. It means that this assessment should put physical culture teacher to a student.

The developed program is simple and easy to use, to use it you don't need deeper knowledge of the computer. The program does not take up much space on your computer, its volume is only 873 Kb. You can download program on any computer, laptop or tablet. Not only teachers of physical culture and other subjects and teachers of schools, colleges, gymnasiums and even universities can use it.

To solve the third task of the research a pedagogical experiment was conducted in secondary school № 6 of Kupyansk city in Kharkov region ($n = 96$) and in gymnasium № 172 of Kharkiv city ($n = 79$). The aim of the experiment was to study the feasibility of using information tools evaluation of physical training in educational process of secondary school. As documentary evidence of physical culture assessment were taken physical culture official grades for the semester of students of 5-11 grades which were recorded in the register.

It was a comparative analysis of average grades in physical culture of each student calculated by using of the developed program, with an estimate that physical culture teacher put. It was found that among students of Kupyansk city 18 pupils were overestimated by 1-1.5 points, representing 18.8%. Only one student of 6 grade was underestimated by 1 point (was put 9 points, and the average current rate - 10 points), which is 1%. Thus we have established a loyal and relatively objective attitude of the physical culture teacher of secondary school № 6 of Kupyansk city to the assessment of students 5-11 grades in physical culture.

When analyzing the average assessment of physical culture in each class were used statistical tools identifying normal distribution. To calculate we used package Microsoft Excel 2007, which involved functions ACCOUNT, AVERAGE, MODE,

MEDIAN, EXCESS, STANDDEVIAT and program STATISTICA6. Comparison of indicators mathematical expectation, mode and median indicate the presence of a normal distribution (Fig. 3) almost all parameters estimates that put the teacher of physical culture (X) and indicators of evaluations, which were calculated by means of a computer program (Y).

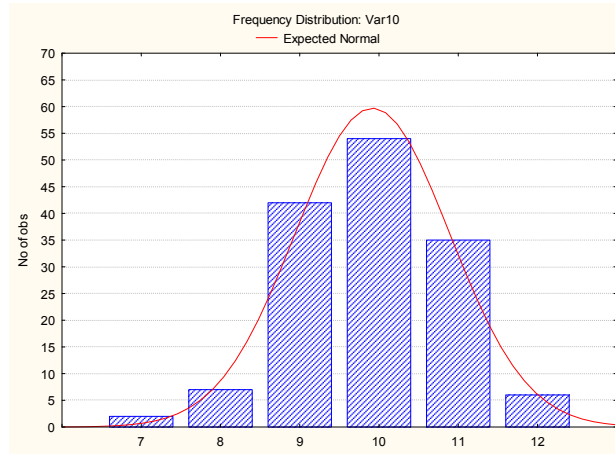


Fig.3. Curve of normal distribution of students' assessments in 5-11 grades

Excess index in each studied class does not exceed 1, that indicate minor fluctuations results relative to the axis of average indicator, and also proves the existence of a normal distribution. Thus, the present normal distribution and equal sampling make it possible to use as a static hypothesis verification and comparative analysis of Student's t test (t) (see Table. 1).

Table 1

Statistical indicators assessments in physical culture of 5-11 grade students of secondary school № 6. of Kupyansk city (n = 96)*

Class, n	Assessments in physical culture were put by teacher (X)					Estimated assessment in physical culture by the computer program (Y)					t	p
	$\bar{X} \pm m$	Mo	Me	E	σ	$\bar{X} \pm m$	Mo	Me	E	σ		
5 (n=14)	9,9±0,24	10	10	0,2	0,9	9,4±0,23	9,5	9,5	1,4	0,8	1,43	>0,05
6 (n=14)	9,9±0,24	9	10	-1,6	0,9	9,3±0,18	9,1	9,4	0,4	0,6	1,71	>0,05
7 (n=15)	9,1±0,22	9	9	0,5	0,8	9,0±0,26	9,1	9	0,7	1	0,29	>0,05
8 (n=15)	10,3±0,19	10	10	-0,7	0,7	9,7±0,15	10	9,6	-0,4	0,6	2,37	<0,05
9 (n=15)	10,4±0,17	10	10	-0,4	0,6	9,8±0,11	9,3	9,8	-0,9	0,4	3,24	<0,01
10 (n=11)	9,7±0,20	10	10	-0,2	0,6	9,4±0,13	9,8	9,4	-1	0,4	1,17	>0,05
11 (n=12)	9,6±0,16	10	10	-0,3	0,5	9,5±0,14	9,8	9,6	-0,6	0,5	0,40	>0,05

Note: * \bar{X} – arithmetic mean value; m – representativeness error; Mo – mode; Me – median; E – excess; σ – standard deviation.

Over tabular data shows that in 5,6,7,10 and 11 classes no significant differences ($p > 0,05$) between assessments in physical culture of teacher and a computer program. This indicates objectivity in assessing teacher knowledge and skills in physical culture of students. But students in 8th ($p < 0,05$) and 9 ($p < 0,01$)

classes are available significant differences in indicators assessment in physical culture. Teacher clearly overestimated these students that were reasonable availability of competitive activities and winning by students of these classes in the Lesser Olympics among students of Kupyansk city schools. Thus, the teacher in physical culture encouraged students to extracurricular activities and physical education.

A similar analysis of student assessment in physical culture by the teacher and a computer program was conducted among 5-11 grades of gymnasium № 172 in Kharkiv city. Statistical analysis of the parameters for the normal distribution indicates the use of comparative parametric criterion of testing statistical hypotheses of Student (t) (Table. 2).

Table 2

Statistical indicators of ratings at physical training of 5-11 grades students of gymnasium № 172 in Kharkiv city

Class, n	Assessments in physical culture were put by teacher (X)					Estimated assessment in physical culture by the computer program (Y)					t	p
	$\bar{X} \pm m$	Mo	Me	E	σ	$\bar{X} \pm m$	Mo	Me	E	σ		
5 (n=13)	9,5±0,61	10	10	-0,8	2,1	8,7±0,64	-	9,5	0,0	2,2	0,95	>0,05
6 (n=13)	10±0,41	9	10	-1,4	1,4	9,2±0,39	9	9,1	-0,1	1,4	1,35	>0,05
7 (n=12)	9,9±0,35	10	10	0,2	1,2	9,1±0,37	10	9,4	0,1	1,2	1,59	>0,05
8 (n=11)	9,2±0,77	6	9	-1,5	2,4	8,8±0,66	-	9,2	-0,6	2,1	0,42	>0,05
9 (n=11)	9,9±0,46	10	10	0,4	1,4	9,3±0,21	9,1	9,4	0,7	0,7	1,26	>0,05
10 (n=8)	9,6±0,53	11	9,5	0,2	1,4	9,4±0,27	9,5	9,5	1,4	0,7	0,34	>0,05
11 (n=11)	9,5±0,38	9	9	0,7	1,2	8,6±0,32	8,8	8,5	1,3	1	1,63	>0,05

Comparison of statistical indicators to measure at physical training of students in Kharkov school (X) with the calculated values of the computer program (Y) indicates no significant differences ($p > 0,05$). This indicates objectivity of physical culture teacher in grading.

Further analysis of test results performed by comparing the estimates that have been exposed by a computer program and by the teacher at physical training to students of Kharkov and Kupyansk schools (Table. 3).

Table 3

Comparative analysis of the average ratings at physical training of students of school № 1 in Kupyansk city and of gymnasium № 172 in Kharkiv city

Class, n	Assessments in physical culture were put by teacher (X)				Estimated assessment in physical culture by the computer program (Y)			
	school № 6 Kupyansk $\bar{X} \pm m$	Гімназія № 172 Kharkiv $\bar{X} \pm m$	p	t	school № 6 Kupyansk $\bar{X} \pm m$	Gymnasiu m № 172 Kharkiv $\bar{X} \pm m$	p	t
5 (n=13)	9,9±0,24	9,5±0,61	0,49	>0,05	9,4±0,23	8,7±0,64	1,01	>0,05
6 (n=13)	9,9±0,24	10±0,41	0,30	>0,05	9,3±0,18	9,2±0,39	0,26	>0,05

7 (n=12)	9,1±0,22	9,9±0,35	1,88	>0,05	9,0±0,26	9,1±0,37	0,16	>0,05
8 (n=11)	10,3±0,19	9,2±0,77	1,36	>0,05	9,7±0,15	8,8±0,66	1,38	>0,05
9 (n=11)	10,4±0,17	9,9±0,46	1,01	>0,05	9,8±0,11	9,3±0,21	1,99	>0,05
10 (n=8)	9,7±0,20	9,6±0,53	0,18	>0,05	9,4±0,13	9,4±0,27	0,07	>0,05
11 (n=11)	9,6±0,16	9,5±0,38	0,31	>0,05	9,5±0,14	8,6±0,32	2,46	<0,05

The analysis comparing estimates of physical training of Kharkiv city and Kharkiv region students indicates the absence of significant differences between them. That is, all students, except of 11 grade, owning physical education as in Kharkiv as in Kupyansk in Kharkiv region. The obtained results confirm the conclusions of scientists in the field of physical education and sport [4; 7–8].

Conclusions.

4. Set high level of scientific and methodical justification and scientific researches on physical training in secondary school. Using information of the accounting devices and control over the state of physical education in the secondary school is not enough covered in modern scientific studies. There was no informational developments of computer programs to optimize work of teachers of physical education and designed to help in calculating the estimates of 5-11 grades students.

5. It was developed the computer program for accounting and monitoring assessments on physical training of students in grades 5-11. This program allows you to simplify the work of teachers of physical education and automatically executes mathematical and statistical analysis of ratings on physical culture.

6. Using the informational methods of evaluating on physical training in teaching students grades 5-11 in Kharkiv city and Kharkiv region indicates the adequacy of the proposed design classic monitoring system of physical development and compliance obtained parameters of the normal distribution curve. Found that students in Kharkiv city and students in Kupyansk city have approximately the same level of physical training.

Prospects for further research. In further research is planned to examine the possibility of using computer databases of individual students' indicators, to optimize the planning and differentiation of physical activity.

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Ludmila Filenko: *PhD (Physical Education and Sport), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkovskaya 99, Kharkiv, 61058, Ukraine.*

E-mail: filenkolv@mail.ru

Ganna Poltorackaya: *Kharkiv State Academy of Physical Culture: Klochkovskaya 99, Kharkiv, 61058, Ukraine.*

E-mail: Anna50611984@rambler.ru

Andrey Sadoviy: *Kharkiv State Academy of Physical Culture: Klochkovskaya 99, Kharkiv, 61058, Ukraine.*

E-mail: filenkolv@mail.ru

GAKH R.

Ternopil national economic university

REGIMES OF FIRST YEAR STUDENTS-ECONOMISTS TRAINING EXERTIONS

Abstract. Goal: *To identify the most effective modes of training loads in the classroom for student athletic gymnastics economists first year, improving their individual characteristics. Material:* *analysis of scientific and technical literature on the problem. The experimental research and found the most effective modes of training loads in the classroom for athletic exercises. Results:* *The trends of changes in physical development and physical fitness of students of economic specialties of the first year. Conclusions:* *pedagogical experiment confirmed the positive effect of modes of training loads on the development of physical capabilities of students and improve the cardiovascular system.*

Keywords: *athletic gymnastics, youth, ballistic method, physical education.*

Introduction: The main problem of methods is the optimization of the physical education of youth at universities. Its importance is due to the results of the tests in Ukraine where only 30-40% of the students perform the appropriate standards of physical fitness. Thus, it is the physical education at the university is destined to assist the gain in students' health and their motor abilities [1].

Nowadays the content and the technology of education should evolve towards the supporting the interests and requests of the modern student. Such realities prove the trend of actively promotion and using the finest traditions of European and national physical education in our society [5].

Physical education of students-economists has certain characteristics. The necessity of increasing of the development of motor skills of students from economic specialties is conditional on high technology and modern production intensity. The professional capacity of an employee depends on his level of physical performance and the professionally important qualities.

One of the ways of student's health improvement is a system of strength training [5]. Now it is strength, as a human physical quality, that more attracts students. Opening new gyms and fitness centers, sports stores and improving sports equipment for training, significant progress of Ukraine in the international arena in the sphere of strength sports demonstrate the growing interest among the population toward athleticism. That is why the teaching of athleticism in modern universities requires special attention [2].

The modes of training loads attracted the attention of both national and foreign experts. The works of I. Akhmetov, T. Krutsevych M. Linz, V. Platonov, V. Romanenko, B. Shiyan have been devoted to the various aspects of this problem.

However, the special researches about the development of the modes of training loads for students of economic specialties in literature weren't found that led to the choice of topic of the research [3; 4; 6].

The connection between this work and scientific programs, plans, themes.

The work is based on the plan of research program of Ternopil National Economic University.

Objective: identifying the most effective modes of training loads for the first-year students-economists at the studies of artistic gymnastics with improving their individual characteristics.

Material and methods of research. The experimental research was conducted from the 1th of September 2013 to the end of December 2013 at the Ternopil National Economic University. It involved 60 first-year students. They were divided into the control group and two experimental ones including 20 students in each of them.

At the beginning of the experiment the physical development and physical fitness of the students from the research groups were defined. Over a period of four months the students had been visiting the section of athletic gymnastics. The control group (CG) was engaged by the method called "pyramid" with traditional modes of training loads: the first attempt (10 repetitions – lifting 1.5 sec, dropping 2.5 sec); the second attempt (8 repetitions – lifting 1.5 sec, dropping 2.5 sec); the third attempt (7 reps – lifting 1.5 sec, dropping 2.5 sec); the fourth attempt (6 repetitions – lifting 1.5 sec, dropping 2.5 sec). The students of the first experimental group (EG1) used the ballistic method, which included such modes of training loads as the first attempt (warming up) – 10 repetitions (lifting 1,5 sec, dropping 2,5 sec without using the ballistic method); the second attempt (ballistic method) – 7 repetitions (ballistic lifting, dropping 3 sec); the third attempt (ballistic method) – 6 repetitions (ballistic lifting, dropping 3 sec); the fourth attempt (ballistic method) – 6 repetitions (ballistic lifting, dropping 3 sec). The students of the second experimental group (EG2) trained themselves by the method called "the ripped pyramid" which included the next modes: the first attempt (10 repetitions – lifting 1,5 sec, dropping 2,5 sec); the second attempt (6 repetitions – lifting 2 sec, dropping 3 sec); the third attempt (8 repetitions – lifting 1,5 sec, dropping 2 sec); the fourth attempt (7 repetitions – lifting 2 sec, dropping 3 sec) [2; 5].

The kind of recovery as one of the main components of the modes of the training loads was the same for all groups: an active kind was between the attempts and a combined one – between the series. The interval of recovery was equal to HR 100-120 beats·min⁻¹ (to 2 min) between attempts; and to HR 90-110 beats·min⁻¹ (3 min) between series.

Results and discussion. There were such criteria of evaluating the effectiveness of the proposed modes of training loads as the level of physical development, the condition of participants' cardiovascular system, the level of power growth that determined by the weight value of the body. Strength endurance was tested by determining the amount of resistance to overcome a certain value for a long time.

Table 1

Anthropometric indicators of students

Indicators	CG					EG1					EG2				
	At the beginning of the experiment		At the end of the experiment		t	At the beginning of the experiment		At the end of the experiment		t	At the beginning of the experiment		At the end of the experiment		t
	$\bar{X} \pm m$	s	$\bar{X} \pm m$	s		$\bar{X} \pm m$	s	$\bar{X} \pm m$	s		$\bar{X} \pm m$	s	$\bar{X} \pm m$	s	
Weight (kg)	64,3±0,9	2,7	66,4±0,8	2,4	2,1	66,3±0,9	2,7	67,8±0,8	2,4	1,6	62,4±0,9	2,7	64,3±0,8	2,4	1,9
The circumference of the biceps (left) (cm)	30,4±0,8	2,3	31,7±0,7	2,1	1,3	30,1±0,8	2,3	31,2±0,7	2,1	1,1	29,9±0,8	2,3	31±0,7	2,1	1,2
Biceps circumference (right) (cm)	30,4±0,8	2,5	31,8±0,8	2,5	1,4	30,6±0,8	2,5	31,6±0,8	2,5	1	30±0,8	2,5	31±0,8	2,5	1,1
Chest circumference (cm)	85±0,7	2,4	87±0,75	2,4	2	88,7±0,9	2,4	90,8±	2,4	2	82,6±1	2,8	84,7±0,9	2,5	2,1
The circumference of the tibia (left) (cm)	34,3±0,3	1	35,2±0,35	1,05	0,9	35,1±0,3	1	36,06±0,35	1,05	0,9	32,8±0,3	1	33,8±0,35	1,05	1
The circumference of the tibia (right) (cm)	34,3±0,3	1	35,3±0,35	1,05	1	35,1±0,3	1	36,06±0,35	1,05	0,8	32,8±0,3	1	33,9±0,35	1,05	1,1
Hip circumference (left) (cm)	49,9±0,1	0,2	51,3±0,1	0,2	1,4	50,2±0,1	0,2	51,4±0,1	0,2	1,2	49,8±0,1	0,2	51,1±0,1	0,2	1,3
Hip circumference (right) (cm)	49,7±0,1	0,2	51,2±0,1	0,5	1,5	50,3±0,1	0,2	51,4±0,2	0,5	1,1	49,7±0,1	0,2	51,1±0,1	0,5	1,3

Table 2

Indicators of physical preparedness of students

Indicators	CG					EG1					EG2				
	At the beginning of the experiment		At the end of the experiment		t	At the beginning of the experiment		At the end of the experiment		t	At the beginning of the experiment		At the end of the experiment		t
	$\bar{X} \pm m$	s	$\bar{X} \pm m$	s		$\bar{X} \pm m$	s	$\bar{X} \pm m$	s		$\bar{X} \pm m$	s	$\bar{X} \pm m$	s	
Жим штанги лежачи (45 кг)	6,2±1,66	4,4	15,5±1,54	4,07	1,7	7,2±2,52	6,7	17,9±3,08	8,14	1,6	7±2,8	7,4	17,4±1,9	5,1	1,8
Жим штанги лежачи вузьким хватом (35 кг)	4,85±1,12	2,96	13,14±1,68	4,45	0,5	4,85±1,96	5,18	13,27±2,52	6,67	1,3	5,4±2,3	6,2	15,4±2,9	7,7	1,2
Підтягування на перекладині	9,42±1,13	2,96	15,14±1,82	4,81	1,4	7,8±1,68	4,44	13,1±1,12	2,96	1,5	10,4±1,09	2,9	17,6±0,97	2,5	1
Згинання і розгинання рук в упорі лежачи	44,2±2,24	5,92	56,5±2,8	7,4	1,1	36,8±3,06	8,1	50,4±1,8	10	0,9	42,1±0,86	2,2	56±1,8	4,8	1,4
Присідання зі штангою на плечах (50 кг)	8,57±1,26	3,4	17,2±2,38	3,3	1,2	9,85±2,4	6,3	18,1±2,66	7,03	1,7	8,6±1,02	3,7	18,4±0,91	2,4	2,1

The research has been going on for four months and there are no significant changes for such a little period. However the indices of physical development have changed that allows us to determine the trend of these changes.

According to the data presented in table 1, at the beginning of the experiment the weight of the students from the EG1, the EG2 and the CG was less than at the end of the research. The best daily weight gain showed the CG with an average growth of 2.1 kg. This is due to the fact that the basic muscle groups are trained better by using the power of the second repetition.

As for the anthropometric indicators there are insignificant differences in all three groups. The best indicator of chest circumference was appeared in the EG2 – the average growth rate was 2.1 cm, in the CG and the EG1 it was 2 cm. The EG2 also had the best indicator of calf circumference (the right calf – 1 cm and the left one – 1 cm too); the CG – 0.9 cm and 1 cm; the EG1 – 0.9 cm and 0.8 cm. This can be explained by the fact that the ankle muscle responds best to a significant increasing load, and the calf relief is better formed by the ballistic method.

Anthropometric indices of the bicep and hip circumferences were better in the control group.

As for indicators of physical fitness the best growth results were observed in the bench press in the experimental groups: the EG2 – 10.4 and the EG1 – 9.6 times compared to the CG – 9.3 times. In the close grip bench they were: the EG2 – 10.1; the EG1 – 8.4; the CG – 8.2 times. The indicators of lying dip-up were: the EG2 – 13.9 times, the EG1 – 13.6 times; the CG – 12.3 times.

In pull-ups exercises, bench bar and squatting with a barbell on the shoulders the best growth results happened in the EG2. But the indicators of the EG1 were lower than the indicators of the CG. This is obviously because the ballistic method is more effective dealing with large muscle groups in exercises where it is easier to develop the initial acceleration of the burden (tab. 2).

The growth indexes of the cardiovascular system of the experiment participants were better at the EG1: Ruffier Test (the EG1 – 0.71; the EG2 – 0.57; the CG – 0.43 points), the heart rate (the EG1 – 1.06; the EG2 – 1.04; the CG – 1.03 points). According to the double-stage test in all three groups the normotonic type of reaction of the cardiovascular system to loadings was preserved.

Conclusions:

1. The analysis of scientific and technical literature has proved the existence of popularity of artistic gymnastics in the field of physical education for improving the students' physical fitness in recent years. However, the modes of training loads in athleticism, their influence on students-economists' physical development and physical fitness have been studied too low.

2. The research showed: a) anthropometric growth indices of chest circumference, both right and left calf circumference were better in the EG2. The indexes of increase of the bicep and hip circumferences were better in the CG; b) the best indexes strength growth observed in the EG2; c) the best indexes of the cardiovascular system were determined in the EG1.

Thus, the modes of training loads of the EG2 were more effective than the loads of the CG.

The prospects for the future research will focus on the development of the training loads modes for second- and third-year students.

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Roman Gakh: *PhD (Pedagogical), Associate Professor; Ternopil national economic university: Lvivska Str. 11, Ternopil, 46000, Ukraine.*

ORCID.ORG/0000-0001-8668-3102

E-mail: gr23@mail.ru

GONCHARUK N., BEZYAZYCHNAYA O., DMYTRENKO O.

Kharkiv State Academy of Physical Culture

COMPLEX PHYSICAL REHABILITATION OF FIRST MATURE AGE WOMEN AFTER ARTHROSCOPIC OPERATION ABOUT COMBINED INJURY OF MENISCUS AND LIGAMENTS OF KNEE JOINT IN POLICLINIC

Abstract. *The purpose of the work is to work out and evaluate the proposed program of physical rehabilitation for women of basic group on the basis of study of dynamics of indexes of the locomotor apparatus, cardiovascular and respiratory systems, and common physical capacity for work. **Material and methods:** twenty four women of first mature age based of regional hospital of Kharkov were investigated in the research. **Results:** the effectiveness of the proposed program of physical rehabilitation is offered proved on the basis of study of the indexes dynamics of indexes of the locomotor apparatus, cardiovascular and respiratory systems, and common physical capacity for work. **Conclusions:** determined that the proposed program of physical rehabilitation for injured women of basic group was more effective.*

Key words: *knee joint, the injury of meniscus and ligaments, physical rehabilitation.*

Introduction. Injuries, according to WHO, has become in many countries, including the Ukraine, one of the causes of mortality, disability and other negative consequences. Injuries as an important medical and social problem affects a wide range of medical, social, and economic aspects and is characterized by three features [6; 7]: a high frequency and a constant increase in the number of injuries; high levels of mortality and disability; high economic cost that undergoes the victim's family and the state. Knee joint being the second largest after hip joint functionally plays a crucial role and is the basis of physical activity. Even minor violations of the knee joint causing significant discomfort, lead to decreased performance, and significant damage - to disability. According to the literature, 70% of musculoskeletal injuries accounted for knee (G.P. Kotelnikov, 2009, V.A. Epifanov, 2010, M.I. Spuzyak with collaborators, 2011). The pathology of the knee joint that occurs both at children and adolescents as well as at adults and older people is not only medical but also a social problem that significantly affects the further fate of patients. Among the injuries of the knee joint on the fate of meniscus and ligamentous apparatus injuries of the knee joint is 80,7-84,8% [6].

The most common pathology of the musculoskeletal system is injured knee joint, which constitute 10-24% of all injuries of the lower limbs [1; 5]. Damage of ligaments knee joint occupy the second place after meniscal damage of all knee

injuries. Damage of meniscal (bursts, tears, crushing) is often accompanied by damage bypass and crossed connection. Combined damage to the internal meniscus, tibial bypass and anterior crucial ligaments has been called in traumatology "unfortunate triad", which is often diagnosed in athletes playing sports. In recent years, surgeons-traumatologists at meniscal and ligaments injuries of the knee joint hold arthroscopic surgery, which has become the "gold standard" of the treatment for the last 15 years. Low invasiveness arthroscopic intervention led to a significant reduction of patient's stay in hospital compared with open surgery in the joint, early loading on limb development of movements in the joint and early return to the profession [5; 8].

The objectives of the physical rehabilitation of patients after arthroscopic surgery on the knee joint are: normalization of trophic tissue of the knee joint; acceleration of tissue regeneration; prevention and elimination of malnutrition and quadriceps femoris contracture in the joint; restoration of normal walk; complete restoration of function of the knee joint; maximum strength endurance training of the thigh muscles and shin; adaptation to running and physical activity; recovery of domestic skills and employment skills; bracing action; restoration of fitness (for athletes) [2; 3].

Connection of the research with academic programs, plans, themes. Problem is developed according to the priority set by the Law of Ukraine "On priority directions of science and technology", the number is 3.5. "Life sciences, new technologies for prevention and treatment of communicable diseases" within the priority thematic direction 3.5.29. "Building Standards and Technology introduction of a healthy lifestyle, technology to improve the quality and food safety" on "Traditional and non-traditional methods of physical rehabilitation in diseases of the various body systems and injuries of the musculoskeletal system in people of varying degrees of fitness." State registration number – 0111U000194.

Goal of the research: to develop a comprehensive program of physical rehabilitation for women of the first mature age after arthroscopic surgery for combined injury meniscal and ligaments of the knee joint in the restoration and training period in a clinic and evaluate its effectiveness

Tasks of the research:

8. Based on analysis of the modern literature on the physical rehabilitation for injuries of the knee joint to characterize modern approaches to appointment of restorative treatment after arthroscopic surgery on the knee joint.

9. Substantiate and develop a program of physical rehabilitation for women of the first mature age after arthroscopic surgery for combined meniscal and ligaments injuries of knee joint in restoration and training period in a clinic that includes hydrocolonotherapy, exercise with exercise equipment, medical massage, physiotherapy.

10. Evaluate the effectiveness of the proposed physical rehabilitation program based on the study of the dynamics of functional state of the musculoskeletal system, cardiovascular system, respiratory system and overall physical performance.

Material and method of the research. Under our observation during 4 months were 24 women of first mature age after combined injury meniscus and ligaments of the knee joint and held in connection with the arthroscopic surgery. Examination of investigated contingent operated patients was conducted at the beginning of the third, the recovery period of the disease (ie, 1-1.5 months after surgery) in terms of clinical department CHPI CEMD and MC on the basis of "Locomotive" pool. Women patients were randomly divided the into 2 groups - control and main in each group - 12 patients. The average age of women in the control group was $21,97 \pm 0,43$ years, and in the main - $22 \pm 0,49$ years.

To assess the functional state of the musculoskeletal system determined such indicators: goniometry of the knee joint of healthy and injured limbs by the method M. Weiss and A. Zembatyi; circumference of the hip and shin of healthy and injured limbs.

To assess the functional state of the cardiovascular and respiratory systems were determined: heart rate, blood pressure, respiratory rate, vital capacity of the lungs. To determine the level of overall physical performance used Master's test.

All obtained results of the study were processed using the package "Discripting statistics" in the System Microsoft EXCEL - 2003, while calculated the average arithmetic value, standard deviation, error of average size, the reliability and credibility of differences of indicators.

Results of the research and its' discussion. During the primary examination contingent of patients of the investigated women we have assessed functional status of musculoskeletal indicators. Analysis of the obtained results (Table. 1) allowed to establish unidirectional decrease in the amplitude of active movement at the damaged knee and a significant decrease in circumference of hip and shin of injured limb as compared with the healthy lower limbs at women as main and control groups, objectively confirmed presence of patients in both groups malnutrition of the hip and shin muscles bending-unbending contractures in injured knee.

Table 1

Comparative characteristics of functional state of the cardiovascular, respiratory system and musculoskeletal trauma of women in both groups during the primary examination

№	Indicators	Control group	Main group	t	p
		$\bar{X} \pm m$	$\bar{X} \pm m$		
1.	HR, beats. · min ⁻¹	78,33±0,49	77,91±0,59	0,54	>0,05
2.	BP, mm of Mercury	119,75±0,69	120,25±0,77	0,47	>0,05
	CT DT	75,83±1,28	72,66±1,46	1,62	>0,05
3.	CHD per min	20,41±0,54	19,91±0,43	0,71	>0,05
4.	VC, l	3,37±0,02	3,37±0,03	0,05	>0,05
5.	Goniometry of the knee joint active movements degrees: – bend in the injured joint -in a healthy joints	107,83±1,29	109,66±1,48	0,93	>0,05

	-unbending in the injured joints	130,16±0,99	129,66±0,84	0,38	>0,05
	-in a healthy joints	155,08±0,82	154,25±0,53	0,84	>0,05
		178,83±1,33	178,25±0,53	0,40	>0,05
6.	Hip circumference, cm				
	- Injured limb	53,66±0,54	54,33±0,48	0,91	>0,05
	- Healthy limb	57,00±0,49	57,41±0,64	0,51	>0,05
7.	Circumference of shins, cm				
	- Injured limbs	32,83±0,47	33,08±0,46	0,37	>0,05
	- Healthy limb	35,00±0,42	35,16±0,48	0,25	>0,05
8.	Test Master's, kgm·min ⁻¹	641,00±0,40	641,58±0,33	1,10	>0,05

The analysis of the cardiovascular and respiratory systems of the investigated group of patients in both groups testified to the lack of significant difference between indicators of heart rate at rest, blood pressure, vital capacity of the lungs of women of control and main groups. It must be emphasized that these figures are not significantly different from that of healthy women of the first mature age. A comparative analysis of overall physical performance, which was determined after the Master's tests, testified to the unidirectional decrease physical performance as the main female patients and control groups compared with healthy untrained women (see. Table. 1), resulting from prolonged physical inactivity due to injuries. Obtained data of primary examination were taken into account in developing and implemented a comprehensive program of physical rehabilitation for traumatized women of main group. The programs of physical rehabilitation of women in both groups used the same means of physical rehabilitation - therapeutic physical culture, therapeutic massage and physiotherapy. Women of the control group received conventional treatment for this contingent comprehensive program of physical rehabilitation in the clinic using conventional techniques of therapeutic exercises, therapeutic massage and physiotherapy (V.A. Epifanov, 2010, A.A. Biryukov, 2004). Traumatized women of the control group engaged in therapeutic exercises five times a week for 45-60 minutes exercise therapy instructor-led and independently 2-3 times every day at home.

Proposed by us comprehensive program of physical rehabilitation for injured main group differed from the conventional in the clinic appointment hydrokinesitherapy (exercise in the pool, swimming different styles), exercise with rubber spring trainer in combination with therapeutic massage technique P.B. Yefimenko [4] and electrical stimulation of the quadriceps hip muscles.

In the water were used a variety of versions of walking, running, jumping, jumps, simulation exercises from different kinds of sport: simulation of different parts of the foot strikes the ball, front and rear sweeps, running with high truck hips with overlap of shin etc. swimming in different styles at a rapid pace, with the "raft", "hands free" swimming in flippers. Classes are held in the pool 3 times a week in the afternoon. The duration of each session ranged from 45 to 60 minutes.

Besides hydrokinesitherapy (3 times a week) female patients of the main group involved 2 times a week exercise with a special rubber-spring exercise equipment

designed to strengthen the power of endurance of the hip and shin muscles. Exercises performed in the original position, lying on his back, side, sitting and standing. The duration of each session on the simulator gradually increased from 25 to 45 minutes.

In the complex program of physical rehabilitation for female patients of the main group therapeutic massage was designed by the method proposed by P.B. Efimenko, according to which first need to massage the thigh and gluteal areas operated of lower limb, doing all massage techniques: stroking, squeezing, surface grinding, kneading, rubbing tendons, percussion techniques (performed by hipotrophic muscle). Then start to massage the knee joint. Finish massage by passive elastic translational movements that alternation of motion in the joint of the full amplitude.

Physiotherapeutic procedures that were prescribed to the investigated contingent of patients were similar for both control and main groups.

Repeated examination of the investigated contingent of patients in both groups were conducted by us after restorative treatment for various physical rehabilitation programs for women of main and control group. According to the results of repeated examination and analysis of indicators of the musculoskeletal system, it was noted that: the amount of active motion in the injured knee joint, hip and shin circumference indicators significantly increased and almost reached the indicators of a healthy lower limbs in of women comparison with indicators of the control group, indicating a significant strengthening of injured muscles of lower limb and the elimination of contractures of the knee joint (Table. 2).

Table 2

Comparative characteristics of functional status of the cardiorespiratory system and musculoskeletal trauma of women in both groups during the repeated examination

№	Indicators	Control group	Main group	t	p
		$\bar{X} \pm m$	$\bar{X} \pm m$		
1.	HR, beats. · min ⁻¹	77,41±0,65	77,08±0,62	0,36	>0,05
2.	BP, mm of Mercury				
	CT	119,83±0,63	119,91±0,52	1,10	>0,05
	DT	75,33±1,20	71,91±1,18	2,00	<0,05
3.	CHD per min	19,83±0,51	19,16±0,47	0,94	>0,05
4.	VC, l	3,54±0,05	3,67±0,08	1,28	>0,05
5.	Goniometry of the knee joint active movements degrees:				
	- bend in the injured joint	117,91±1,36	128,58±1,85	4,63	<0,05
	-in a healthy joints	130,91±0,67	131,33±0,76	0,40	>0,05
	-unbending in the injured joints	165,00±1,40	173,66±1,29	4,53	<0,05
	-in a healthy joints	180,58±0,80	180,25±0,88	0,27	>0,05
6.	Hip circumference, cm				
	- Injured limb	54,75±0,52	59,16±0,29	2,81	<0,05
	- Healthy limb	57,33±0,49	60,00±0,60	3,41	<0,05

7.	Circumference of shins, cm				
	- Injured limbs	34,00±0,57	36,08±0,70	2,29	<0,05
	- Healthy limb	35,50±0,45	36,91±0,45	2,21	<0,05
8.	Test Master's, kgm·min ⁻¹	699,41±6,19	722,50±8,06	2,27	<0,05

All patients are women (100%) of the main group continued their studies in universities or started work on its production, while five (42%) women in the control group did not start to study or work in connection with the presence of complications after traumatic - flexor- extensor contracture of the knee joint, contributing to the occurrence of the violation support ability and lameness during moves. Full recovery of motor function and support ability injured lower limb was based on the results of obtained data at injured of the main group an average of $32,50 \pm 3,70$ days of treatment in a clinic, while women of the control group - only $40,30 \pm 3,20$ days ($p < 0,05$).

A comparative analysis of indicators the functional state of the cardiovascular and respiratory systems, and physical disability among patients in both groups revealed significant economization of these systems, increase resistance to hypoxia, improving of respiratory function and a significant increase in overall physical performance conducted according to the tests Master's of female patients of main group in comparison with indicators of control group, which, in our opinion, due to the use hydrokinesitherapy, swimming in the pool and physical exercise in rubber-spring simulator.

Thus, on the basis of data obtained of dynamics of the functional state of the musculoskeletal system, indicators of cardiovascular, respiratory systems and overall physical performance contingent of investigated, we can conclude that our proposed comprehensive program of physical rehabilitation for women of main group was effective because its use in recovering period after arthroscopic surgery allowed accelerate the recovery of motor functions and supporting the injured lower limb functional improvement in cardiovascular and respiratory systems and increase overall physical performance of patients.

Conclusions:

7. Primary examination of investigated contingent injured (at 2-3 day restoration and training period) allowed us to establish a significant reduction in the volume of unidirectional movements active in damaged knee, hip and shin circumference reduction of damaged limbs compared with healthy limbs and reduce overall physical performance against the background of a satisfactory state of the cardiovascular and respiratory systems at female patients as control and main groups.

8. Obtained data of the primary examination of investigated contingent were taken into account when developing and implementing a comprehensive program of physical rehabilitation for traumatized women of main group that included Hydrokinesitherapy (exercise and different styles of swimming, diving flippers in the pool), exercise with rubber spring simulator (in the original positions, supine, side, sitting and standing), therapeutic massage the injured lower limb on how PB Yefimenko and electrical stimulation of the quadriceps muscle of thigh.

9. Based on the data obtained during the repeated examination of dynamics of the functional state of the musculoskeletal system, cardiovascular system, respiratory system and overall physical performance of traumatized women, we can conclude that our proposed comprehensive program of physical rehabilitation for patients of the group was more effective than common for the contingent had a significant advantage in the restorative treatment of the first mature women in a clinic and will accelerate and fully restore the anchor and motor functions of the damaged lower extremity functional improvement in cardiovascular and respiratory systems and increase overall physical performance.

Prospects for further research related to the development and scientific substantiation of a comprehensive program of physical rehabilitation trained individuals after anterior cruciate ligament injury of the knee joint based on gender, age at early and late postoperative periods.

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Nataliia Goncharuk: *PhD (Physical Education and Sport), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkovskaya str. 99, Kharkov, 61058, Ukraine.*

E-mail: reabilitolog13@mail.ru

Olga Bezyazychnaya: *Kharkiv State Academy of Physical Culture: Klochkovskaya str. 99, Kharkov, 61058, Ukraine.*

E-mail: obezyazychnaya@mail.ru

Oxana Dmytrenko: *Kharkiv State Academy of Physical Culture: Klochkovskaya str. 99, Kharkov, 61058, Ukraine.*

E-mail: reabilitolog13@mail.ru

GORPINICH O.

Oles' Gonchar Dnipropetrovsk National University

THE PECULIARITIES OF PSYCHOLOGICAL PREPARATION OF MILITARY STUDENTS

Abstract. Purpose: *to carry out the analysis of the influence of hand-to-hand fighting training on physical and mental health of military students of the Academy of Interior Forces of the Ministry of Internal Affairs of Ukraine. Material and methods:* *the control group consisted of the students of Polytechnic University, who did not have any physical loads (except for the obligatory physical education classes). Results:* *it is shown that hand-to-hand fighting training improves the indicators of both physical and mental health. However, the positive changes in the first-year students, in comparison with their fourth course counterparts, are far less pronounced. When it comes to the students without additional physical loads, the positive changes are quite insignificant. Conclusions:* *the use of antistress and social-psychological training along with physical loads resulted in a significant increase of indicators of physical and mental health of the first-year military students of the academy.*

Keywords: *military students and university students, physical and mental health, hand-to-hand fighting, antistress training.*

Introduction. The professional preparation of any specialists is a complex, multidimensional process, a realization success of which depends on a wide range of factors, such as human resources and teaching personnel of a higher education institution, its material and technical resources, teaching fund and the attitude of citizens to a profession of those people, which they teach. It also includes the organization of teaching and educational process, the peculiarities of leisure activities of the students and a possibility of their participation in amateur performances and in the work of sports clubs, sections and scientific societies, and many other factors. A great number of scientists carried out the solution of the problem of teaching and educational work improvement in higher education institutions. Thus, the strategic ways of its solving are formulated with a help of the following principles: providing the stage-by-stage teaching and educational work with regard to all kinds of adaptation, taking into account the factors, pedagogical functions and conditions, adequate for each of them; realizing the individually oriented and differentiated approach according to the professional orientation type of the personality of the individual, who is taught; introducing a system of emotional positive stimulating into the teaching and educational process [3; 8; 9].

Thus, there is a range of researches, where the authors has identified various factors, which have a negative influence on formation of the professionals in internal

affairs agencies. A majority of these researchers recommend the concrete arrangements for eliminating the revealed imperfections in this process. At the same time, in some works, the researchers mentioned only the appeals for the necessity of solving these problems and no further measures were suggested [2].

When concluding the above-mentioned data, it is possible to state that the authors consider social-psychological, material, organizational and educational directions the main ones of the improving the learning and official activity and increasing the effectiveness of professional preparation in the Ministry of Internal Affairs. Moreover, in some works, the researchers highlight that it is possible to solve these issues by means of increasing requirements for military students and demands for their fulfillment of a range of norms and the orders of different rank commanders. We incline to another opinion and believe that cardinal successes are unachievable on this way.

It is also possible to state that, in search of the ways of academic training and military service optimization, the identification of the methods of successful realization of this process, there are too little researches, which would refer to the usage of physical culture and sports specialization means for this purpose.

Thus, when it comes to solving the giving problem, the authors do not find it expedient to use physical education means. However, there is a great number of scientific works, where the possibility of improving not only the learning processes and personal qualities formation, but also diminution and stoppage of posttraumatic stress disorders symptom expression, mental backwardness and intellect defects with a help of physical culture means is scientifically proved [5; 7].

Taking into account all the above-mentioned information, we decided to carry out the given research.

The goal of the research: to determine the influence of hand-to-hand fighting trainings along with psychological training on physical and mental health and anxiety of military students.

The methods and organization of the research. The participants of the research were 40 military students of the first and the fourth years of study of the Academy of Interior Forces of the Ministry of Internal Affairs of Ukraine (experimental groups). The students of the National Technical University «Kharkiv Polytechnic Institute» – the first course (n=20) and the fourth course (n=20). All the participants of the research were male aged from 17 to 21.

The military students of the first and the fourth years of study voluntarily agreed to go in for hand-to-hand fighting that was realizing over the course of the year. The each of the trainings continued for 3-4 hours during this period. The students of the control group got physical loads at physical education classes. The psychological antistress training was carried out according to the recommendations of S.M. Shingaev [6].

For assessing physical and mental health of the participants of the research, the methods of D.N. Davydenko were used [1]. The anxiety appearance level was diagnosed using the inquirer of G. Spielberg and Y. Khanin [4].

Table 1

The indicators of health and anxiety of the students before and after the hand-to-hand fighting trainings along with psychological training, points

The indicators under study	1 st course (n=20)			4 th course (n=20)		
	Before the experiment	After the experiment	t p	Before the experiment	After the experiment	t p
Physical health	75,8±3,64	89,9±4,02	2,60 <0,05	76,8±4,23	96,1±4,32	3,19 <0,01
Mental health	61,2±3,86	72,7±4,01	2,17 <0,05	70,3±3,75	86,2±4,16	2,83 <0,05
State anxiety	62,8±4,23	44,4±4,32	3,04 <0,01	51,4±7,05	28,9±6,94	2,27 <0,05
Trait anxiety	38,5±0,4	37,6±0,2	1,81 >0,05	38,2±0,2	37,9±0,1	1,36 >0,05

Table 2

The indicators of health and anxiety of the students of the control group before and after the experiment, points

	1 st course (n=20)			4 th course (n=20)		
	Before the experiment	After the experiment	t p	Before the experiment	After the experiment	t p
Physical health	76,2±0,64	74,0±0,64	2,47 <0,05	77,7±0,2	77,1±0,2	2,14 <0,05
Mental health	62,7±3,80	50,1±3,70	2,37 <0,05	73,0±1,76	66,5±1,48	2,75 <0,05
State anxiety	62,6±3,91	75,1±4,07	2,21 <0,05	52,7±3,30	63,2±3,40	2,21 <0,05
Trait anxiety	38,6±0,3	39,1±0,3	1,19 >0,05	39,2±0,6	40,7±0,5	1,92 >0,05

The received data confirm the possibility of the influence on the indicators under research and achieving their improvement due to purposeful and psychologically founded physical load. Thus, first of all, it is necessary to lay stress on a difference of received data in experimental and control groups. It is established that military students of the experimental group has had the improvement of all indicators under research. Secondly, it is shown that the positive kinetics of the indicators under research of experimental group of the fourth year of study, compared to the first one, was more active, than the one of the first-year students. Thus, for instance, the level of physical health of the first-year students increased by 14,1 points ($p<0,01$), and of the military students of the fourth year of study by 19,3 points ($p<0,05$). At the same time, this indicator reduced by 0,6 points ($p<0,05$) in the control group.

It is necessary to point out that the level of physical health of the fourth-year military students of both groups was higher before the experiment that can be related to the results of their physical preparation during three previous years of study.

The interesting data were identified as a result of determination of mental health indicators. As it turned out, this factor increased quantitatively by 11,5 points in fourth-year military students of the experimental group ($p < 0,05$). At the same time, in their counterparts of the first year of study, it increased by 11,5 points ($p < 0,05$). That is to say, the activity of mental health improvement of the first year-students is again weaker than of the fourth-year military students. It is probable that it is a result of a range of stress factors influence on the students of the first year of study, who has not still managed to adapt to them. Perhaps in this connection the indicator of mental health of the first-year students was 9,1 points lower, than the one of the fourth-year military students ($p < 0,05$).

However, the main point is the proof of a positive influence of psychologically founded physical loads on mental health of military students. It is important to mention that these physical loads were accompanied by positive emotions and the students used them of their own records (these are the results of observations). That is why, for nine months, this indicator decreased in the control group by 12,6 points ($p < 0,05$) in the first-year students and by 6,5 points ($p < 0,05$) in military students of the fourth year of study. Thus, it is possible to conclude that loading the students with learning and official activity during nine months of study leads to decrease of mental health level.

The determination of anxiety of the participants was considered a goal as measuring their reaction to stress factors of learning and official activity. The experimental data, placed in Table 1 and 2, point to the fact that, firstly, physical loads considerably restrain the anxiety appearance and, besides, the decreasing of state anxiety level is much greater: by 22,5 points ($p < 0,01$) in the fourth-year military students and by 18,4 points ($p < 0,05$) in the students of the first year of study. In addition, it is necessary to keep in mind that these indicators increased in the control group: by 12,5 points ($p < 0,05$) in the first-year students and by 10,5 points ($p < 0,05$) in military students of the fourth year of study.

Conclusions:

1. The hand-to-hand fighting training, which military students chose voluntarily as a kind of sport, required for future professional activity, improved the indicators of physical and mental health. Although, the more considerable deadaptation appearance of the first-year military students is responsible for lesser changes in the stated indicators, compared to military students of the fourth year of study.

At the same time, the control groups of students, which did not have any additional physical loads and did not participated in psychological training, had quite insignificant changes of the indicators under research.

2. It is recommended to use the additional physical loads (it is preferable to allow voluntary choice of the sports) along with antistress psychological training in order to improve physical and mental health of military students.

The perspective for further researches can be represented by the development of recommendations, which concern the methods of physical and mental

health improvement of military students of higher education institutions of a closed type.

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Oleksij Gorpnich: *PhD (Physical Education and Sport), Associate Professor; Oles' Gonchar Dnipropetrovsk National University: ave. Gagarin, 72, Dnepropetrovsk, 49010, Ukraine.*

ORCID.ORG/0000-0002-5682-3861

E-mail: lehabeter09@mail.ru

IVANII I.

A. S. Makarenko Sumy State Pedagogical University

THE CHARACTERISTIC OF THE NATURE OF PHYSICAL CULTURE OF A PHYSICAL EDUCATION AND SPORT SPECIALIST'S PERSONALITY

Abstract. Goal: *to prove the nature of physical culture of a physical education and sport specialist's personality. Material of the research:* *the materials of special literature, where some aspects of physical culture are developed, are the basis for this article. Results of the research:* *it was shown that physical culture of a specialist's personality is a component of its general and professional culture and professional competence; it is the basis of social and pedagogical maturity, which is acquired in the process of professional training and activity. Conclusions:* *physical culture of a personality is a complex integrated formation in the structure of a specialist's personality; it unites professional and personal aspects and stipulates formation of physical, sport and life position of the physical education and sport specialist.*

Keywords: *physical culture, personality, competence, specialist, physical education, sport, professional maturity.*

Introduction. The modernization of a special sports education in a high school is carried out in the direction of its re-orientation to humanitarian, culture forming nature of physical culture and sport reality. It determinates a new content of professional activity of the physical education and sport specialist on basis of his formed individually personal physical culture. The important role, which is assigned to physical culture and sport specialist in society, is also determined by the system of values and life suggestions, which are realized in two major directions: firstly, those ones, which are necessary for productive physical and sport activity, and, secondly, the personally significant ones. Thus, the actuality of proving and defining the nature of physical culture of a physical education and sport specialist's personality is determined by the modern tendencies of physical culture development and practical significance of the designated problem.

The understanding of a concept «physical culture» had a long way from «a totality of the researches of society...», the interrelation of its «effective and active sides», the deeper disclosure of its «active side» from a perspective of cultural conformity and system analysis of human activity, and to the development of a concept «physical culture of a personality», as a prerequisite of its all-round and harmonious development. At the same time, the obvious transition from «body and motor» (somatopsychic) component of physical culture understanding to the growth

of its «sociocultural» component and its consideration as «spiritual and physical» phenomenon is observed (V. Balsevich, M. Vizitey, M. Vilenskiy, E. Vilchkovskiy, T. Krutzevich, Y. Kuramshin, L. Matveev, L. Lubysheva, B. Shyian, and others).

The physical culture of a personality is a complex multidimensional phenomenon, and there is no single idea as for its nature and structure. Thus, M. Vilenskiy, when defining the nature of physical culture of a physical education teacher, indicates that it integrates knowledge of three important universal dimensions of human existence, which are connected with spiritual and cognitive comprehension of reality, the ability to value and axiological attitude to the world and physical culture; the ability to social and active self-transformation [1]. B. Shyian defines physical culture of a personality as «a totality of human qualities, which are acquired in the process of physical education and expressed in his vigorous activity, oriented to all-rounded physical nature improvement and leading a healthy lifestyle» [15, c. 27]. L. Matveyev believes that physical culture of a personality is a kind of human culture, intended to optimize a physical (biostructural and biofunctional) condition and development of an individual in conjunction with its mental development on basis of rationalization and efficient planning of its motion activity along with other cultural values [10]. Y. Kuramshin marks that the concept of physical culture is determined by the choice of scientific position of a researcher. Thus, according to his opinion, physical culture of a personality is a result of the adoption of sports objective (spiritual and material) values. He marks this direction as «a personally axiological» one. As for the second direction, «anthropo-sociocultural and pedagogical» one, the author connects it with educational process and defines physical culture of a personality as the development and self-development of a human, realization of his potential somatomental abilities in reaching personal achievements and improving individual characteristics, qualities and abilities [6].

The analysis of the latest publications shows [5; 11; 13; 16] that the usage of modern methodological approaches provides new information as for the balanced influence both on motion and mental functions, on intellectual and physical qualities, athletic abilities, which determine physical culture of a personality. In addition, there is a need for proving the nature of physical culture of a physical education and sport specialist's personality on basis of existing level of modern scientific knowledge in this field.

The connection of the research with scientific programs, plans and subjects. The research is carried out in accordance with a complex plan of the research work «The methodological, informative and methodical innovations in professional pedagogical training of the physical culture teachers» (a state registration number is 0109U004948).

The goal of the research is the theoretical proving the nature of physical culture of a physical education and sport specialist's personality.

The material and methods of the research: the results of the analysis of special literature sources, where the aspects of physical culture theory are developed, form the basis of the given article.

The results of the research and their discussion. The authors proceeded from the fact that it was necessary to consider physical culture of a personality as the totality of elements, which consist of the system of knowledge, skills, abilities, emotional experience, emotional and value orientations, convictions of a personality, which help the specialists to become aware of their place in society, a duty and a responsibility to compatriots. It allows interpreting physical culture of a physical education and sport specialist's personality as a particular personal innovation, the formation of which is realized under the influence of social environment and manifests itself in his social, professional activity (also at the stage of professional training in the education institution), and as a component of his professionalism [9].

The realization of theses of system and synergetic approach to the interpretation of the nature of physical culture of a physical education and sport specialist's personality makes it possible to consider that «a human as an individual is a supreme system integrity of all his most complex contradictory qualities, first of all – mental states, processes and characteristics, his consciousness and the unconscious» [5, p. 33]. The literature sources interpret human integrity as a unity of the manifestations of his existence: natural, individual, collective, cultural, subjective and the conscious one [8, p. 11]. It is necessary to mention that it was human social life, which caused the appearance of a personality as integral human characteristic, which expresses a way of life and actions and is able to determine his place in society. In this context, the goal of the pedagogical process is to form a cultured and educated person according to his native traits, supreme values and general and physical culture ideals [14, p. 127].

The physical culture of a physical education and sport specialist's personality can be determined as human ability to realize multifunctional culture-expedient kinds of activity, to solve efficiently the tasks of professional and sociocultural spectrum [2; 13]. In this context, according our opinion, it is appropriate to connect physical culture of a personality with professional culture development. It is essential to take into account the opinion of I. Zyazyun here, who believes that «a culture assigns the system of value conceptions for each person and regulates his individual, social behavior, serves as a basis for setting and solving cognitive, practical, professional and personal tasks» [4, p. 131]. Since professional activity is a leading kind of sociocultural activity and the main field of the realization of physical culture of a specialist's personality, we regard physical culture as the important component of his professional culture. In our research, we draw on a professional culture definition, proposed by V. Lozova, who considers it as a generalized indicator of professional competence and a way of professional self-improvement [7]. Thus, taking into account the culturological approach at the time of forming physical culture of a personality allows not only considering knowledge, skills and abilities in its structure, but also distinguishing the value constituent (as a projection of those values, which form the content of value orientations) and the motivation constituent, which include the elements of self-regulation.

Taking into account all the above-mentioned, we are able to maintain that physical culture of a specialist's personality is an integral part of his general and

professional culture. Since the competence-based approach is currently the one of the main ones in professional education, we find it necessary to mention two important moments. Firstly, according to the opinion of a majority of scientists, the realization of a competence-based approach cannot be carried out separately from the comprehension of values of different kinds of physical culture. Secondly, the process of professional competence formation as «proved readiness for activity» is carried out only in common activity of those, who teach and those, who is taught. Thus, the professional competence admits both the presence of particular life position, and the inner readiness for its realization, and it can become fully apparent only in real life or in professional activity [7; 9].

It is necessary to admit that we accept the point of view of V. Lozova, who states that the competency of a specialist has «an integrative nature, because various fields of culture (spiritual, social, pedagogical, administrative, legal, ethical, ecological, etc.) are its source, and, in addition, it requires a considerable intellectual development, includes analytical, communicative, prognostic and other mental processes» [7, p. 5]. According to the researcher's opinion, the competence «includes ecological, motivational, reflexive, cognitive, operational-technological, ethical and other content constituents of the preparation of a specialist and provides for the growth of the skills, knowledge, the experience of professional and personal self-development of creative activity, emotional and value attitude [7].

The consideration of acmeology theses [3] allows regarding the formation of physical culture of a personality as a constituent of the integral guided process of professional development, interpreting by E. Zeyer, in her acmeological conception, as «a walk of life» of a professional, and including five stages:

1. An optation (lat. *optatio* – a desire, a choice) – the choice of a profession with account of individually personal and contextual peculiarities.

2. A professional training – acquiring professional knowledge, skills and abilities.

3. A professional adaptation – professional basics, mastering the social role, professional self-determination, the qualities and experience formation.

4. A professionalization – the formation of a position, the integration of personal and professional qualities, the readiness for the performance of duties.

5. The professional skills – the realization of a personality in professional activity [3, p. 291].

It is necessary to mention that the regularities of the development of a person as for the level of his maturity are the subject of studying the pedagogical acmeology. A maturity is not identified with adulthood in acmeology. From the acmeological point of view, a maturity of a personality is the most large-scale category, which includes mostly the development of moral and ethical qualities, humanistic personality orientation, normalization of its behavior and relations. Thus, considering the subject of our research, we regard a maturity as a certain goal and an important indicator of the formation of physical culture of a physical education and sport specialist's personality.

It is important to indicate that, in pedagogical literature, a maturity of a personality is considered as a constituent of a wider concept – social or social-professional maturity. When talking about social-professional maturity, V. Radul means a result of interaction of purposeful education and internal and external factors, which influence a person; a certain level of the development of a personality that contributes to creative mastering different kinds of a culture, and creates a possibility for the most effective bringing the benefit to other people by means of taking part in different kinds of activity [12, p.131].

Thus, a social-professional maturity can be considered as the consequence of a formed physical culture of a physical education and sport specialist's personality, as a wider formation. Such understanding, on the one part, makes it possible for us to extrapolate qualities and characteristics, which form the content of social-professional maturity, to the structure of physical culture of a specialist's personality. On the other part, we are able to consider the process of learning, education and socialization of a future physical education and sport specialist in sport and sociocultural environment of a higher education institution and in the process of professional activity as leading ways of forming his individually personal physical culture.

All the above-mentioned information gives a possibility to trace the connection of the physical culture of a personality of physical education and sport specialist with other basic concepts (Figure).

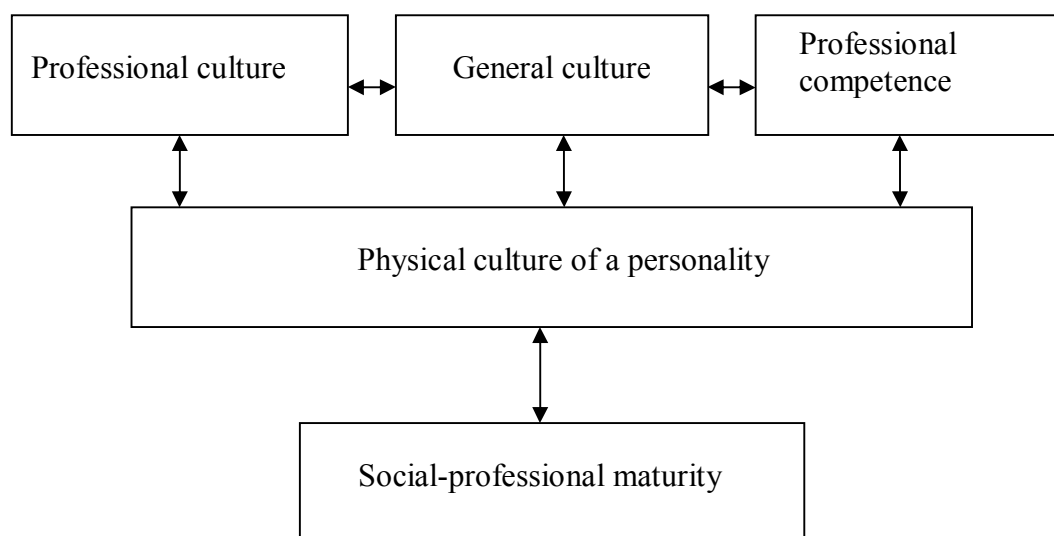


Fig. The connection of physical culture of a personality with basic concepts

The generalization of the indicated theses allows maintaining that *physical culture of a physical education and sport specialist's personality* is a complex integrated formation in the structure of a specialist's personality; it can be considered as a constituent of its general and professional culture and professional competence, a basis of social-professional maturity.

Conclusions. As the result of the carried out researches, it is established that the physical culture of a personality of physical education and sports specialist unites professional and personal aspects, substantively and functionally connected with

other personal basic formations, qualities and characteristics, first of all – by professionalism, general and professional culture, professional competence that stipulates formation of social-professional maturity and a specialist's position. It is a general category, which expresses a sociocultural development of a specialist as a personal quality, which determines physical culture and sports position, social and professional maturity and socially useful activity of a personality and readiness for the efficient solving the physical culture and sport activity tasks on basis of formed knowledge, skills, abilities, value orientations, professionally important qualities and capabilities.

The perspectives for further researches are connected with the determination of the structure and the content of physical culture of a personality of physical education and sport specialist, and with proving the organizational and pedagogical conditions of its formation in the process of professional training.

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Ihor Ivaniy: *PhD (Pedagogic), Associate Professor, Sumy state pedagogical university named by A.S. Makarenko: Str. Romenska, 87, Sumy, 40002, Ukraine.*

ORCID.ORG/0000-0002-6578-1480

E-mail: i.ivanii@yandex.ru

LYSYAK V.

Kharkov Institute of Banking

FUNCTIONAL CHANGES IN THE BODY OF WOMEN IN AEROBIC FITNESS

Abstract. Purpose: to analyze the influence of aerobic fitness training on physiological parameters students. **Material:** the study involved 30 students of 1–3 courses of Kharkiv Institute of banking, of which were divided into two groups. First – experimental (n=15). Students in this group for 10 months, 2 times a week doing aerobic fitness. The second group – the control (n=15). Its representatives were attending regular classes in physical state education program. Control tests were conducted three times throughout the experiment. Tests were used to assess the functional state of the respiratory and cardiovascular systems: a delay of breath and out breath, vital capacity, maximum oxygen consumption. Defined as living index and the Harvard step test, the power brush and physical performance. **Results:** it has been established that of the individual experimental group compared to the control, significantly improved performance respiratory and cardiovascular systems. Increased MOC, physical performance and muscle strength. **Conclusion:** concluded that aerobic fitness classes can be an effective means of strengthening and preserving the health of students.

Keywords: aerobic fitness, students, functional changes preserving health technology.

Introduction. Nowadays the main goal of physical education must be its health-giving orientation. The system of education of young people should occupy such approaches and methods of influence on person, which can evoke a response and motivation to learn the healthy way of life, feel happiness and satisfaction of active movements, sense oneself healthy and capable of solving difficult tasks.

Unfortunately, the existing programs in universities of physical education focus on the achievement of certain standards of physical training, which more determines the supporting of educational level without training one, which provides morphofunctional reserves of body. Moreover modern system of physical education in universities includes the tasks, which aim at applied physical training, not at modern health-giving technologies, that can generate interest, be accompanied by music and achieve sufficient level of physical load. There are such health-giving technologies as rhythmic gymnastics, fitness, aerobic etc.

According to the previous information, searching and grounding of ways of health promotion of youth should be pointed as important problem nowadays.

Among most authors in literature the question about practicability of generating interest among students to physical training, providing new health-giving

technologies in teaching and learning activities doesn't raise doubts [7; 8; 12]. The researches about influence of rhythmic gymnastics, fitness and aerobic on doer's body point out that such trainings make an additional load and keep the effect, which is achieved by gymnastics exercises [5]. To the positive aspect of their influence also should be considered high level of positive emotions after the classes that guarantees good psychophysiological changes in doer's body [4; 9].

The importance of aerobic training for mending functions of cardiovascular and respiratory systems is mentioned in a number of authors' researches [6]. The works about health-giving aerobic describe the fact that it is one of the modern directions of mass physical education, which leads to the positive changes in the body, good influence on health in general and high interest among youth [3; 10]. Aerobic training also determines the dissolution of gaps in movement activity among the students of universities [1].

In addition to recognizing the health-giving and training direction of aerobic, the researchers point out the necessity of individual attention to doers [1; 2], monitoring the level of their physical fitness [11]. Besides, there are some data which prove the negative consequences under doing fitness and aerobic, because their high emotionality, exercise intensiveness accompanied by music lower the ability of checking out their influence on the human body [13]. That is why some authors think that different kinds of fitness and aerobic within the structure of classes of physical education for students should be practiced as additional kinds of loading and not to replace them into appropriate ones in a program.

According to the existing of different points of view on using modern kinds of fitness aerobic in a system of academic classes for students, we decided to make this research.

The goal of research: making the analysis about influence of fitness aerobic training on physiological indexes of students.

Material and methods of research: the research involved 30 students from 1–3 courses of Kharkiv Institute of Banking; they were divided into two groups. The first one is experimental (n=15). The students of this group have been doing aerobic fitness for 10 months 2 days a week. The second group is control (n=15). Its members have been visiting simple physical training classes according to the program of Ministry of Education and Science of Ukraine.

Functional indications were carried out three times during the academic year (10 months). There were such tests and indications for detecting functional parameters of respiratory system as lung capacity (LC), timed inspiratory capacity (Stange) and timed expiratory capacity (Hench). Also the breath-death ratio was determined. Step-test index of Harvard (STIH), which characterizes the level of physical capability and endurance, was counted on the next formula:

$$STIH = (tx100) / (f_1 + f_2 + f_3) \times 2$$

where t – the practical time of doing the test

f_1, f_2, f_3 – heart rate in 1, 2 and 3 minutes after the pre-dosed muscular performance: climbing on a step of 43 cm (time of climbing is 5 minutes, frequency of climbing is 30 times in a minute).

Physical capability was determined on the veloergometer by three loadings: the first one (N_1) was 250 km h^{-1} , and the second one (N_2) was 750 kgm min^{-1} . The speed of pedaling was 30 km h^{-1} .

PWS^{170} was counted by the next formula:

$$PWC^{170} = N_1 + (N_2 - N_3) \times (170 - f_1 - f_2),$$

where N_1 and N_2 were the power of the first and second loading; f_1 and f_2 were the heart rate after the first and second training.

MOC was counted on the magnitude of PWC^{170} , using V.L. Karpman's formula:

$$MOC = 1,7 \times PWC^{170} + 1240 \text{ (ml min}^{-1}\text{)}.$$

Quantitative data was elaborated by statistic methods.

Results and discussion. The received data of the research show the fact that both groups of students had better results of functions of cardiorespiratory apparatus at the end of the academic year (tab. 1 and 2). But the students of the control group received some small changes and, moreover, most of them had doubtful indexes. Every change of students' parameter from experimental group is appreciable and the indexes are accurate.

Table 1

Students' functional indexes from the control group during the experimental period, $X \pm m$ (n=15)

Detecting indexes	Before the experiment	After the experiment	The level of accuracy	
			t	p
Birth-death ratio, $\text{ml} \cdot \text{kg}^{-1}$	$55,3 \pm 0,34$	$56,2 \pm 0,38$	1,8	$>0,05$
Timed inspiratory capacity, c	$49,7 \pm 0,12$	$50,0 \pm 0,14$	1,7	$>0,05$
Timed expiratory capacity, c	$24,1 \pm 0,25$	$24,8 \pm 0,28$	1,9	$>0,05$
Functional test, st. un.	$37,2 \pm 0,85$	$34,4 \pm 0,79$	2,4	$<0,05$
PWC^{170} , $\text{kgm} \cdot \text{min}^{-1}$	$770,5 \pm 0,31$	$780,6 \pm 0,36$	2,2	$<0,05$
MOC, $\text{ml} \cdot \text{min}^{-1}$	$2552 \pm 3,91$	$2565 \pm 4,07$	2,3	$<0,05$
STIH, st. un.	$84,1 \pm 0,33$	$85,0 \pm 0,37$	1,8	$>0,05$
Hand power, kg	$28,8 \pm 0,27$	$29,6 \pm 0,34$	1,9	$>0,05$

Table 2

Students' functional indexes from the experimental group during the experimental period, $X \pm m$ (n=15)

Detecting indexes	Before the experiment	After the experiment	The level of accuracy	
			t	p
Birth-death ratio, $\text{ml} \cdot \text{kg}^{-1}$	$55,2 \pm 1,17$	$59,7 \pm 1,20$	2,7	$<0,05$
Timed inspiratory capacity, c	$49,3 \pm 0,75$	$53,4 \pm 0,81$	3,7	$<0,01$
Timed expiratory capacity, c	$23,6 \pm 0,98$	$27,1 \pm 1,06$	2,4	$<0,05$
Functional test, st.un.	$36,8 \pm 1,48$	$30,6 \pm 1,76$	2,7	$<0,05$
PWC^{170} , $\text{kgm} \cdot \text{min}^{-1}$	$766,5 \pm 13,8$	$808,6 \pm 14,5$	2,1	$<0,05$
MOC, $\text{ml} \cdot \text{min}^{-1}$	$2548 \pm 14,5$	$2606 \pm 17,1$	2,6	$<0,05$
STIH, st. un.	$82,7 \pm 1,75$	$89,6 \pm 1,49$	3,0	$<0,01$
Hand power, kg	$28,0 \pm 1,38$	$33,3 \pm 1,45$	2,7	$<0,05$

So, the birth-death ratio, timed inspiratory and expiratory capacities, STIH and hand power had the doubtful indexes at the end of experiment in the control group that is why we can observe only the tendency to changes.

The same student's parameters from the experimental group had, firstly, the accurate changes and, secondly, they were much higher. They were near 0.3-0.9 in the control group and near 6.9 to 3.5 in the experimental one.

Especially appreciable changes obtained after the experiment of testing of the physical performance (PWC^{170}), maximal oxygen consumption (MOC) and the step-test of Harvard (STIH). PWC^{170} increased $10.1 \text{ kgm}\cdot\text{min}^{-1}$ in the control group and $42.1 \text{ kgm}\cdot\text{min}^{-1}$ in the experimental one; MOC increased $13 \text{ ml}\cdot\text{min}^{-1}$ in the control group and $58 \text{ ml}\cdot\text{min}^{-1}$ in the experimental one; STIH increased 0.9 st.un. in the control group and these data were doubtful and 6.9 st.un. in the experimental one.

The increase of hand power is also indicial: the control group has the increase 0,8 kg (when $p>0,05$) and 5,3 kg in the experimental one.

Thus, we have the objective data which allow to confirm that aerobic fitness exercises even twice a week provide a significant lowering of the motor deficit of the students, an increase of functional capacity of the cardiovascular and respiratory systems, stamina and muscle strength.

In the control group of students nonessential improvements of functional indexes indicate low efficiency, which is due to the lack of conscious motivation to academic classes, low level of interest to them and, of course, unfair implementation of the proposed exercises.

That is why the use of health-keeping technologies, which include fitness and aerobics, is certainly a positive value for students in the system of physical education and it can be considered one of the trend not only of improving students' attitudes toward physical training, but also have a positive effect on their health.

Conclusions:

1. Aerobic fitness classes during the academic year supported a firm improving of the functional parameters of the cardiovascular and respiratory systems. Positive changes occurred in terms of muscle strength and physical performance of those who were involved in aerobic fitness.

2. Using aerobic fitness as a way of promoting and keeping the students' health in the system of physical education classes is fully justified and will realize the role of health-keeping and make a positive attitude of students toward physical education.

The challenge of further research can be the development of applications about using of health-keeping technologies taking into account the psychological and individual criteria of influence on personality of involved ones.

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Valentina Lysyak: *PhD (Physical Education and Sport), Associate Professor; Kharkov Institute of Banking: 55 Pobedy Ave, Kharkiv, 61174, Ukraine.*

E-mail: valya_koz.54@mail.ru.

MOSHENSKAYA T.¹, BODRENKOVA I.²

¹*Kharkiv State Academy of Physical Culture*

²*National University «Yaroslav the Wise Law Academy of Ukraine»*

DETERMINING THE LEVEL OF DEVELOPMENT OF THE YOUNG SPORTSWOMEN FLEXIBILITY IN SPORTS AEROBICS

Abstract. Purpose: *To develop and prove experimentally methodology development athletes flexibility in initial specialization in sports aerobics. Material and methods:* *we used pedagogical research methods and methods of mathematical statistics. Results:* *the basic tools, methods, techniques, and requirements for the exercises, which were the contents of the experimental method development flexibility that will improve the quality of competitive elements and combinations in sports aerobics. Conclusions:* *the use of the author's methodology development flexibility in sports aerobics provide a higher growth rate of the studied parameters.*

Keywords: *flexibility, sports aerobics, step initial specialization.*

Introduction. In sports aerobics special physical training is aimed at developing and improving physical abilities as required for successful learning and high-quality performance of competitive compositions. One of the key physical qualities that make up the physical potential of athletes is flexibility that makes a substantial contribution to the technical skills of athletes [1; 4–6; 15].

Nevertheless in the research [2; 3; 9-11] concerning the issue of development of flexibility much attention is paid to the step initial training and sports reclamation and practically there is no information about athletes' initial specialized training. However this step is a link between basic training and formation of sports mastery in sports aerobics. Exactly during this period the changeover from basic elements to specialized ones is made, and high-amplitude elements of basic structural groups which continue to constitute the foundation of competitive compositions of high-quality athletes are learned. So, the particularly acute problem is the issue on increasing the physical potential of athletes and the ability to use it in technical actions.

On the basis of the provisions of the actual value of the thesis is determined by search of the most effective methods designed to develop flexibility in the step initial specialization and its implementation in the performance of competitive elements in sports aerobics.

Connection between thesis and academic programs, plans and themes. The research was completed in accordance with the Summary Plan theme of research in the field of physical training and sports of Ministry of Education and Science of Ukraine for 2011-2015 under the theme 2.2.4 «Improving control of athletes' motor activity».

Objective of the research: to develop theoretically and to prove experimentally the method of development athletes' flexibility at the step initial specialization in sports aerobics.

Tasks of the research:

1. Based on the analysis of specialized literature to define modern and efficient means and methods of development of flexibility of young sportswomen.
2. To verify experimentally the efficiency of influence of the developed method of training on indicators of development of flexibility of young sportswomen.

Material and research methods. The research was based on municipal company «Integrated Children and Youth Sports School» No. 13 in Kharkiv. 20 sportswomen (9-11 years) took part in its experimental part. The complex of scientific methods of research has been used: pedagogical methods of research (analysis and synthesis of data of scientific and methodical literature, pedagogical supervision, pedagogical testing); methods of mathematical statistics.

The pedagogical experiment in which two groups of sportswomen took part, the control (10 girls) and the main (10 girls) was carried out within a year, the lessons took place four times a week lasting for 120 min. The control group was engaged according to the program of Children and Youth Sports School and the main group applied an author's technique, which by the volume and intensity was adequate to work in control group, but includes means that are more effective and methods of special exercises and techniques allowing to develop purposefully the flexibility at young athletes in sports aerobics.

During the training process of sportswomen specializing in sports aerobics we have developed an experimental technique consisted of five blocks of exercises as accented impact on certain joints as well as complex effect, which had been alternated in a week cycle of training sessions. The preparatory part of the training sessions contained the motor tasks for the hip, shoulder joints and spine. There were next types of movements: swing movements, using elasticity, with pose fixing, with burdening. The elements of structural groups included: moves (alternate forward, backward), balance (side, front, using hands), turns, jumps ("splitting" in the longitudinal twine, jump step), which along with relaxation exercises, were carried out in a final of training sessions with belt rubber cushion of medium elasticity.

In the beginning of experiment till its termination were administered a test among the main and control groups. This experiment determined a level of flexibility of young athletes. To assess a level of girls' flexibility 9-11 years old, which were engaged sports aerobics was conducted by using common tests [7; 8; 12-14]. The following tests were offered:

1. To trunk bending forward in sitting position (cm);
2. "Bridge" from the initial position – lying on the back (cm);
3. To caper in shoulder joints with the gymnastic stick (cm);
4. A split on the right leg (cm);
5. A split on the left leg (cm);
6. A side split (cm);

The results of research and its discussion. Test results of athletes' flexibility set out below in table 1.

Table 1
Changes in flexibility indicators among the main and control groups
($\bar{X} \pm m$) ($n=10$; $p < 0,05$)

№	flexibility indicators	Main group			Control group		
		ID*	FD*	Increase %	ID*	FD*	Increase %
Mobility control in spine joints							
1	trunk bending forward in sitting position	,8	23,63±0,3	26	17,76±0,9	22,41±0,5	21
2	“Bridge” from the initial position – lying on the back	36,64±1,5	27,72±0,9	32,2	35,78±1,03	28,84±0,9	24,1
Mobility control in shoulder joints							
3	cap in shoulder joints with the gymnastic stick	32,5±1,01	25,66±0,8	26,65	31,87±0,9	25,7±0,6	24
Mobility control in hip joints							
4	A split in the right leg	6,81±1,05	4,47±1,01	52	6,07±0,9	4,1±0,8	48,5
5	A split on the left leg	6,76±1,3	4,28±0,8	57,5	6,54±1,07	4,32±1,1	51
6	A side split	7,45±1,4	5,67±1,02	31,3	6,88±1,05	5,65±0,7	21,7

Note: *ID – initial data (at the beginning of the experiment); *FD – final data (to the end of the experiment).

The finding was affirmed that in both groups were observed increase flexibility indicators. However, the most basic changes we can see in the main group. With the analyze of finding we can assert, that introduction of an experimental and author's method put to use the training process, which show at the first place, that young athletes, who are training by author's method have achieved in development a higher level of flexibility. It has an efficiently influence on studying and improvement the technical elements in sport aerobics.

Pic. 1 shows the dynamics of the performance flexibility indicators in groups.

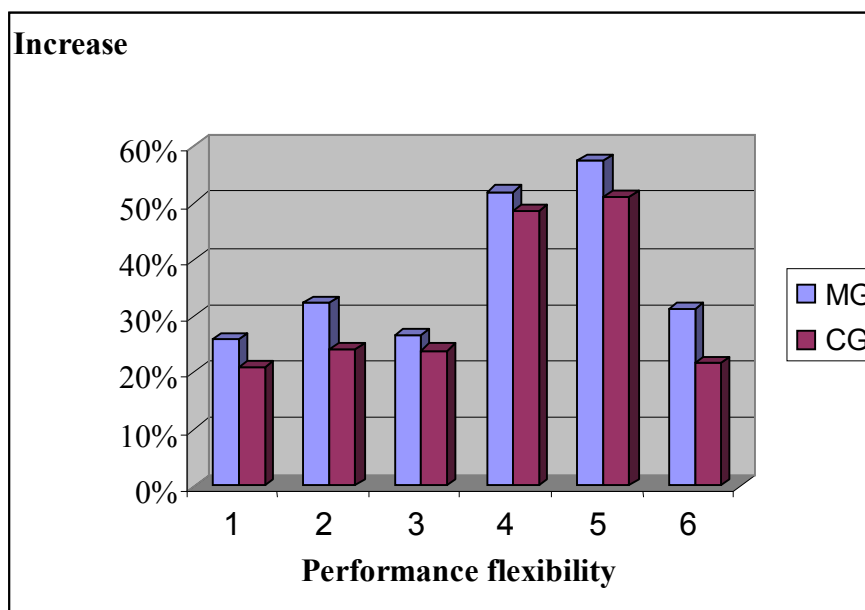


Fig. 1. Dynamics of indicators of flexibility for young athletes

The dynamics of the performance flexibility indicators for young athletes:

1. Forward flexion of the body from the sitting position (cm)
2. «Bridge» from the initial position. – Lying supine (cm).
3. Rotation of the shoulder joint with the gymnastic stick (cm).
4. Splits on the left leg (cm).
5. Transverse splits (cm).

Significant changes in the hip joints mobility were detected:

The test result of the «Twine on the right foot» improved to 2.34 cm in MG, and the test result of the «twine on the left foot» – to 2, 48, an increase is of 52 % and 57, 5%. In CG increment result of these tests fulfillment was 48, 5 and 51% respectively. The difference between groups is statistically significant $p < 0, 05$.

The mobility of the spine joints was determined by two test tasks: 1) forward flexion of the body from the sitting position, where the indicators of the growth amounted 26% in MG and 21% in CG, 2) test «Bridge» from the initial position. – lying supine(cm), where the result has improved by 8,92 cm in MG and 6,94 cm in CG, so growth is 32,2 % and 24,1 % respectively.

Improved results have appeared in the shoulder joint mobility terms. The biggest growth in MG such as 26, 65% was detected and the growth in CG was 24%. Based on these data the growth of parameters in the main as well as in the control group is revealed. In our opinion this fact can be explained by the fact that this age is considerate sensitive for developing flexibility. However, in the main group the growth was higher than in the control one. This indicates the correct and efficient choice of the training facilities for the definite kind of sport.

Conclusions:

1. Based on the analysis of literature, has developed a technique of flexibility in athletes at the initial stage of specialization. Its feature is the use of different types of exercise ("primary wing", "spring", "static", with "active foreign aid" to the "shock absorber") for the development of joint mobility and stability of quality in the complex process of alternating "active" and "passive" periods of training athletes is an important factor determining the prospects of training work in the annual cycle.

2. Comparative analysis of flexibility in athletes of both groups showed that the performance of all investigated parameters in the main group of sportswomen found the advantage of the control group.

3. It is established that the author's method of flexibility of sportswomen at the initial stage of specialization in sports aerobics is effective and provides opportunities for coaching activities in problem solving and training of athletes achieve their highest athletic performance.

Prospects for further research in the area is expected to study the characteristics of flexibility qualified athletes in sports aerobics.

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Tetiana Moshenska: *Kharkiv State Academy of Physical Culture: Klochkovskaya str. 99, Kharkiv, 61058, Ukraine.*

E-mail: tvm78@mail.ru

Bodrenkova Inna: *PhD (Physical Education and Sport), National University «Yaroslav the Wise Law Academy of Ukraine»: Str. Pushkinskaya, 77, Kharkov, 61024, Ukraine.*

ORCID.ORG/0000-0001-8807-6808

E-mail: Innasport2009@rambler.ru

PETRENKO Yu.¹, DUDNIK Yu.¹, CHERNISHOV V.¹, PETRENKO Yu.²

¹*V. N. Karazin Kharkov National University*

²*Kharkiv State Academy of Physical Culture*

IMPROVING THE TRAINING PROCESS OF YOUNG TENNIS PLAYERS AND BASKETBALL PLAYERS 10–14 YEARS GIVEN THE TIME SIMPLE AND COMPLEX REACTION

Abstract. Purpose: perfection of process of preparation of young tennis players and basketball-players 10–14 years taking into account time of simple and difficult reaction. **Material and methods:** theoretical analysis and generalization of literary sources; pedagogical supervision; pedagogical experiment; psychophysiological testing; methods of mathematical statistics. Young tennis players (n=30) and basketball-players (n=27) took part in research. **Results:** Conducted factor analysis of structure of development of sensorimotor functions of young sportsmen which engage in the playing types of sport and the models of development of sensorimotor reactions and quickness are built. **Conclusions:** the factor of sporting specialization of basketball-players and tennis players has an influence on development of difficult sensorimotor reaction with a choice or without a choice; conducted analysis of indexes of time the outage of sensorimotor reaction and Tapping Test testifies to their dependence on age of sportsman. Finding can be used for a selection on corresponding sporting specializations.

Keywords: tennis, basket-ball, sportsmen, simple reaction, complex reaction.

Introduction. A constant increase of the achievements in sports, in general, and in sports games, places a growing number of demands on a system of a selection and a preparation of sportsmen, where a significant place belongs to a search of children with high time indicators of simple and complex reaction. That is why, at a selection stage, according to the researches of Rovnyy A.S., it is necessary to give an advantage to those sportsmen, who have an adequate level of psychophysiological qualities development [9]. The improvement of a system of selection of children with high time indicators of simple and complex reaction for sports games classes is actual in our country, but insufficiently researched.

As Ozerov V.P. mentions, a bases for moving abilities is psychomotor abilities, which are represented as their cognitive-psychomotor component, which includes sensomotor, perceptive, intellectual and neurodynamic peculiarities, realizing both on voluntary and involuntary levels [8].

The moving actions of the players, as well as the ones of the representatives of many other sports, are, as a matter of fact, the complexes of simple and complex sensomotor reactions. The ability of a quick response to an opponent's actions is of a

great importance for sports wrestling efficiency in many sports. These questions are considered in a work of Korobeynikov G.V and other authors [6; 3], where the psychomotor qualities of sportsmen are analyzed, which are, as a matter of fact, the complexes of simple and complex sensomotor reactions. The practical recommendations, which are proposed by the authors, are mainly oriented to the improvement of a motor component of these reactions. At the same time, a sensor component is out of a field of vision of the researchers (a time, necessary for a signal processing and making a solution as for a practicability of one or another reaction in return. However, an increase of a sensomotor response rate just on account of dynamics characteristics change of its motor component is possible only to a certain extent that considerably reduces the possibilities of professional growth of sportsmen.

According to M.T. Matyushonok's opinion, there is a perspective in searching the reserves of speed capabilities of sportsmen, which go in for game sports, in the peculiarities of a sensor component of reactions [7]. A specificity of this component has individually typological character, and these peculiarities can be revealed, as Ashanin V.S. [1], Kozina Z.L. [5], Tserkovnaya O.V. and other scientists [10] proved in their works, with a usage of modern information technologies of psychophysiological diagnostics and computer psychodiagnostic programs.

The connection of a subject with important scientific plans. The scientific research is carried out according to a subject «The scientific and methodological bases of information technologies usage during a preparation of the specialists in a field of physical culture and sports» (a state registration number is 0113U001207).

The goal of the research: the improvement of a process of a preparation of young tennis players and basketball players at the age of 10-14 years with a regard of a time of simple and complex reaction.

The achievement of a desired goal has meant solving the following **tasks of the research:**

9. To conduct a computer psychodiagnostic testing for determining simple and complex reaction of young sportsmen, which go in for game sports.

10. To research the indicators of simple and complex reaction of young sportsmen with a help of information technologies means.

11. To identify the major factors, which influence the development of simple and complex reaction of young sportsmen, which go in for game sports and build the correspondent regressive models.

The material and methods of the research. In order to solve the stated tasks, the following methods of the research were chosen: the theoretical analysis and generalization of literature sources; the pedagogical observation; the pedagogical experiment; the psychophysiological testing; the methods of mathematical statistics. The research was carried out on the premises of SC «KBP» («Kharkiv Bearing Plant») and Youth Sports School № 7. The participants of the research were the boys, aged from 10 to 14. The boys under research were divided into two subgroups according to a kind of sports: basketball - (n=30) and table tennis (n=27). Besides, a gradation of young sportsmen into 5 subgroups according to age indicator took place:

10 years – 10 persons, 11 years – 12 persons, 12 years – 14 persons, 13 years – 11 persons, 14 years – 10 persons.

The research of psychophysiological indicators of simple and complex somatic reaction of young sportsmen, which go in for game sports, was conducted with a help of computer psychodiagnostic program «Complex», developed by a team of authors of the Department of informatics and biomechanics of KSAPC under the supervision of a professor V.S. Ashanin, which includes the following kinds of tasks: identification of a simple reaction to light; a simple reaction to sound; a complex reaction with a choice; a complex reaction without a choice and tap test.

The given program also supposes a possibility of carrying out a test of reproducing time frame, reducing time frame twice, reproducing time frame on sound, and reducing time frame on sound. These kinds of tests were not used in the represented work, as they were not the constituents of a main task of the research.

After a termination of a complex testing, a sportsman received a result, formed by way of archive file, which is kept in data base on PC, can be printed or placed on the Web. A computer program automatically counts the average indicators, a standard deviation and a variation coefficient. The test was conducted under the conditions of silence and in the absence of other irritants, in a comfortable body position, in the presence of a rest for an elbow, in order to reduce an influence of statical hand muscles contraction.

The quantitative and qualitative analysis of psychophysiological indicators of simple and complex somatic reaction, a factor analysis of a structure of sensomotor functions development were carried out, the group regressive models of sensomotor reactions development and speed qualities of young sportsmen, which go in for basketball and table tennis, were built.

The research results and their discussion. The generalized data of time indicators of simple and complex reaction of young sportsmen, which go in for game sports are represented in Table 1.

Table 1

The time indicators of simple and complex reaction of young sportsmen, which go in for game sports (n=57)

The kind of sensomotor reaction	$\bar{X} \pm m$	σ	V
Simple reaction to sound, msec	329,7±9,4	50,5	15%
Simple reaction to light, msec	527,6±11,8	63,3	12%
Complex reaction with a choice, msec	1155,0±30,9	116,6	14%
Complex reaction without a choice, msec	1016,5±24,1	130,0	13%
Tap test, presses per 1 sec	4,97±0,10	0,52	11%

A comparative analysis of the indicators of sensomotor reactions of young sportsmen, which go in for basketball and tennis, represented in Table 2, gives an evidence of the absence of significant differences of a time of simple and complex reaction to sound irritant ($t=0,54$; $p>0,05$) and visual irritant ($t=1,60$; $p>0,05$). In

other words, the sportsmen, which go in for basketball and tennis, have approximately similar level of simple sensomotor reaction.

Table 2

The time indicators of simple and complex reaction of young sportsmen, which go in for basketball (n=30) and tennis (n=27)

The kind of sensomotor reaction	Basketball players			Tennis players			t	p
	$\bar{X} \pm m$	σ	V	$\bar{X} \pm m$	σ	V		
Simple reaction to sound, msec	333,2±9,4	50,8	15%	325,9±9,3	50,2	15%	0,54	<0,05
Simple reaction to light, msec	540,2±12,1	65,3	12%	513,7±11,3	61,1	12%	1,60	<0,05
Complex reaction with a choice, msec	1104,8±28,6	153,9	14%	1212,0±33,5	153,9	15%	2,43	>0,05
Complex reaction without a choice, msec	974,5±23,2	124,7	13%	1063,2±25,2	135,9	13%	2,59	>0,05
Tap test, presses per 1 sec	5,02±0,10	0,52	10%	4,92±0,10	0,52	11%	0,72	<0,05

The time indicator of complex sensomotor reaction with a choice ($t=2,43$; $p<0,05$) and without a choice ($t=2,59$; $p<0,05$) has significant differences in basketball players and tennis players. At the same time, when it comes to basketball players, these indicators are higher, than the ones of tennis players. It comes from the fact that basketball is a team game, and a player should orient himself in allocation of the partners and the opponents for a short period of time, and make a decision as for effective action performance. The tennis players should make a tactical decision as for putting a ball to a corner of a playing ground, which is necessary for shooting a result, and react to the actions of only one opponent. The indicators of tap testing of sportsmen-players also had not significant differences ($t=0,72$; $p>0,05$)

Thus, it is possible to state that a factor of sports specialization of basketball players and tennis players has an influence on a development of complex sensomotor reaction with a choice or without a choice. The simple sensomotor reaction and a speed of performance of a simple action do not depend on sports specialization of sportsmen-players.

According to the indicators of results dispersion, homogeneity of a group of basketball players and tennis players is also observed and is represented in Table 3. The high values of dispersion are explained by a high variability of an indicator. The reason for this is the groups of sportsmen, which differ in age, from 10 to 14. In other words, for conducting further researches, it is necessary to divide young sportsmen into age subgroups.

Table 3

The indicators of time dispersion of simple and complex reaction of sportsmen, which go in for basketball (n=30) and tennis (n=27)

The kind of sensomotor reaction	Basketball players		Tennis players		F	p
	D	σ	D	σ		
Simple reaction to sound, msec	2580,6	50,8	2518,5	50,2	1,02	>0,05
Simple reaction to light, msec	4264,1	65,3	3733,2	61,1	1,14	>0,05
Complex reaction with a choice, msec	23685,1	153,9	23692,3	153,9	0,73	>0,05
Complex reaction without a choice, msec	15550,1	124,7	18468,9	135,9	0,84	>0,05
Tap test, presses per 1 sec	0,271	0,52	0,278	0,52	0,97	>0,05

Table 4

The time indicators of simple and complex reaction of sportsmen, which go in for game sports (n=57) according to age criterion

The kind of sensomotor reaction	10 years (n=10)		11 years (n=12)		12 years (n=13)		13 years (n=12)		14 years (n=10)	
	$\bar{X}\pm m$	V, %	$\bar{X}\pm m$	V, %	$\bar{X}\pm m$	V, %	$\bar{X}\pm m$	V, %	$\bar{X}\pm m$	V, %
Simple reaction to sound, msec	392,5±1,63	1,2	359,9±3,51	3,2	328±2,44	2,6	294,9±2,62	2,9	274,8±3,11	3,4
Simple reaction to light, msec	631,1±14,5	6,9	577,1±3,58	2,1	537,4±3,67	2,4	492,0±8,36	5,6	395,0±15,3	11,6
Complex reaction with a choice, msec	1320,8±39,6	9,0	1232,8±5,8	1,6	1139,8±6,92	2,1	1087,9±3,91	1,2	999,8±16,8	5,0
Complex reaction without a choice, msec	1295,2±64,5	15	1105,2±6,43	1,9	1044,1±3,49	1,2	907,3±2,09	7,6	726,8±12,8	5,3
Tap test, presses per 1 sec	4,14±0,07	4,9	4,70±0,02	1,7	4,90±0,04	2,5	5,30±0,02	1,4	5,90±0,15	7,5

The data, represented in Table 4, gives an evidence of a considerable improvement of time indicator of simple and complex reaction of sportsmen-players with the increase of years. Thus, almost according to all the researched indicators, the sportsmen of 14 years old have twice as little time of simple reaction to light and sound and complex reaction with a choice and without a choice, than the ones of 10 years old. The indicator of tap-test has a stable dynamics of result increase according to age in sportsmen-players. The changes of the indicator of sensomotor reactions with the increase of years are depicted on graphs, represented in Fig. 1-3. As a diagram shows, a decrease of a curve points to reducing time, which is spent during identification of simple reaction of older sportsmen.

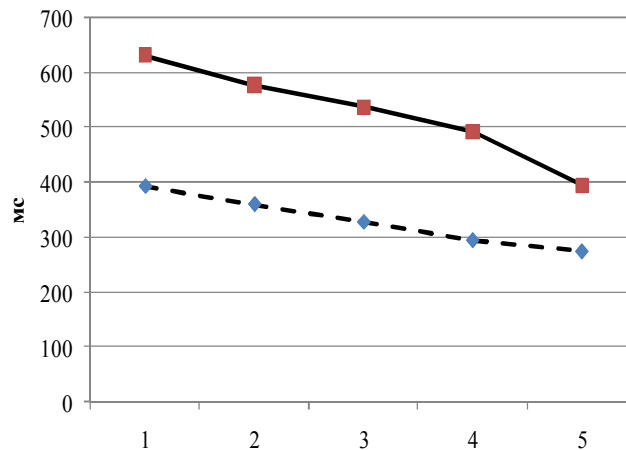


Fig. 1. Division of average time indicators of the simple reaction of sportsmen who go in for those kinds of sport that involve game (n=57):

10. to the sound ; b) to the light .

1 – 10 years (n=10); 2 – 11 years (n=12); 3 – 12 years (n=13); 4 – 13 years (n=12); 5 – 14 years (n=10)

It was also discovered that time of the reaction to the sound is a bit less that time of the reaction to the light for all sportsmen of different age who had been under the experiment. This fact proved the results of the scientists who pointed out this physiological principle [2; 7-9].

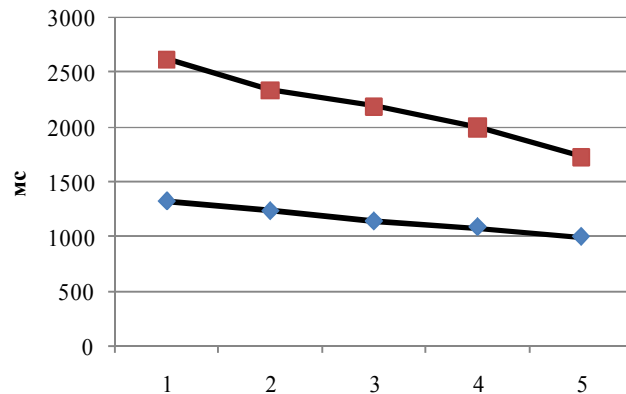


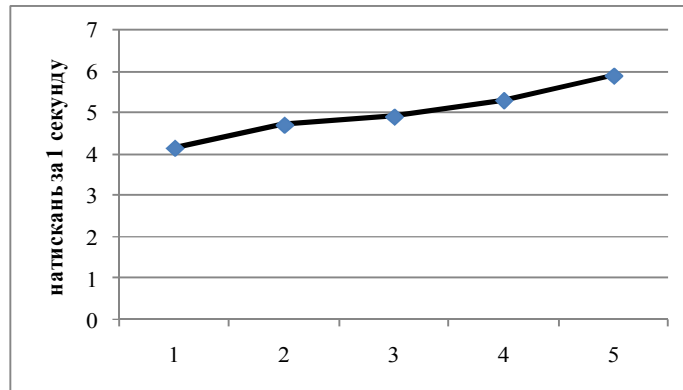
Fig. 2. Division of the average time indicators of the complex reaction among the young sportsmen who go in for those kinds of sport that involve game (n=57):

14. with the choice ; b) without the choice .

1 – 10 years (n=10); 2 – 11 years (n=12); 3 – 12 years (n=13); 4 – 13 years (n=12); 5 – 14 years (n=10)

As we can see from the diagram 2, time of the complex reaction without the choice among sportsmen-players is a bit better than time of the complex reaction with the choice. It is caused by the fact that the sportsman loses molecules on the decision making while making a choice. In its turn, making a decision is caused by neural ligaments and the work of Higher Nervous Activity. Provided that, one can observe the higher age dynamics of the changes, specifically in the complex reaction

with the choice. In another words, 14 years old sportsmen react twice faster in choosing a complex object than 10 years old ones. We explain this with the influence of the trainings, at which sportsmen-players learn not only to react to the moving object, but also to take decisions as for the realization of the tactical situation that follows the action.



(натисків за 1 секунду – presses per 1 sec)

Fig. 3. Results of the testing of the speed of the single actions by means of the tapping-test among the sportsmen who go in for those kinds of sport that involve game (n=57):

1 – 10 years (n=10); 2 – 11 years (n=12); 3 – 12 years (n=13); 4 – 13 years (n=12); 5 – 14 years (n=10)

In such way, the analysis of the time indicators of the simple sensomotor reaction and of the tapping-test shows their dependence on the age of the sportsman and the lack of the dependence on the kind of the game specialization. At the same time, the age indicator also has influence on the development of the complex reaction with and without the choice, but alongside with this, the variation of the sports specialization among the game kinds of sport has its influence as well. Further research of the time of the simple and complex reaction among the sportsmen-players lies in discover of the factors, substantiation of the dependence of these indicators, the level of their influence on the sports result.

It was discovered during the researches that age was one of the main factors of the influence on the development of the simple and complex reaction among the sportsmen-players. Apart from this, the inner-group research of the influence of the indicators of the simple and complex reactions took place. The results (table 4) show that all the criteria under research: x1 – time of the simple reaction on the sound; x2 – time of the simple reaction on the light; x3 – time of the complex reaction with the choice; x4 – time of the complex reaction without the choice; x5 – Tapping Test – have direct connection with one another ($p > 0,001$).

Table 5

Correlative matrix of the inner-group connections of the psychophysiological indicators of the sensomotor reaction among the sportsmen who go in for those kinds of sport that involve game

	x_1	x_2	x_3	x_4	x_5
x_1	1				
x_2	0,93	1			
x_3	0,90	0,95	1		
x_4	0,91	0,92	0,93	1	
x_5	0,92	0,94	0,93	0,92	1

As we can see from the results of the research, one kinds of sensomotor reaction develop alongside with the others.

A regressive analysis that took place in order to detect basic sensomotor reactions that have influence on the sports result allowed us build the following model of the regression for a group of the tennis players (n=27):

$$Y = -4,156 + 0,416x_1 + 0,372x_2 - 0,091x_3 + 0,227x_4 + 0,462x_5$$

We may graphically display the results with the help of the lines of regression in the picture 4.

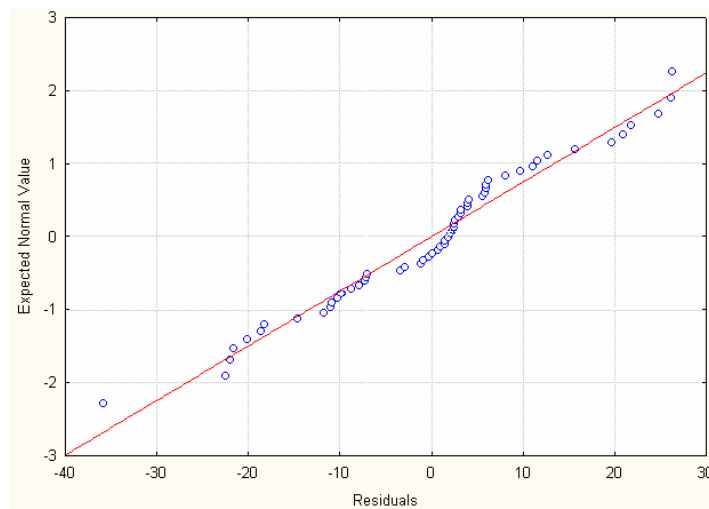


Fig. 4. Regressive division of the indicators of the sensomotor reaction among the young tennis-players (n=27) (picture generated by means of the program STATISTICS 6)

In the fig. 4 we can observe high density of the disposal of the indicators being tested with regard to the line of regression that has the increasing tendency and is in direct proportion. It is a rectilinear simple regression.

With a purpose of substracting the indicators that have the most significant influence on the sports result there was used the method of the back step-by-step regression that allowed us make the following equation:

$$Y = 2,541 + 0,372x_1 + 0,462x_5$$

The analysis allowed us reveal two indicators: x_2 – time of the simple reaction on the sound and x_5 – Tapping Test. So, in order to reach high sports indicators

sportsmen of the provided selection should first of all pay attention to the development of the simple sensomotor reaction on the sound indicator and performance of the simple single motions. Fig. 5 and Fig. 6 display that almost all sportsmen under research entered the limited regression corridor in terms of simple reaction on the sound and Tapping Test. So these indicators have the most significant influence on the sports result for the tennis players.

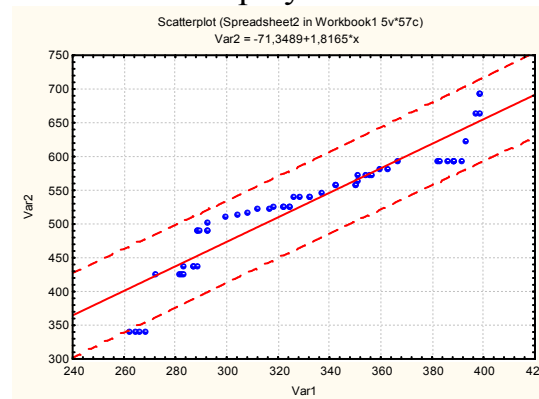


Fig. 5. Regressive analysis of the influence of the time indicator of the simple reaction on the sound (Var2) on the sports result (Var1) among the tennis players

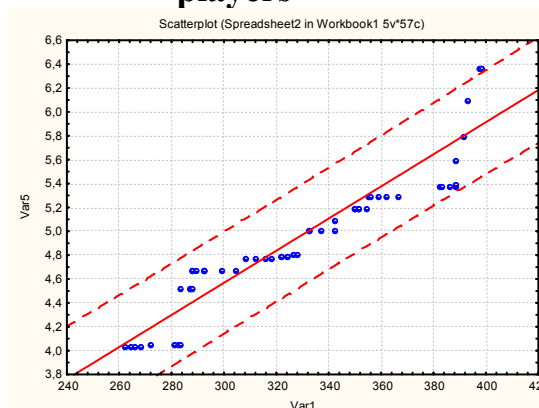


Fig. 6. Regressive analysis of the influence of the time indicator of the tapping-test (Var5) on the sports result (Var1) among the tennis players

There also took place an identical analysis for the group of basketball-players. Regressive analysis allowed us making the following regression equation:

$$Y = -3,562 + 0,441x_1 + 0,254x_2 - 0,391x_3 + 0,227x_4 + 0,162x_5$$

With regards to the indicators of the beta-analysis in the process of making the lines of regression we got a trustworthy level of influence of x_1 – time of the simple reaction on the light; x_3 – time of the complex reaction with the choice; x_4 – time of the complex reaction without the choice – on the sports result. Usage of method of back step-by-step regression allowed us select only those indicators of the sensomotor reaction of the 10-14 year old basket-ball players that have the most significant influence on the sports result and make the following regression equation:

$$Y = 5,627 + 0,367x_1 - 0,533x_3$$

From the model above we can see that the most significant indicators of the basketball-players are x_1 – time of the simple reaction on the light; x_3 – time of the complex reaction with the choice.

Conclusions:

1. The comparative analysis of the indicators of the sensomotor reactions among the sportsmen that go in for basket-ball or tennis indicates the lack of trustworthy difference between time of the simple reaction on the sound stimulus and visual stimulus and trustworthy difference between time of the complex sensomotor reaction with and without the choice. Indicators of the Tapping Test also did not have any reliable differences among the sportsmen-players. In such way, we can affirm that the factor of the sports specialization of the basketball and tennis players has influence on the development of the complex sensomotor reaction with or without the choice. The simple sensomotor reaction and the speed of performing of simple action does not depend upon the sports specialization of the sportsmen-players.

2. Data received during the experiment display the meaningful increase of the time indicator of the simple or complex reaction among the sportsmen-players with their aging. It was revealed that time of the sound reaction is a bit less than time of reaction on the light among all sportsmen of different age groups under experiment; time of the complex reaction without the choice among the sportsmen-players is a bit better than time of the complex reaction with the choice, one may observe the meaningful age dynamics of changes exactly in the complex reaction with the choice. 10-14 years old sportsmen who go in for those kinds of sport that involve game show the stable age dynamics of the quantitative increase of the single actions (buttons pressing) in 1 second.

3. Analysis of the main factors that influence on the development of the simple or complex reaction among the sportsmen who go in for those kinds of sport that involve game indicates the tight connection between the indicators under research. There were indicated two the most influential indicators on the sports result of the tennis players: time of the simple reaction on the sound and Tapping Test. For the basketball-players: time of the simple reaction on the light; time of the complex reaction with the choice. The regressive analysis allowed us make regressive models for the group of tennis and basketball-players.

The perspectives for further researches. The conduction of a further analysis of a development of psycho-physiological time indicators of simple and complex reaction of a researched group with the aim of forming leading sports teams on their bases is at the planning stage.

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Yuriy Petrenko: *Karazin Kharkov National University: Svobody Sq. 4, 61022, Kharkiv, Ukraine.*

ORCID.ORG/0000-0001-8169-88-07

E-mail: Petrenko83@inbox.ru

Yuriy Dudnik: *V. N. Karazin Kharkov National University: Svobody Sq. 4, 61022, Kharkiv, Ukraine.*

E-mail: Petrenko83@inbox.ru

Vitaliy Chernishov: *V. N. Karazin Kharkov National University: Svobody Sq. 4, 61022, Kharkiv, Ukraine.*

E-mail: Petrenko83@inbox.ru

Yulia Petrenko: *Kharkiv State Academy of Physical Culture: Klochkovskaya str. 99, Kharkiv, 61058, Ukraine.*

ORCID.ORG/0000-0002-6549-3729

E-mail: horbatenko@mail.ru

PRONTENKO K.¹, BEZPALIY S.², MIHALCHUK R.³, POPOV S.³

¹Zhitomir military institute by Korolev of State University of telecommunication

²National Academy of Internal Affairs

³Lugansk State University of Internal Affairs by Didorenko

MORFOFUNCTIONAL STATE OF GRADUATING CADETS OF HIGHER MILITARY EDUCATIONAL ESTABLISHMENTS, WHICH WENT IN FOR WEIGHT SPORT DURING STUDYING

Abstract. Purpose: to explore a level and changes of indexes of physical development and functional state of officers of the first age group, which during studying in higher military educational establishment got busy in the section of weight sport. **Material:** the study involved 46 graduating cadets of the Zhytomir military institute in age 22–29 years, which pass service on officer positions in Ukraine Armed Forces during 1–5 years after finishing of studying. **Results:** it is set, that the explored indexes of physical development, functional state and physical health level of officers remain stable during 5 years of service ($R > 0,05$), that provides effective implementation of tasks of military-professional activity. **Conclusions:** the results of research testify to positive influencing of employments by weight sport on maintenance of indexes of health, morfofunctional state and capacity of officers at high level still long time after finishing of studying in military establishment.

Keywords: physical development, functional possibilities, officer, weight sport.

Introduction. In addition to the necessary professional knowledge and skills, a high level of physical and psychological fitness, good physical development and functional state of the main body systems of graduate higher military educational institution (HMEI) is the key to high combat readiness and combat effectiveness of the Armed Forces (AF) of Ukraine [3; 10]. Along with traditional means of physical training in HMEI to improve physical fitness, morphofunctional state of students, enhance their health and motivating them to regular exercise throughout the period of military service may apply kettlebell lifting exercises with a number of positive features: simplicity, accessibility, richness, health-oriented, cost-effectiveness [1; 2; 8 та ін.].

Regular competitions among HMEI of AF of Ukraine in kettlebell sport, reviews - contests for the best organization of physical training and sports-media work in HMEI, servicemen participation in sports day of armies CIS member states, including kettlebell lifting to regional and national sporting events - the facts that confirm high popularity of kettlebell lifting exercises among cadets of HMEI.

Analysis of recent researches and publications showed that the use of kettlebell lifting for the development of physical skills in the military, especially students of HMEI, is of high interest to researchers [2; 5; 7].

In the studies [1; 4; 6; 9] found that regular kettlebell lifting exercises contribute to the effective development of force and total strength endurance, static endurance of the muscles of the body, coordination skills, while promoting a positive influence on the cardiorespiratory system of cadets. Most of the exercises performed with kettlebell with a slope and straightening of the body. Such slopes of varying amplitude in one session can run 200-500 times, which greatly strengthens the back muscles, shoulder girdle, legs, abdominal press - to form a muscular "corset".

A.V. Maglovanyi with coauthors, investigating the impact of kettlebell lifting sessions on the functional state of the students' organisms, found that heart rate during the rest at kettlebellers of high qualification is between $56,7 \pm 6,65$ beats*min⁻¹, indicating a positive impact of studies with kettlebell on cardiac function [8].

D.V. Boiko, V.M. Romanchuk [1] note that due to studies with kettlebell gradually increasing the amount of heart muscle, increasing the network of blood vessels that nourish it; there are changes in structure of blood (increased number of red blood cells, hemoglobin); increases the circumference of the chest, lung capacity; improves the nervous system and mental performance; increases the concentration and sustained attention. In this paper, V.G. Oleshko [4] found that when dealing with a large number of repetitions encumbrances aimed at the development of the cardiovascular system. The results of the author's research show that training with kettlebells helps to reduce heart rate (HR) and stabilize blood pressure at rest.

According to scientists, the response myocardial to stress expressed in bradycardia, and the higher degree of general physical endurance, the more it is expressed. For example, in studies of A.F. Frolov, V.A. Litvinov [7] found that skilled kettlebellers heart rate at rest is 55-56 beats*min⁻¹, which confirms the positive effect of studies with kettlebell on the functionality of the body of cadets.

Yu.D. Chernyavskiy, M.S. Zadorozhnyi, A.V. Cherepov [9] experimentally proved that the application of kettlebell lifting in the learning process of students improves their physical development - eliminate various defects of the body structure (narrow shoulders stoop, disproportionate development), provides a good functional status of the musculoskeletal system (muscle forms "corset") and cardiorespiratory system provides confidence, optimism, promotes good mood.

G.G. Dmitriev, I.Yu. Pugachev, V.E. Shchepinin, conducting research with the personnel of tank, engineering and aviation units, found a strong relationship between productivity of kettlebell lifting studies and efficiency of military professional servicemen [2].

Thus, analysis of scientific works of many scientists showed positive impact of kettlebell lifting studies on students' body, but the issue of study morphofunctional status and health of HMEI graduates who were involved during the learning in this sport, left without sufficient attention of specialists.

Connection of the research with academic programs, themes, plans. The study is part of research department of physical education, special physical training and sports of Zhitomir Military Institute named after S. P. Korolev.

Goal of research: set level and to investigate changes in physical development and functional state of first age group officers, who while studying in HMEI were engaged in kettlebell lifting.

Material and methods of the research: Theoretical analysis and synthesis of the literature, questioning, pedagogical observation, testing, methods of mathematical statistics.

In order to analyze functional state of the servicemen who during studies were engaged in kettlebell lifting, we conducted a survey of officers of the first age group - graduates of Zhitomir Military Institute named after S.P. Korolev (n = 46) who are serving in officer positions within 1-5 years after HMEI. The survey was conducted using questionnaires. The developed questionnaire included questions that officers responding to define their attitude to exercise and sports during the service and noted the indicators of physical development (height, weight, VC, dynamometry hand) and functional status (heart rate, blood pressure) during the last clinical examination, the indices: Quetelet, birth-death, strength, Robinson's; Heart rate recovery time after dosed physical loading (20 squats for 30 seconds) and level of health by the method of G.L. Apanasenko.

Results of the research and its' discussion. On the question of the author's questionnaire "How many hours a week you are engaged physical training and sport (if you plan to 4 hours)?" - 53.2% of officers said they engaged in 4 hours, as planned, and in addition to personal time; 23.9% - 4 hours in accordance with the regulations; 8.7% - 1-3 hours; 15.2% of respondents have their own answer. It is important to note that among interviewed officers, there is no one who is not engaged in physical training and sports. It gives the right to say that kettlebell lifting exercises raise the sense of responsibility for their own level of physical fitness and physical development, and accustomed to regular exercise throughout the period of service for officer positions.

Answering the question "For what purpose are you doing physical exercise and sport?" 43.5% of respondents reported that engaged in order to maintain the level physical preparedness; 26.1% - maintain a level of sports preparedness (about 20% of officers are active athletes and continue to take part in the competition); 17.4% - health promotion; 6.5% - maintain working capacity; 6.5% of officers have given a different answer. It should be noted that the highest percentage of officers involved in order to improve physical fitness, are on the first year of service - 50%, and the highest percentage of those involved to promote health, served in officer positions 5 years.

In studies of Yu.A. Borodin (2004) VM Romanchuk (2007) VM Krasota (2008) indicate a decline in physical health of officers during the service. Thus, the conclusions the authors stated that officers who served in positions 3 years, assess their health as follows: 5% believes it perfect; 20% - good; 35% - average; 30% - satisfactory; 10% - poor. Analyzing the results of response officers who during

studying in HMEI were engaged in kettlebell lifting, the question "How would you rate your health?" Can be determined that 16.1% of officers believe their health is ideal, 60% - good; 15.2% - average; 4.3% - satisfactory; 4.4% of officers have a different opinion. At the same time none of the of officers did not appreciate my health unsatisfactory.

In order to study the physical development of officers who during the study were engaged in kettlebell lifting, we analyzed the following parameters: Quetelet index, birth-death ratio and strength index (Table. 1). Analysis of Quetelet ratio allows to note that during 1-5th years of service, the average value of this indicator for officers remain stable: the 5th year of service value of Quetelet index was not significantly different from similar indicators 1-4 th years ($P > 0,05$), indicating an even distribution of weight and stature of officers during the service (Table. 1). It is important to note that the Quetelet index for all years of service is characterized as "good" for men.

Table 1

Indicators of physical development of officers who during their studies in HMEI were engaged in kettlebell lifting (n=46)

Year of military service	1	2	3	4	5 or more
n	10	9	7	9	11
Quetelet index (g/cm)					
\bar{X}	402,5	403,1	402,7	403,9	404,1
$\pm m$	7,55	10,27	7,02	6,08	9,00
Birth-death ratio (ml/kg)					
\bar{X}	61,60	61,90	61,17	61,29	61,69
$\pm m$	1,72	2,14	1,35	1,85	2,28
Strength index (%)					
\bar{X}	79,06	79,53	79,44	79,69	79,61
$\pm m$	3,51	3,61	2,38	1,80	3,02

The study of values of birth-death ratio of officers gives the right to say about its insignificant improvement on 2nd-year of service ($P > 0.05$), a slight decrease on the 3rd year ($P > 0.05$) and insignificant improvement on the 4th and 5th years of service ($P > 0.05$) (Table. 1). It should be noted that in 1-5 years of service value of birth-death ratio of officers who during their studies in HMEI were engaged in kettlebell lifting, is rated as "above average", indicating a high level of functionality of the respiratory system.

The analysis of strength index - the ratio of dynamometry stronger hand to body weight - allows you to mention unreliable indicators of improvement during the five years of service ($P > 0.05$): indicator of 5-year exceeds first by 0.55% ($P > 0.05$) (Table. 1). At the same time reserve level of functions of officers' musculoskeletal system during 1-5th years of service is rated as "higher than average".

Functional status of officers was assessed by indicators of Robinson's index and heart rate recovery time after 20 squats in 30 seconds.

The study of Robinson's Index showed that indicators of 1-5 th years of service between them were not significantly different ($P > 0.05$). Indicators functionality cardiovascular officers for five years of service are at "higher than average", which indicates a high level of cardiovascular of officers who were engaged in kettlebell lifting during the study (Table. 2).

Analysis of heart rate recovery time for officers to original level after 20 squats in 30 seconds to note about insignificant deterioration in this indicator 1-5 th years of service ($P > 0.05$) (Table. 2). Average value of heart rate recovery time for officers over five years is estimated as "above average", indicating the superior functionality of the cardiovascular system officers who during the study were engaged in kettlebell lifting (Table. 2).

The level of physical health of officers who during their studies in HMEI were engaged in kettlebell lifting is fairly stable and does not change during the five years of service ($P > 0.05$) - at officers of the 5th year of service his indicator (10.48 points) by only 0.62 points lower compared with the rate of officers of the 1st year of service (11.10 points) ($P > 0.05$) (Table. 2, Fig. 1).

According to the methodology proposed by G.L. Apanasenko, level of physical health of officers on 1-5 th years of service is rated as "average".

Analysis of physical development, functional status and level of physical health of officers who during their studies in HMEI were engaged in kettlebell lifting, showed that all the studied parameters were not significantly changed during the five years of service ($P > 0.05$). This underlines the positive impact of kettlebell lifting sessions on maintaining functional state, health and working capacity of officers at a high level for a long time after graduation from HMEI.

Table 2

Indicators of functional state of officers who during their studies in HMEI were engaged in kettlebell lifting (n = 46)

Year of military service	1	2	3	4	5 or more
n	10	9	7	9	11
Robinson's Index(cu)					
\bar{X}	80,87	81,34	81,25	81,27	81,71
$\pm m$	2,15	1,42	2,24	2,44	1,95
Heart rate recovery time (s)					
\bar{X}	81,4	81,67	82,14	82,22	82,27
$\pm m$	5,48	6,62	9,98	7,61	5,58
he level of physical health (points)					
\bar{X}	11,10	11,07	10,63	10,64	10,48
$\pm m$	1,15	1,70	1,09	1,24	1,21

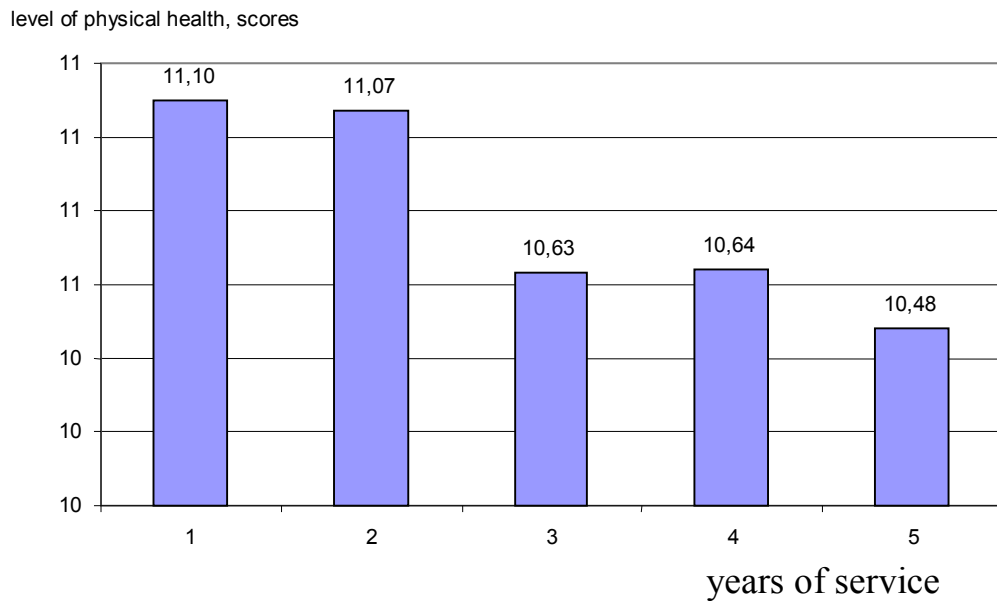


Fig. 1 The level of physical health of officers of 1-5th years of service who during the study were engaged in kettlebell lifting (n = 46 points)

Conclusions. Was established that officers who during their studies in HMEI were engaged in kettlebell lifting, have a high level of physical development, functional status and physical health, providing effective implementation tasks of military occupation. Thus indicators studied have significantly stable value within 1-5 th years of service ($P > 0.05$).

Prospects for further research is a comparative analysis of physical development, functional status and health status of students who during their studies were engaged in kettlebell lifting, and students who worked under the current program of physical training in HMEI.

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Kostiantyn Prontenko: *PhD (Physical Education and Sport); Zhitomir military institute by Korolev of State University of telecommunication: Mira ave. 22, Zhitomir, 10023, Ukraine.*

ORCID.ORG/0000-0002-0588-8753

E-mail: prontenko-kostya@mail.ru

Sergiy Bezpalyy: *PhD (Physical Education and Sport); National Academy of Internal Affairs: Sq. Solomenskaya 1, Kiev, 03035, Ukraine.*

E-mail: s_bezpaluy@mail.ru

Roman Mihalchuk: *Lugansk State University of Internal Affairs by Didorenko: General Didorenko street, 4, Yubileynoye, Lugansk, 91493, Ukraine.*

E-mail: mihalchuk.roman61@mail.ru

Sergiy Popov: *PhD (Pedagogics); Lugansk State University of Internal Affairs by Didorenko: General Didorenko street, 4, Yubileynoye, Lugansk, 91493, Ukraine.*

ORCID.ORG/0000-0001-9299-1232

E-mail: s5220501@ukr.net

PYATNYCHUK G.

Vasil Stefanyk Precarpathian National University

EVALUATION OF INFLUENCE OF TRACK AND FIELD ATHLETICS ON SPEED-STRENGTH PERFORMANCE OF STUDENTS DURING THE SCHOOL WEEK

Abstract. Purpose: *the aim was to evaluate the influence of the athletics on the dynamics of speed and power performance of students during the school week. Material and methods:* *were surveyed 205 students who studied at 1–5 courses of Vasil Stefanyk Precarpathian National University. Results:* *introduction to the process of physical education students means track and field athletics during the year resulted in positive changes in the level of development and manifestation of their physical qualities during the school week. Conclusions:* *studying the dynamics of speed and power abilities in students during the school year requires further study.*

Keywords: *students, school week, speed-strength performance, athletics.*

Introduction. The decrease of students' health is based on the intensiveness of educational activity, which is characterized by high mental and neuro-emotional stresses. However, the stress becomes progressive because of increasing of information scope and the computerization of education. The lack of physical activity during the hours-long classes produces the abnormality of the activity of musculo-skeletal system. Meanwhile, students' free time consists of doing the home tasks or having a passive rest. But such level of physical activity, which is necessary for the full development of the human body can't be achieved only by two classes of physical training per week [2].

The situation is complicated by the fact that students suffer from hypodynamia during the learning process. There are many problems and various diseases in a number of human systems and organs. Overstrain of a person is often due to a lack of attention to the individual physiological characteristics, ignoring of the day regimen and learning environment. The increase of study load lead to the decrease of physical and mental capability that affects the physical development and the state of health. This confirms the necessity of studying the functionality of the organism during the students' adaptation to living conditions and learning environment [5].

The process of tiredness must occur during the classes at universities and be accompanied by numerous internal (changes of psychological state, changes of living conditions including the adaptation to learning at university, decrease of physical activity, certain social habits, the changing kind of food) and external (increase of study load, the socio-economic situation provoking the emergence of adaptive responses) factors that lead to decrease of students' physical qualities.

The effects of the works about students' working capacity prove the existence

of its progressive deterioration during the studying at universities. These facts suggest the necessity of research duration and searching the causes and mechanisms of correction of physical and functional training. The analysis of the relationship and their orientation between the level of development and finding the basic students' physical properties and performance during studying at universities is also in prospect.

The national and foreign scientists' researches in the last decade take up the position that about 50% of students have the health problems. Their real amplitude of motor activity does not provide their full development [2; 5].

Expanding of the range of students' athletic ability helps to improve the adaptive capacity of the organism to ongoing mental load by optimizing the functioning of the major body systems that ultimately will help to rationalize the students' activity and increase the resistance to neuro-emotional stress.

Students' working capacity has changes per day, week, semester and whole academic year under the influence of educational and working activity. The continuance, the depth and the direction of these changes are defined by the functional state of organism before the work starts, especially the work itself, its organization and other factors [4].

There are some thoughts that the representative curve of the students' week ability to work can be changed by the factor of neuro-emotional stress which accompanies the work during a few days of the week in a row. Thus, the students who had to take part in the final class write a quiz and take the test on a specialty during the first three days of a week went through a great academic load and emotional stress that bring the high decrease of working ability at the beginning of the week. The usual academic loads of the next days were rather easy for the students; they effectively stimulated the renewal of working ability with the appearance of supercompensation phase on Saturday. The typical dynamics of working ability during the academic year may also be different because of increasing the number of classes of physical training to 4-5 per day [1; 3].

So, we can come to conclusion that the level of students' working capacity during the academic week needs the further research, and the changes need the effective methods and devices of their correction.

The relation between academic programs, plans, themes. This work is based on the plan of scientific researches of Prekarpatkiy National University of V. Stefanyk and it is a part of complex scientific topic of the physical rehabilitation faculty of physical training and sports "The use of drug-free remedies and natural factors for improving of physical development, functional and physical fitness of the body", the number of state registration is 0110U001671.

Research goal: evaluating the influence of track-and-field athletics methods on the dynamics of students' speed and power capability during the academic week.

Material and methods. 205 students of Prekarpatkiy National University of V. Stefanyk were examined to achieve the goal of the research. There were 42 first-year students (20 boys and 22 girls, middle age – $17,5 \pm 0,4$ years), 41 second-year students (19 boys and 22 girls, middle age – $18,7 \pm 0,6$ years), 44 third-year students (20 boys and 24 girls, middle age – $19,7 \pm 0,4$ years), 40 fourth-year students (18 boys and 22 girls, middle age $20,6 \pm 0,4$ years) and 38 fifth-year students (18 boys and 20 girls, middle age $21,9 \pm 0,5$ years). All of them were divided into two equal age and

gender groups by the blind randomized selection. The first group (the basic group (BG)) consisted of 104 students from 1-5 courses (48 boys and 56 girls) who studied by the program with track-and-field athletics means. According to the influence of athletics exercises on the students' bodies we chose such kinds of athletics exercises like racewalking, sprint, relay race, long jump and pitching. The experiment had been going on during 2012-2013 academic years, from September to June. Classes were held three times a week as elective ones for students of all courses. Every class had a period of 2 hours.

The program of physical education in universities focuses on students' free choice of type of motor activity that is why the comparison group (CG) included students who did not use athletic exercises during their physical training. The CG consisted of 101 students from 1-5 courses (47 boys and 54 girls).

K₃₀ Test was applied to complex evaluation of speed-strength qualities. The students had to run 30 from a standing start using their maximum possible speed and then, without stopping, long jump with a landing to the jumping pit. The test result was calculated by the formula:

$$K_{30}=(S \cdot t) / 30,$$

where S – the result of long jump (cm)

t – the time of test including the jump (sec)

Results and discussion. The results of a complex evaluation of students' speed-strength abilities (SSA) received by K₃₀ Test showed that there were no changes in dynamics of SSA of students from the BG and the CG during the period from September to November, including the last month.. However, in December the first differences in level of SSA demonstration were observed in the BG. Such trend also had observed later, and since March the difference between the students' indexes from the BG was authentic. The results of the SSA dynamics of the students during the academic week after the experiment are shown in Table 1.

Table 1
K₃₀ Test results (M±m), cu

Study year (course)		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
I	BG	92,4±1,5	91,6±1,3	90,7±1,4	89,4±1,8*	87,6±1,5**	I
	CG	93,3±1,3	90,4±1,4	81,7±1,3 [•]	78,5±1,1 [•]	65,9±0,9 [•]	
II	BG	99,8±1,5	98,1±1,4	97,5±1,8*	96,8±1,6**	95,3±1,4***	II
	CG	101,5±1,8	94,2±1,8	83,8±1,2 [•]	76,3±1,4 [•]	63,6±0,7 [•]	
III	BG	110,8±2,1	108,7±2,5	107,4±2,7	106,9±2,2*	104,8±2,4**	III
	CG	109,7±2,1	104,3±2,1	106,6±1,9	92,7±1,5 [•]	78,8±1,4 [•]	
IV	BG	116,9±2,8**	114,5±2,6	113,5±2,9	111,7±2,4	109,4±2,1*	IV
	CG	98,4±1,8	108,5±2,4 [•]	117,7±2,0 [•]	104,7±1,9	97,2±1,5	
V	BG	122,7±2,4**	120,4±2,3	120,7±2,2	119,3±2,7	117,4±2,4**	V
	CG	105,3±1,6	114,4±2,1 [•]	124,1±2,6 [•]	115,8±1,8 [•]	99,9±1,7	

Note. The chance of index differences in comparison with the same ones in the CG: * – $p < 0,05$; ** – $P < 0,01$; *** – $P < 0,001$. The chance of index differences in comparison with the same ones at the beginning week: [•] – $p < 0,05$.

The analysis of the received SSA indexes in an academic week showed that first-year students of the BG values had the stable SSA indexes, in spite of some rare lowering at the end of the week, and on Friday these indexes were significantly different from those of the CG ($87.6 \pm 1,5$ cu against $65,9 \pm 0,9$ cu; $p < 0,01$) (Table 1.).

The second-year students from the BG had the same pattern, the average SSA indexes were stable too, although there was a tendency to their decrease during the working week, besides on Friday the SSA index of the BG was significantly higher in comparison with the same one in the CG ($95,3 \pm 1,4$ cu against $63,6 \pm 0,7$ cu.; $p < 0,001$).

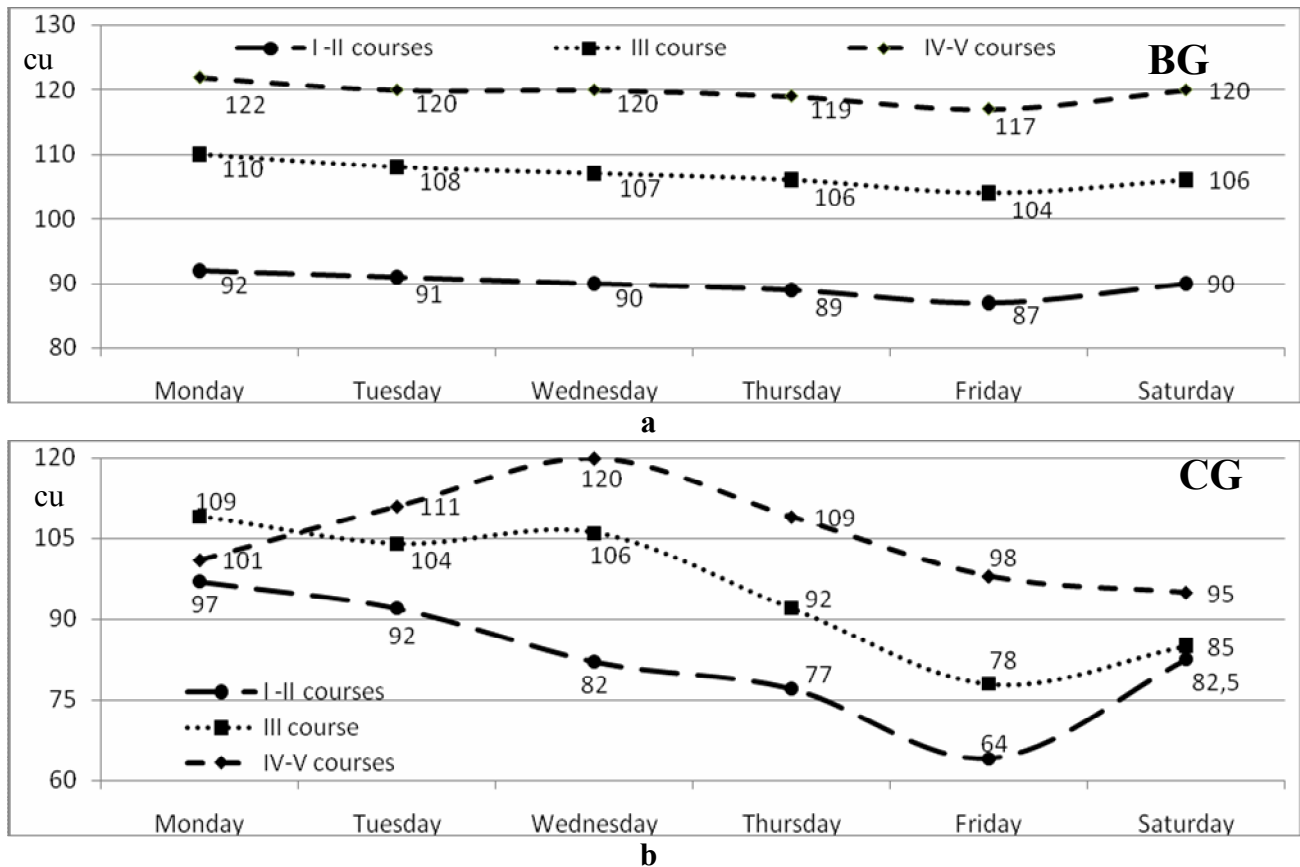
The average SSA indexes of the third-year students of the BG did not differ among themselves, and the SSA index of the BG was significantly higher than the same one in the CG at the end of the week, on Friday ($104,8 \pm 2,4$ cu against $78,8 \pm 1,4$ cu; $p < 0,01$).

The SSA index of the fourth-year students' from the BG also was stable during the week, and on Friday and Saturday it was rather higher than that of the CG ($109,4 \pm 2,1$ cu against $97,2 \pm 1,5$; $p < 0,05$ and thus, $113,9 \pm 2,2$ cu against $94,4 \pm 1,5$ cu; $p < 0,01$).

The SSA index of the fifth-year students' from the BG also were tended to decrease during the week but there were no statistical changes in comparison with the previous indexes at the beginning of the week, moreover, the SSA index of the students from the BG was significantly higher than the similar students' index of the CG ($120,7 \pm 2,8$ cu against $96,2 \pm 1,7$ cu; $p < 0,001$).

We received the results that allowed producing methodological approach of using the track-and-field athletics during students' physical training in relation to the period of their study (course). Because of the prevail influence of athletics exercises on the basic indexes of body's activity the proportion of doing certain kinds of exercises was identified for students of every courses, and the athletics classes were given by three stages, which were aimed at the formation the required level of general and special physical trainings, the initial training of certain exercises and the proximate training and improvement of the exercise technique, which became the novelty of the research

The diagram of the SSA dynamics of the students from the basic and comparison groups after the experiment is represented at pic. 1. The analysis of the diagram of the SSA dynamics during the academic week showed that the students of 1-5 courses from the basic group had the horizontal and rectilinear dynamic curve which did not differ among the students of various courses.



Pic. 1 The diagram of the SSA dynamics of the students from the basic (a) and comparison (b) groups during the academic week after the experiment.

Conclusions. The estimation of the SSAs of the students from 1-5 courses and their dynamics during the academic week showed that the parameters of the basic group were kept at the same level, although there was a tendency to their decrease at the end of the week. Moreover, the speed-strength abilities of the students from the basic group were significantly higher at the end of the week than the same ones from the comparison group.

The further perspective is the exploration of the dynamics of students' speed-strength abilities during the academic year and identifying their role of the athletics tools correcting.

Recommendation. According to the results the development of the students' speed-strength abilities during the academic week should be determined. For this purpose there is an effective, simple and informative K_{30} Test results of which gives express train-estimation of the development of the studied parameters. Such results and their consideration week are appropriate for the effective planning of educational training week.

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Halyna Pyatnychuk: *Vasil Stefanyk Precarpathian National University: Shevchenko street 57, Ivano-Frankivsk, 76018, Ukraine.*

E-mail: halinapy@gmail.com

ROVNIY A.¹, ROVNA O.¹, GALIMSKYI V.²

¹*Kharkiv State Academy of Physical Culture*

²*Kirovograd Flight Academy of National Aviation University*

THE ROLE OF SENSORY SYSTEMS IN THE CONTROL OF ATHLETES' COMPLEX-COORDINATED MOVEMENTS

Abstract. Purpose: *to determine the mechanism of the sensory motor control human system approach, based on the theory of functional systems* **Materials and methods:** *analysis and generalization of scientific works of 60 native and foreign authors.* **Results:** *It was found that motor control involves all sensory systems, but the dominant role is played by one sensory system or its separate function. Others play a complementary role.* **Conclusions:** *A complex intra- and inter-system communication of sensory systems as a main coordinator in motor control.*

Keywords: *sensory systems, control of human movements.*

Introduction. Taking into account that in control of motions a major role sensory systems play, from the point of view of theory of the functional systems, systematic approach to the systems must be dominant. Consequently, an afferent synthesis forms activity of acceptor of action, as a result every component of the motions control functions as component part of formation of purposeful activity of man.

It is established that in the process of formation of motor skills leading role is played, by turns, of visual and motor sensor systems [5; 19]. However, not yet enough researches were conducted of the functional state of the sensory systems, their correlations in a control of precise motions and, at the same time up to date there are no conceptions of physiological mechanisms to determine reliability of functioning of the sensory systems and their intercommunication at implementation of precise motions in the conditions of deficit of time on a background nervously-emotional tension of sporting activity.

In interpretation of analysis of results of research of role of the sensory systems in a control of precise motions there are contradictions in understanding of their meaning, that is a reason of absence of methodological principle of research of the sensory systems role in control of precise motions.

It is established that exactness of motions depends on psycho-physiological functions, because with the increase of level of motive experience individual functional activity of these functions increases during motive activity [25; 30; 31]. Consequently, a study of mechanisms of variability of sensory control of precise motions is a modern and live issue.

A research goal consists in theoretical research of psycho-physiological mechanisms of system organization of sensory control of correct motions of sportsmen in the conditions of deficit of time of competition activity.

Material and research methods : analysis and generalization of scientific data of 60 domestic and foreign authors.

Research results and their discussion. Examining the question of meaning of the sensory systems in forming of motions and their control, is well-proven that their role in these processes is complicated and weightily. Foremost, forming and management of motions is carried out due to the presence of two-way communication (afferent and efferent) between a cerebrum and managing organ of formation of motion – by muscles. Impulses, arising up in muscles, reach at nervous centers along afferent ways and carry information to brain on the state working organ, and also enable to organize its work most rationally. Without this feed-back which is characterized as a "muscular feeling", the co-coordinating role of CNS can not be carried out.

Terms "muscular sense", " kinesthesia", "muscularly- joint sensitiveness" are perceived by a number of researchers as a computer-integrated index of feelings. It allows to evaluate not only a motor act on the whole but also its separate properties – quickness, force, direction, rate [8; 13; 16; 17].

Signals, coming from the different sensory systems, arise up on the basis of analysis- synthetic activity of cortex of large hemispheres as a single "complex analyzer". The degree of participation of every sensory system in a control of motions changes in ontogenesis, and also as far as perfection of motor skills.

A man can perceive information from a few sensory systems simultaneously, if the total volume of sensations does not exceed his possibility [10; 15]. However, this simultaneous entry of information is not always positive. In similar instances organism of man regulates itself entry of information by the temporal "shutdown" of some sensory systems. This shutdown activates considerably the main, in this case, sensory system. The mechanism of such shutdown of superfluous information is shown in works [1; 23; 33]. It was well-proven that the shutdown of visual information activates the motor sensory system and provides accuracy of execution of precise motions.

From position of modern scientific views forming and control of motions is a complicated self-regulating process by alternating switching on separate muscular groups and stipulating systems. Basis of such judgments are studies of I. M. Sechenov, who asserts, that a process of self-regulation of functions is none other than the sum of return reflex reactions on an external irritation. In future this theory of self-regulation was developed in the studies of I. P. Pavlov about conditioned reflexes.

Developing the studies of I. M. Sechenov and I. M. Pavlov M. A. Bertshtein created the theory of construction of motions and theory of activity (1966), which exposes the mechanisms of control of motions more extensively .

An analogical ideas on organization of motive acts [32] in which accordance of eisdic information and " reference image" is grounded in composition of managerial system of motor actions.

Thus, there is not a single theory of physiological mechanisms of adjusting of motions, although there is a number of hypotheses. Therefore, in our view, for

understanding of mechanism of sensory control of motions one needs to consider the role of the separate sensory systems and their co-operation in the process of control of motions.

First and foremost, it is necessary to note the role of kinesthesia in the process of formation and control of motions.

Long before I. M. Sechenov spoke out opinion that the muscular sensation is an analyzer of time and space and it activates other sensory systems. "A muscle is an effective organ, our working organ and at the same time native, primary organ of sensations, building up all other sense-organs" by an order of its own properties. [27].

A concept about the sensory mechanisms of adjusting is related to discovery of adjusting of activity of muscular receptors outside CNS. It is established that it is possible to accelerate, slow down or terminate charges of muscular spindle under irritation of inhibitory structures of brainstem, i.e. to control sensory processes.

In acts of sensory systems an important factor is principle of dominant which is formed as a complicated aggregate of the analyzer systems. Its separate elements can be widespread in CNS, while then in an aggregate they are the single dominant setting. Tuning up the sensory systems constantly connect with proprioceptive afferentation and provides not only signaling about co-ordination of motions but also carries out the important function of measuring time and space [11; 15].

It is established by researches, that such adjusting of systems shows up in the functional association of the sensory systems in a single complex with formation in it one or a few leading links.

It was known, that between these links on the different levels of CNS there are ties which play a different role in the display of motor act.

It is well-proven that an integral role belongs to the motor sensory system in providing of interanalyzer co-operations. Value of every sensory system, its part in providing motor acts is determined by the stage of their origin and their complication [20; 21].

A large practical importance is the research of influence of specific character of complex motive activity on the functional state of the sensory systems. Proceeding from that fact that the level of sensitiveness of the episodic systems rises under influence of motive activity [25; 26], one may suppose that the specificity of sports activity lays on an imprint on the sensitiveness of the episodic systems, i.e. the certain level of the sensory systems corresponds to the certain type of sporting activity.

The study of this problem has a large practical meaning for selection in sports. Already there were attempts to solve this problem, however materials of researches carry contradictory character. So, L. B. Gubman [7], investigating exactness of reproducing of spatial parameters of motion for the sportsmen of different specializations (skiers, volleyball- players , basketball-players, gymnasts, athletes), asserts that the best indexes of sensitiveness of complex muscles are observed for athletes and sportsmen of game types of sport. According data of F. M. Talishev [29], the decathlon-athletes possess the most sensitiveness of the motive sensory system .

Contradictions of these materials of researches are explained by the fact that the authors investigated activity of the sensory systems by determination of absolute

thresholds of sensitiveness, characterizing the state of most pickoffs of the sensory systems, and which are beyond measure of variable values as a result of influence of the different factors non-accepted into account.

Applying the methods of different sensitiveness, A. S. Rovniy [22] showed that the specificity of motive activity influences on sensory functions. At determination of thresholds of sensitiveness at gradual increasing in weight sportsmen feel better weight in ranges, corresponding to weight of sports facilities.

In the process of the long-term system of preparation of sportsmen the level of perception of the kinesthetic system and its biological stability rises in the process of competition activity. Training on endurance considerably reduces the level of kinesthetic perception, and the training tasks of tactic-technique direction promote the level of functional activity of the motive sensory system considerably.

It is established that during execution of motions of complicated coordinations structural changes take place in the sensory element itself of muscles. So, in works [12; 19] it is shown that sportive motions, which are directed to achievement of high sporting results are carried out due to the special mechanisms, providing exactness of execution. The system co-operation of muscles in a motive act is carried out due to the transmission of energy in the separate phases of motion and the using it in subsequent ones.

A considerable role in adjusting of arbitrary movements belongs to the visual sensory system. It is established by researches, that effectiveness of exact motions in sport depends on instantaneous and exact perception of the program of motive actions.

It is known that 90% of all information, coming from outward world, a man perceives through the visual sensory system [26]. This position is confirmed in researches which read that training of exactness of motions gets better in that case, when "urgent visual information" is used about the results of motive activity.

In researches of I. Belyaev (1972) the leading role of the visual system was established at the rapid throwing of rings on a bar. It was shown that the volume of exactness of instantaneous visual information considerably influences on final result of motive activity.

After development of versatile methods (A. V. Zavialocv, 1969) many researches of sensitiveness of the visual sensory system are conducted depending on the orientation of the training loading. So, it is shown in researches (V. P. Zavadskiy, 1997; A. S. Rovniy, 1998, 2000), that the level of functional activity of the visual system rises under influence of complex and coordinated motions of speed-power orientation, but while exacting cyclic exercises on endurance, slow down considerably.

In researches N. V. Makarenko (1995) it is established, that critical frequency of confluence of flashings (CFCF) is the objective index of functional activity of not only the visual system but also CNS. Analyzing connection of indexes of CFCF and exactness of motions, it is established that the level of activity of the visual sensory system provides urgent and exact rebuilding of the motive program of motive activity.

Presently there is an issue to be researched about existence of integral central organization, carrying out connection between perception and motions, sensority and motility. The results of developing of semantic information showed prematurely of localization of general processes in the visual sensory system of N. Medvedev (1967) when researching the functional activity of the sensory systems for shooters it was established that after dark adaptation speed of recognition of object rose and exactness of firing became better.

Heterogeneous influence changes such sensory function, as CFCF, and subject perception (E. Cafarelli, 1992; D. Laming, 1985).

The analysis of the research of materials of sensory activity of the visual system educed, that in most cases only one its function was investigated.

Highly actual issue is research of functional possibilities of the sensory systems. However, in literature there are no researches, touching of the complex research of clearance capabilities of the visual sensory system. Some researches touch both the functions of the visual sensory system and peripheral and deep sight. However, (differential sensitiveness) and unclear adaptation is of an importance. These functions are expounded in works of A. S Rovniy [20].

In sporting activity quality of control of motions depends on objective perception and estimation of external information through the tactile sensory system (A. M. Pudorya, 1992).

In understanding of mechanism of perception an important sense has an exchange of information. In this connection there is a need for the differential approach to the evaluation of activity of the sensory system This change of information can take place in the different links of the sensory system. The errors of perception of information are corrected gradually with the accumulation of motive experience, with the increase of level of motive experience, with appearance of motor skill, when the factors of environment (loading, change of climatic conditions and the like) change exactness of perception of information in less degree.

Analyzing materials of researches, exposing the role of the sensory systems in the control of motions, the role of interaction of kinesthesia , visual, auditory, tactile systems is visible (V. N. Zabatsky, 1997; A. V. Zavialov, 1990; M. Y. Trestles, 1991; A. S Rovniy, 2002).

It needs to underline that all motions in sport are executed on a background of very strong vestibular irritations, influencing not only on the sensory systems, muscular system but also on the vegetative systems which provide motive activity (V. Strelets, 1996; A. S. Rovniy , 2012).

A vestibular system is the multidimensional biological system which transforms mechanical energy of angular and rectilinear accelerations in signals about a location and motion of separate links of body of man in space, in a state of rest and during motive activity (V. N. Babniak and others, 1990; K. V. Gerasimov, 1995). It is the only sensory system, which continuously functions in an organism, perceives direction of gravity forces and accelerations, which arise up when changing position of head and moving the body in space (V. Strelets, 1996;U. K. Yanov, 1995).

The new stage of researches of the vestibular system is related to flights of man in outer space. Discovery of cybernetic principles of control of physiological functions of living organisms by R. Wiener (1983) and working out by P. K. Anokhin of theory of the functional systems allowed to study the functions of the vestibular sensory system in the position of the systematic approach.

Thus, in accordance with modern scientific positions the vestibular system is examined not as the separate sensory system, but as element of the stato-kinetic system of organism, which provides a synthesis of vestibular, proprioceptive, visual, dermic-arthral interoreceptive afferentation with the aim of forming of final result – balance and withholding of body's pose .

Vestibular receptors do not have an influence on effector organs. Therefore this system does not take part in activating of emotionally-motivational mechanisms and does not determine the conduct of man. That substantially distinguishes the vestibular sensory system from auditory and visual sensory systems, and also from internal receptors, supporting a homoeostasis. By the same fact of its role and place is explained in the functional systems when executing of active arbitrary movements. A vestibular impulse enters anatomic centers only in a situational but not trigger afferentation. At the same time vestibular information has a considerable impact on an eisdic synthesis in the systems of organism by which provides these systems exact implementation of motive tasks [30].

Activity of the vestibular system is controlled by the cortex of large hemispheres of cerebrum, as a result of that the certain form of equilibrium is set between an external and internal environment.

The different degree of the corticular adjusting of vestibular function is determined in the feature of vestibular reactions on an irritation. The adequate irritant of vestibular system is angular, rectilineal and complicated cariole accelerations, and also force of gravitation [29]. It is established in researches of the last years, that acoustic signals up to 16 KGHs is an adequate irritant along with accelerations, vibrations, magnetic fields and some toxic matters (V. A. Dubovik , 1996). Under the adequate irritation of the vestibular system come into being three types of reaction: vestibule-sensory, vestibule-somatic and vestibular-vegetative K. V. Gerasimov, 1995; O. P. Zholtova, 1987).

Vestibular reactions have a unequal meaning in everyday vital functions of people. Vestibular-vegetative and vestibular-sensory reactions have a ponderable meaning. Their violations cause discomfort in an organism, that reduces a capacity, and sensory reflexes violate the orientation of man in space.

Thus, the versatility of vestibular functions provides their major role in maintenance of vital functions and control of motions [36].

Sporting science and practice was enriched by new results about the role of the vestibular sensory system in providing of motive activity in such types of sport of complicated coordination , as acrobatics, figure-skating, diving, ski jumping, , slalom, freestyle and others [36; 38].

The function of the vestibular sensory system was fully expounded as a multidimensional transformer of mechanical energy of angular and linear

accelerations in signals about position and travel of body in space, and also simultaneous performer of function of equilibrium and spatial orientation [12].

One of founders of physiology of sport of A. M.Krestovnikov [16] suggested to introduce into practical labirintology a term "vestibular stability", i.e. stability to the vestibular irritations.

In researches [31] it is shown that the increase of vestibular stability is possible due to the special training. Quantitative description of indexes of vestibular stability is related to the level of vegetative, somatic, sensory reactions, arising up as a result of irritations of vestibular system [36]. Along with a term "vestibular stability" in scientific publications a term is read as "statodynamic stability" [35].

Term "statodynamic stability" characterizes ability of the functional system to keep stable activity at the passive and active moving of body in space [39].

Principles of training of vestibular vehicle were especially clearly formulated in those types of sport, where co-ordination of motions has a main sense [12].

A considerable contribution to development of sportive vestibulotomy was made by [6; 21].

One of major descriptions of the functional state of the vestibular sensory system is a correlation of a sensitiveness and stability to the adequate irritants. It is established that vestibular stability increases with the perfection of sportive skill, especially in those types of sport, in which motive activity is related to the vestibular irritants [37; 39]. The specific features of motive activity in many types of sport make high demands not only to vestibular stability but also to its sensitiveness, i.e. capabilities to react on minimum (threshold) of irritations [5].

Thus, between the indexes of stability and threshold of sensitiveness of the vestibular sensory system in the process of the systematic trainings reverse dependence is created: at the stability increase the threshold of excitation rises. It testifies to high plasticity of nervous processes of cerebrum, what do provides an adequate reaction on an irritation [21]. Such state between stability and sensitiveness of the vestibular sensory system takes place only in case of sportsmen.

Thus, the specific features of sporting activity stipulate formation of various correlations of stability and sensitiveness of the vestibular sensory system as for the sportsmen of different specialization. This conformity to natural laws acquires an important practical meaning. Trainings of vestibular system are conducted not in general, but strictly differentiatly taking into account sporting specialization.

During execution of sporting exercises of complicated coordination permanent co-operation of proprioceptive and vestibular sensory systems is observed. Its co-operation at the simultaneous irritation of kinesthetic and vestibular systems shows up in reduction of duration of nystagmus, in diminishing of amplitude of protective motions, reduction of duration of illusion of acquisition, decline level of vegetative reactions [39]. The physiological mechanism of this phenomenon consists in what, that at the simultaneous irritation of proprioception and vestibular system proprioception subordinates impulsiveness of the vestibular system and inhibits its reactions and thus provides the execution of motive acts [40].

These conformities to laws explain implementation of difficult motive acts of sportsmen, possessing low vestibular stability.

It is established that the moderate muscular loads assist the decline of vestibulomotor and vestibulovegetative reactions. Extraordinarily strong vestibular irritations cause the decline of exactness of motions, decline of capacity, that testifies to change of tone and excitability of muscles, worsening of differentiation of time's intervals [14]. Besides, it is established that under influence of impulsation coming from vestibular system the speed endurance increases, maximal frequency of motions and duration of static effort rises, that warns a fatigue [13].

Worsening of perception by the proprioceptive system, as a rule, is related to influence of excessive irritations. However, adequate impulsation from the vestibular receptors assists the increase of functional possibilities of locomotor system [11].

It is established by researchers, that in various stages of formation of motor skills the complicated individual adjusting reactions come into being. However, at the state of being overtrained the sportsmen feel noticeable changes in a state of the nervous system, that causes the increase of the reaction time on light and sound irritants [15].

Thus, interdependence of vestibular reactions and functional state of CNS testifies that character of co-coordinating attitude of CNS and tolerance of the physical loads can be studied on the basis of expressiveness of vestibular reactions.

Conclusions: analyzing the role of the sensory systems in forming and control of motive actions, their separate role and co-operation is visible on every stage of display of motor skills. However, in a view of that a whole organism of man is the complex biological self-regulating system, the physiological mechanisms of formation and control must be examined according to the systematic principle of simultaneous co-operation of all sensory systems. It is just necessary to distinguish at what stage of the motor skills formation, which of sensory systems or its separate function represents as main.

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Anatoliy Rovnyy: *Doctor of Science (Physical Education and Sport), Professor; Kharkiv State Academy of Physical Culture: Klochkovskaya str. 99, Kharkiv, 61058, Ukraine.*

ORCID.ORG/0000-0003-0308-2534

E-mail: tolik.rovnyy@mail.ru

Olga Rovnaya: *PhD (Biology); Kharkiv State Academy of Physical Culture: Klochkivskaya str. 99, Kharkiv, 61058, Ukraine.*

ORCID.ORG/0000-0003-1519-5632

E-mail: rovnayaolga@mail.ru

Volodymir Galimskiy: *Kirovograd Flight Academy of National Aviation University: Dobrovolskiy str. 1; 25005, Kirovograd, Ukraine.*

ORCID ORG/0000-0001-7682-2009

E-mail: Galimskiy@rumbler.ru

SYNYCJA A., BUBLYK S.

Vasyl Stefanyk Precarpathian National University

The concept and principles of psychological training the development of empathy of future specialists of physical education and sport

Abstract. Purpose: based on the analysis of the literature to form the concept and principles of psychological training development of the empathy in future specialists in physical education and sport. **Material and Methods:** The analysis of national and foreign literature, of the illuminating the specific features of the psychological training of physical education specialists for the development of their ability to understand the feelings and experiences of wards. **Results:** formulated the concept of the formation of the system of internal self-control and the basic principles of empathy training of future specialists in physical education and sport. **Conclusions:** proposed the concept of psychological training gives you the opportunity to explore complex, emotionally important issues of personal development in a safe environment training to strengthen the motivation to self-development and uptake of relevant skills of introspection and self-regulation.

Keywords: *psychological training, principles, empathy, specialists in physical education and sport.*

Introduction. Development and functioning of physical training are determined by factors, conditions and principles of the society, including the rate of culture-compliance, providing training in the context of culture, careful examination of their values as necessary for the formation of the future. Therefore, the integration of education and culture is defined by the guiding principle of modern education reform.

The subject of professional specialists in physical education and sport as representatives of sociometry professions is single person or group of people. This is determined by the requirements for professional skills of future professionals: a high level of professional knowledge and skills, responsibility for health, ability to establish productive interpersonal relationships, work effectively with wards and colleagues, create a positive emotional climate, avoid conflicts and provide adequate assess the social impact of diverse activity [4].

Study and analysis of the theory and practice of training specialists in physical education and sport allows you to say that there are certain contradictions between the new quality requirements for pedagogical work, the professional level of university graduates teaching institutions and the real level of their professional preparedness, maturity and culture [2].

Resolving of these conflicts is impossible without identifying the theoretical basis and mechanism of a culture of communication of future industry professionals

in physical education and sport [6]. In our opinion, it will allow comprehensively to take into account features of the content, structure and methods of their academic work, provide conditions for humane and humanistic education, the need to form a stable and motivation for professional self-improvement, continuous professional and teacher education.

One of the main problems of concern, given the above, is to educate at future professionals in physical education and sport ability of empathy and understanding of the problems that appear in their wards, mean empathy.

Problems of professional communication styles and features of the formation of professional communication are widely discussed in modern scientific psychological and pedagogical literature. However, against the background of a large number of scientific psychological and pedagogical developments devoted to form communication style of military (M. Koval V. Notarov, S. Kapitanets), teachers (Haluziyak V., V. Harkusha, G. Meshko A. Korotaev, T. Tambovtseva, M. Toba) managers and heads of various units and departments (V. Kossov, T. Shepelenko) not found a work on the issue of cultural communication of future specialists in physical education and sport. Taking into account the fact that communication is the main type of professional activity, which is significantly different from the communication of other specialties, under researching problems of cultural communication specialists in physical education and sport, in our opinion, is a significant gap in current educational researches.

In physical education and sport communication studied enough superficially. Remain uncertain socio-psychological characteristics that allow specifically describe and evaluate communication industry representatives [1]. It is this aspect of the problem is of particular interest to researchers [3; 9], as directly related to the formation of constructive relations between the subjects of the educational process [7], with the acquisition teams [5], relations between players, as well as mastering the tactical arsenal and techniques and effective use of competition [8].

Importance of level of psychological formation of future professionals in physical education and sport requires a comprehensive analysis of the culture of communication with regard to their degree of empathy. This approach is the best in the plane of three interrelated components - communicative, interactive and perceptual [8]. Review each of the selected components can more deeply analyze the structure of culture of communication representatives of the branch, identify specific social and psychological characteristics that influence the effectiveness of their activities.

Connection of the research with academic programs, plans, themes. The article shows the piece of scientific work undertaken in accordance with the consolidated plan of research work in the field of physical culture and sports in 2006-2014 years. Ministry of Ukraine for Family, Youth and Sport theme 3.1.1 "Theoretical and methodological and software and normative foundations of physical training of pupils and students" (state registration number 0107U000771).

Goal of the research: based on an analysis of the literature to form concepts and principles of empathy development psychological training of future specialists in physical education and sport.

Tasks of research: to study the scientific literature concerning the psychological characteristics of the training of specialists in physical education and sport, to formulate the concept of internal self-control in order to achieve success in careers of specialists in physical education and sport, to form the basic principles of psychological training to develop empathy of specialists in physical education and sport.

Materials and methods of the research: analysis of domestic and foreign literature that highlights the features of psychological training of specialists of physical education for the development of ability to understand the feelings and experiences of wards.

Results of the research and its' discussion. We have formulated a concept designed to promote internal self-control, to achieve success in careers.

The concept of training involves formation of an idea that training should be motivating. Creation of achievement motivation means the organization of the environment in which human activated important for learning and work motivation. Our task was to ensure that participants were able to feel the impact of motivational forces, and then learn to manage them.

Each of the existing training periods include certain stages of its implementation. In particular, this introductory, solving major problems, analysis, monitoring and evaluation. It must be emphasized that the introductory stage is instructing training participants on the specifics of the meeting, rules of conduct, etc.

The second phase involves providing adequate feedback between students and supervisor training. With regard to the review of the training necessary to stress the importance of phase analysis of the students according to specialty. It is intended to detect errors in learning in HEE and their adjustment. It uses tools such as observation and introspection. Especially useful and scientifically sound appears control the assessment stage, which ensures the adequacy of all previous components of the training. To activate the participants at this stage proposed independently to assess their own work critically point out the flaws and highlight and focus on the positive.

Important is the fact that the leading group at each new stage passed function commentator and analyst training participants. This methodological procedure reflects a general principled approach to change management style from organizational directive to personally-oriented.

The basis for training laid motivation theory succeed [8]. Inherent human desire to win is its psychological characteristics and consists of such components:

- independent formulation of the goal by subject and the desire to achieve;
- readiness for every decision to see concrete results;
- confidence in achieving realistic goals;
- favoring of average or slightly above average complexity objective;
- tendency to moderate risk based on their own knowledge and skills, rather

than the case.

The value of the proposed concept - to focus on the formation of auto-regulatory mechanisms in the training of students of Physical Education and Sport Faculty.

Using special technology, we wanted to make the formation of reflection in training participants received knowledge transformed through intelligence, experience, emotional experience of the subject in constructive behaviors that largely provide adequate feedback. Thanks to it in the process of employments of experimental group students were found lack of skills and abilities inadequacy of existing attitudes and stereotypes. This contributed to the correction of inefficient models of motor actions and their replacement with new, more efficient.

The basis for the training were charged with the following principles.

The principle of creating motivational microenvironment. For the training sessions the student need to dive into activities completely carried away by this process, which will result a call of a kind of "flow". To enter this state of training participants must have a positive attitude, motivation, achievement, ability to maintain the focus and concentration on the activities, the desire to solve difficult problems, the optimal relating to their level and their ability. Therefore, when designing training exercise leader must put before each of the individual tasks are focused on their ability and goals. This increases motivation and interest in the training. Psychologist encourages and supports the achievement of the participants, not comparing them with the results of others and with its own, built on past successes and failures of individual standards. The result of such strategies in the training is to increase the attractiveness of success, self-confidence. Such activities may encourage the independence of participants, cause manifestation of originality, initiative, intellectual flexibility, inventiveness and novelty.

The principle of creating reflective microenvironment. The implementation of this principle of power of intellectual creativity is based on the creation of certain conditions: in thinking - creating a critical mood and find common grounds for the analysis of ideas; in activity - create targets that motivate States to act in the absence of the actual means of achieving the objectives of this idea; organization of actions to control and self-control, assessment and self-assessment; communication - relationship building cooperation on the common search of basis for assessing results and the process of creativity. The personal aspect of reflexive-activity principle aims to develop the capacity for conscious choice of values and forming ideas about the content and meaning beyond the situation. This allows further understand the problem that is in the process of solving creative problems, and outline ways of creative transformation.

The principle of organization search and heuristic microenvironment. Heuristic microenvironment - specially created in the training situation which provides the appearance of the participants in finding solutions to the needs of specific tasks. Participants should learn the various methods and techniques of creative activity. Thanks to this principle at students formed the necessary operating mechanisms of implementation of creative activity - cognitive and personality. This

principle ensures the development of assessment functions. It is thanks to skilled designing for psychological training exercises this function is perceived as a universal criterion for assessing personality and allows increasing importance of creative solutions, creates opportunities for creative personal fulfillment.

The principle of free choice and without value judgments. Provides an understanding of creativity as the ability to express their special unique relationship to the material. Facilitator should give each member the freedom of choice and opportunity to be creative in the case. Agency may provide for the right to make mistakes. The solution of problem situations can be difficult if the participants will be criticized for errors or failures. Therefore, the rules should be provided for training provisions that prohibit criticism of ideas. This can allow only in cases where there are other rules solve problem situations.

The principle of an adequate level of difficulties. Because of individual differences in the formation of psychophysical and personal qualities not all trainees can demonstrate good results, offer original solutions to be mentally flexible as to develop training objectives necessary to define realistic goals. The goal, based on the level of their own achievements, gives a sense of confidence, competence, positive effect on increasing the probability of success in the profession.

Principle of implementation of problem situations. It is problem situations contribute to the formation and consolidation of specialized skills, is the need to overcome difficulties as problematic situation, according to G.O. Ball - the starting point of productive thinking, the source and stimulus retrieval cognitive activity and human creativity. The author stresses that such circumstances should be selected from the scope of the individual professional. This will ensure variadic resolve the issues, will allow flexibility to apply the acquired knowledge will carefully conceived design ideas.

The principle of alternation logical and heuristic activity – applies to ensure that participants in training not formed a stereotype execution monotonous work on specific rules. Should develop at them the ability to creatively solve problems, but follow the logic, propose realistic solutions.

The principle of activation of components of creative thinking is needed to develop at students the ability to not pay attention to external noise and form the ability to focus, develop imagination, thinking to get rid of backwardness; do not be afraid to take risks and experiment, have adequate self-esteem.

The principle of sequences involves continuous logical transition from topic to topic, summarizing the work.

The principle of involvement in the development of intrinsic motivation for creativity: the degree of mastery of the material; organization of positive emotional experiences; the pleasure of the profession, which they get. A necessary prerequisite for the successful implementation of the program sessions of psychophysical influence is mutual need of the training to work together.

The principle of dialectical unity. None feature of creative thinking cannot in its implementation be effective unless it relates to the property opposite it. In a situation where every problem in the teacher of physical culture is ambiguous and

multifaceted, we need balance between the desire for a new criticality and its assessment. Similarly, should be balanced and correlated each other such personal qualities as divergence and convergence, and stereotype lability, impulsivity, reflection, etc.

The principle of informational mutual enrichment. Creative self-actualization - a process that assumes that each time, making the choice, the individual makes it for personal growth. That is - some instruction as the propensity to everything creative approach, abandoning the idea that creativity must result in the creation of any production. This concept covers the development of creative and spiritual potential of the individual, to realize all its possibilities, adequate perception of others, the world and their place in it, the richness of emotional and spiritual areas of life, a high level of mental health and morality.

Conclusions. The advantage of the proposed concept of psychological training is that it provides a unique opportunity to explore complex, emotionally important issues of personal development training in a safe environment, not in real life with his threats and risks. Training avoids worries about possible unpleasant consequences that may arise in case of the wrong decision. Dedicated principles suggested that during the development of empathy training future specialists in physical education and sport can provide a gradual complication of psycho-diagnostic and molding problems deepen the degree of processing of professionally important problems, strengthen internal integration, strengthen the incentives for self-development and assimilation of appropriate skills of introspection and self-regulation.

Perspectives for further research. A promising future is to study the efficacy of the proposed concepts and principles among future specialists in physical education and sport.

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Andriy Synycja: *PhD (Physical Education and Sport), Associate Professor; Vasyl Stefanyk
Precarpathian National University: Shevchenko st., 57, Ivano-Frankivsk, 76018, Ukraine.*

ORCID.ORG/0000-0002-9687-038X

E-mail: svetlana_sunuzja@mail.ru

Serhij Bublyk: *PhD (Physical Education and Sport), Associate Professor; Vasyl Stefanyk
Precarpathian National University: Shevchenko st., 57, Ivano-Frankivsk, 76018, Ukraine.*

ORCID.ORG/0000-0002-9666-2038

E-mail: bublyk1979@ukr.net

SIGAL N., SHTYKH V., ALEXANDROV U.

Kharkiv State Academy of Physical Culture

AGGRESSION IN SPORTS ACTIVITY

Abstract. ***Purpose:** to analyze and ground theoretical and experimental researches of sports. **Material methods:** method of theoretical analyses and systematization of literately sources, method of logical conclusions and expert estimation. **Results:** it is shown that problem of aggression is one of the most popular world and sportive psychology. Sport is a model for study of aggression behavior of human. **Conclusions:** the problem of aggression in sport is practical value as many coaches consider aggression behavior as important quality for gaining success in different kinds of sport. Sportive competitions under regulated levels of their holding have no impact on an aggression.*

Keywords: *psychology, sport, aggression, competitions, frustration, catarsis.*

Introduction. Lately the special attention has been to aggression in sport, considering it as comfortable model for the study of this phenomenon. However, this interest has a practical value, because many trainers and sportsmen consider an aggressiveness to be an important quality for achievement of success in sport as a most theorists frequently examine the negative aspects of its display [3; 15; 25]. Such contradiction requires on the part of psychologists involved in sport more attentively and ambiguously to examine such phenomenon, as aggressiveness, which takes place in sports activity [2; 4; 9; 24].

Practical meaningfulness of problem of aggression and aggressiveness in sport actually is not studied enough in domestic psychology, what stipulated actuality of theme of our research.

Research purpose: to analyze the modern state of problem of aggression in sporting activity in the light of modern theories.

Material and research methods : analysis of literary sources, method of theoretical, system analysis and generalization, method of logical conclusions, method of expert estimations.

Research results and their discussion. Modern theories suppose quite different dependences between sport and aggression. In obedience to the theory catharsis of instinct, a man must have some opportunity for the output of the inevitable aggressiveness. Therefore, the theory of instinct recommends sport as mildly aggressive activity for diminishing of aggressive motives [5; 11; 23].

The supporters of theory of the social teaching, vice versa, consider that if aggression in sport positively to support, then it will strengthen aggressive habits, diminishing ability to restrain, to brake the displays of aggression [4 ; 10; 13]. Ideas of removal of wars and diminishing amount of crimes with the display of violence by

means of sport very attractively at attempts to justify heavy tolls on development of sport, but requires experimental proofs. Just so the theory of instinct was not able convincingly to explain an aggressive conduct and recommendations in relation to vent the aggression through sport, appear too simplified. It is therefore necessary to appeal only to conception of the social teaching and renewal formulated hypothesis Frustration – Aggression as it applies to dependence sport – aggression. This dependence has two aspects: effect of catharsis and competition [4; 12; 20].

An idea that the acts of aggression reduce probability of display of aggression in future seems plausible at the first glance.

3. Freud and other psychoanalysts underline the importance of the catharsis effect, often explaining by it the necessity of man to clear up from aggressive tendencies [6; 25]. The results of experimental researches show on the whole, that an aggressive conduct diminishes the further on displays of aggression in a number of cases, and in a number of cases – 22 increases [; 24]. One of hypotheses, reconciling these distinctions, asserts that a catharsis arises up at instrumental aggression, but comes after anger or reactive aggression. However, this hypothesis mostly was not confirmed experimentally. In a few reviews of references on a catharsis conclusion was drawn, that in basis of hypothesis of catharsis there are small facts, that the theory of the social teaching can predict aggression [8; 11; 23].

Unfortunately, role of sport and physical exercises as means of achievement of catharsis so far was not clearly formed. Abstrusely, whether all types of sport or only those which enable to show aggression possess the catharsis properties. It seems to improbable, that all types of sport possessed certain mystic property to clear off aggressive aspirations. Abstrusely also, whether the catharsis is consequence, really displayed at engaging in sport, aggression if it comes is simply as a result of active executing of physical exercises [12; 16; 21].

Too often aggression is equated with energetic motor activity in the "pin" types of sport. If a sportsman plays aggressively (means high motivation), he is named aggressive and many his actions, executed with large physical tension, are interpreted as acts of aggression. An aggressive player (higher motivated) by mistake is considered the man of accomplishing aggression.

Even if physical trauma is inflicted to the player A by chance as a result of aggressive conduct of player B (high motivation), then it is not aggression by definition. Player B must mean cause a trauma to the player A. Certainly, often it is very difficult to define premeditation of actions, but almost in every type of sport judges are accountable for the decision as to this problem. If a judge considers that a sportsman assumed a rudeness intentionally, he punishes him severely. A statement is very doubtful therefore, that sport is comfortable and useful institution of society for salvation and encouragement of aggression and acts of violence. Sport usually is carefully controlled and enables a man to try to cause harm to nobody for achieving results by vigorously participating in motor activity. According to a hypothesis Frustration is Aggression, the only preceding acts of aggression are considered as catharsizes, but in broad sense the catharsis effect relates to any action which diminishes aggressive aspirations [17; 18; 24]. It is therefore important to answer

such question: is there the catharsis effect at the energetic execution of physical exercises?

Rean A [18] while experimenting, caused at an examinee the state of anger by means of the assistant. As a result of the conducted experiment the conclusion was drawn, that for the man who got angry the best method to reduce aggressive aspirations is to take revenge to whom, who caused anger. He asserts that motor activity does not cause a catharsis. The last carried out researches show the following: as a result of intensive motor activity a man can become more subjective to aggression, if he is run across with its potential stimulus [12; 14].

Other researchers, conducted an experiment in which the half of participants was strongly excited by intensive physical exercises, and other half was in a state of insignificant excitation [6; 19]. Strongly excited examinees got mad by the assistant of examiner inflicted him much more proponent shots by a current than examinees who were in a state of insignificant excitation and were angry. The obtained results are strongly opposite to the statement that active physical exercises can serve for the removal of aggressive tension and thus are cause of a catharsis. Motor activity of grater intensity is examined as a remnant activating, the presence of which in the moment of provocation to aggression considerably facilitates the external display of aggressive reactions. It is a result of what that a man explains his excitation by the factors of environment and, thus emotions become stronger which are tied with these factors [4 ; 13; 24].

Other question which is of interest also : is a supervision of violence in sport of catharastic character or conduces to greater violence? Uollters (1966) proves convincingly, that the supervision of violence does not cause a catharastic effect, but strengthens probability of display of aggression because of teaching through a supervision [17; 25].

Thus, supervision over violence in sport, presumably, will not tame the aggressiveness of audience, and whips up it yet more. It is well known that the cases of aggression among an audience often follow at once by an aggressive conduct among players. In conclusion one must say that data for the ground of hypothesis of catharsis in general and in the field of sport, in particularly, very insufficient.

Aggression after previous aggression or execution of physical exercises in a greater measure is conditioned by encouragement or punishment for initial aggression and factors of environment. Moreover, there is no experimental confirmation that the indirect participating in aggression, the supervision over aggression diminishes subsequent aggression.

Sport, by definition ,has competitive character, and the competition itself can become the source of frustration potentially. Frustration comes then, when one or another hindrance emerges as to the purposeful conduct. During competitions one participant obviously interferes with actions of the other. Both can not win, and a defeat often results in the loss of sense of self-esteem. Probably, the major source of anger and subsequent aggression is the direct unfavorable ascendancy on self-esteem of man, mostly through an insult or humiliation of his dignity [7; 11; 22].

Thus, a competition is a frequent source of frustration, and frustration strengthens probability of the aggression. The followers of theory of the social teaching, already for some time, acknowledge this idea, often using competition situations for a management over frustration for the possibility to observe the displays of aggressiveness.

There comes a question, does a competition increase aggression? So it does but is that so actually? A natural experiment testifies to powerful influence of sport, competitions on aggression.

An important factor in the process of competition is that, a sportsman lost or won. One of the most obvious hypotheses about influence of competition on aggression is position that a loss generates prepotent aggressive aspirations, than victory. Supposes, that, probably, not itself competition, and its result causes frustration. Certainly, intermediate events during a competition also can cause frustration and increase probability of aggression [18; 21].

By other hypotheses, appearing logical from the point of view of the revised conceptions Frustration – Aggression, are the followers:

1) frustration increases, if a sportsman loses to the opponent approximately equal in strength. Man, not seeing possibility for victory, less disordered, than a man who almost is winning but lost;

2) the more important victory, the stronger frustration loser feels .

So, probability of aggression is higher, if powers of rivals are approximately identical and victory is valued very highly. These hypotheses require verification in the natural sporting activity and in laboratory conditions.

Conclusions:

1. Different theories and models of aggressiveness of conduct of people are presented in dependence both on their personality descriptions and type of activity in different social conditions.

2. It is shown that sport is a useful model for the study of aggressive conduct of man in the stress factor conditions.

3. The problem of aggression in sport is of practical value. Sport is toughly controlled and enables a man possibility to achieve results without causing harm to nobody , vigorously participating in motor activity.

4. In many kinds of sport, especially in those, where a direct physical contact is allowed, the different forms of control of physical aggressiveness are needed.

Prospects of further research. The results of theoretical analysis on sporting aggression are planned to apply in the system of practical physical, tactical and psychological preparation for the sportsmen of different kinds of sport.

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Natalia Sigal: *PhD (Biology), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkivskaya str. 99, Kharkiv, 61058, Ukraine.*

E-mail: natsigal@mail.ru

Viktoriya Shtykh: *PhD (Biology), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkivskaya str. 99, Kharkiv, 61058, Ukraine.*

E-mail: tori2008_68@mail.ru

Yuriy Alexandrov: *PhD (Psychology), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkivskaya str. 99, Kharkiv, 61058, Ukraine.*

E-mail: ALEKS251053@mail.com

SIGAL N., SHTYKH V., PAVLIK H., ALEXANDROV U.

Kharkiv State Academy of Physical Culture

REGULATION OF MENTAL STATES IN THE SPORTS ACTIVITIES

Abstract. Purpose: *to analyze and summarize the theoretical and experimental study of the problem of mental states in sports activities. Material and methods:* *the theoretical system analysis and synthesis of the literature, the method of logical conclusions and expert estimates. Results:* *It was shown that the integral structure regulation of mental states is characterized by varying degrees of stability, awareness, due to the specific features of life and personal organization of an athlete. Conclusions:* *the mental state is seen as a complex, polystructural, multifunctional phenomenon characterizing the personality expressed in the behavior and typical systemic-functional mechanisms of regulation at the level of self-regulation through a variety of methods and techniques.*

Keywords: *psychology, sports, mental state, adaptation, self-control, personal characteristics, psychophysiology.*

Introduction. Efficiency of man's directed commitment does not depend only on the level of development of his professionally important skills but also from that mental condition which is preceded and accompanies his activity. Control and management of man's mental state is a necessary condition for the decision of practical tasks of the efficiency increase in any activity [4; 6; 14].

The special attention to the study of mental conditions and their adjusting is paid attention in psychology of sport, where forming of psychical condition to the competition is examined as a basic task of psychological preparation [26].

Initially in psychology of sport the subject of research were the pre-start emotional states of sportsmen [12]. On the basis of considerable volume material three forms of the pre-start states were distinguished and their psychophysiological mechanisms are described: alertness (optimal emotional state), pre-start fever and pre-start apathy (unfavorable emotional states). The study of mental conditions of sportsmen appropriately "led" researchers to the problem of their adjusting [15; 20]. A requirement in such researches is conditioned by that actual training and competition activity of sportsman and so called "difficult" circumstances of vital functions is constantly turned to the necessity of adequate self-regulation of the states [5; 23].

Concept "adjusting" is closely related to the basic functions of the psychic – reflection and control, traditionally distinguished in psychology. By derivatives from a concept "adjusting" there are getero- and self-regulation. In the context of these

ideas our address to consideration of problem of self-regulation of mental conditions is stipulated by insufficient studies of this process at its obvious meaningfulness in sporting psychology.

Research purpose: to analyze the state of problem of mental conditions and mechanisms of their self-regulation in sportive activity in the light of modern scientific conceptions.

Research methods: analysis of literary sources, method of theoretical, systematic analysis and generalization, method of logical conclusions, method of expert estimations.

Research results and their discussion. Most determinations of mental condition, given by psychologists, have the same logical basis – this state, characterized as an aggregate (symptomatic complex) of psycho- physiological and psychic functions, stipulating efficiency of activity, capacity, level of activity of the systems, conduct, etc. [19]. There are other approaches to determination of mental conditions which represents the system of personality descriptions of man [4; 8].

From the point of view of authors [6; 13], a mental condition in the widest comprehension is a reaction of the functional systems on external and internal influences, directed to the receipt of useful to the organism result (adaptations to data, including changing the terms of existence). Accordingly it is possible to draw conclusion, that the state is a reaction of the functional system not only for maintenance of its stability but also for a change with the purpose of adaptation to the new terms of existence. The necessity of approach of the systems at the study of mental or psychophysiological conditions of man is conditioned by that any state of man is a reaction of not only psychic but also an organism and personality on the whole, with plugging in response of both physiological and psychic levels (subsystems) of adjusting. Hereupon, according to N.Levitov every mental condition is both subject's experiencing and the activity of his different functional systems. It has external expression not only on the number of psychophysiological indexes but also in the conduct of man [8; 17].

An issue about the structure of mental condition in many respects is key one , as a structure and functions are unity. Functions reflect the features of structures, making the system. In the structure of mental condition the system comprises : 1) purpose of man's activity, psychological description in the orientation of personality; 2) estimation by man of situation, from the point of view of the setting aims; 3) presence of concrete purpose of action in these terms and foreseen result as a system-creating factor of structure of the state; 4) degree of efficiency, good organization of psychic components and their systems in a united functional structure, which passes ahead a situation, adequate to the desired result; 5) description and amount of dominant and inhibited components of structure; 6) degree of general tension and functional level of the state; 7) features of dynamics of mental condition.

By united different theoretical conceptions, it is possible to follow to next generalizations in regard to the functions of mental condition [6; 23].

Taking into account that a mental condition is investigation of reflection of situation by personality, it is possible to consider that a mental condition performs the

duty of adaptation, balancing the subject with an environment (natural and social). A dominant leading role in such active purposeful process perform those psychical components and their systems, on which activity, first of all, a successful co-operation of man and environment depends [21]. Other function, in opinion of U. Sosnovikova [25] is related to the managing role of mental conditions. In this sense a mental condition can be a mood, readiness, condition for being carried out and forthcoming co-operation.

Mental conditions are characterized by such properties and descriptions as modality, duration, convertibility, depth and quality [14; 19].

Modality. The states of high-quality differ from each other and foremost that, what feelings (emotions and emotional tone of feeling) accompany them.

Duration (stability) of the states. Each state is temporal. In this connection important description of the states of man is their convertibility. Exactly by temporal feature they try to distinguish the states from processes (first – more protracted, second – transient). However, this criterion is very relative, as well as dividing of the states by steady and unsteady, brief and protracted. Every state can be fleeting (for example, anxiety of fan at a dangerous moment at the goal of his favorite team), and protracted (anxiety of parents at expectation of results of examination which their child took), and chronic (anxiety as the personality's temper).

The depth of the states (intensity) is characterized by the degree of expressed of experiencing and shifts of physiological functions. Next semantic chains can serve an example: fear – horror; an irritation (be crossed) is indignation – anger – fury (hydrophobia); admiration – delight – ecstasy.

Quality of the states is determined by the specific affecting on man factor, initial background, and also individual features of personality of sportsman. By the sign of experiencing (emotions) the states are divided by positive and negative. Depending on meaningfulness of one or another state for efficiency of activity, intercourse and health of the state it is accepted to divide states by favorable and unfavorable [12; 15].

The analysis of approaches to the study of the phenomena of psychical self-regulation of the states of man was conducted by L. Dickaya in the context of study of psychology of self-regulation of the functional state of subject in the extreme terms of activity [9; 11]. On the basis of experimental data of the author a conception of psychophysiological self-regulation was formulated and worked out as to specific psychical activity, directed to maintenance or transformation of the "available" or current state in the "required". The feature of this activity consists in specificity of its object – its own condition, in combination of subject and object in one object, in specificity of methods and facilities of its realization including adjusting as necessary condition the so-called "dark feelings", id est realized to some instant, the involuntary physiological processes participating in adjusting of those.

At the involuntary and unrealized level of self-regulation of mental condition an anchorman is an activating component for which the mechanisms of the unspecific activating are accountable. Elements of self-regulations which a subject utilizes at this level find a reflection in a form of involuntary reaction (excitations/of inhibition),

and they can not yet correlate with some component of structure of activity. At this level there is involuntary, unrealized and out-of-control by a man substructure of level of activation to the requirements of activity. On this stage self-regulation of the state as though is "intertwined" in activity and is part of activating component of activity.

At the next, already arbitrary, but unrealized yet enough level, an activating-emotional component prevails in self-regulation of the state, and methods of self-regulations which are applied by a sportsman, one can possibly correlate with operations in the structure of activity. Activation of these techniques of self-regulation arises up in the complicated terms of activity but not comfort states: monotony, initial fatigue or easy tension. In these states a sportsman accomplishes muscular motions involuntarily, detains or makes more frequent breathings, motive and vocal activity rises by him, changing of poses becomes more frequent, observed out-of-control emotional reactions in his conduct, and he tries to support the states of active vigil, vigilance and sporting readiness. All these means are accomplished automatically and practically does not divert attention of a sportsman from the basic activity [17; 22].

In more complicated terms of activity and growth of requirements to attention, exactnesses of motions existent disparity between current and required psychical status a subject begins to realize. He begins to estimate the state, degree of fatigue or tension. One have possibility to say, that the state becomes the object of his attention, and a subject makes decision about purposeful transformation of the state with the use of certain methods of self-regulation, which are directed to the cognitive and emotional component of self-regulation. Therefore such methods, as conations, self-control, emotional reproduction, auto-training, psychophysiological exercises, including. elements of yoga, are already the purposeful actions, and each of these methods of self-regulation is the complicated functional system [21; 26].

Depending on meaningfulness of executable activity and the unfavorable states, when a man realizes that in this state he will not be able to execute activity with the certain quality, he faces the task of choice between activity on self-regulation of the state and implementation of professional activity. Here is a change of special purpose options, reasons, change of orientation of consciousness, and a man begins to use such methods of self-ascendancy as auto-suggestion, self-convincing, self-examination, self-programming. And depending on predominance of one or another necessities, reasons a sportsman can prefer self-regulation for the improvement of the state due to worsening of results of sportive activity or temporal its stopping.

A cognitive- personal component prevails at this realized and purposeful level of self-regulation, and each of methods is integral activity with all its basic "formative" components (table).

Chart of levels of the system, components of structure and constituents of activity in self-regulation of the psychophysiological state

Spheres of psyche	Levels of self-regulation of the state or activity	Component of structure (anchorman)	Methods of self-regulation	Attitude toward <i>PSA</i>
Unconscious	Involuntary and unrealized	Activating (nonspecific. activating, generic. localization)	Fluctuations of activating in a continuum "sleep is a vigil", reference reaction, cognitive activating,	"Involuntary reaction"
	Arbitrary and unrealized	Activating-emotional (specific local. activating)	Expectation, vigilance, muscular motions, respiratory and poznotonic exercises, emotional states	Operation
Consciousness	Arbitrary and realized	Cognitive-emotional	Conations, self-control, emotional reproduction, auto-training, elements of yoga	Action
	Realized and purposeful	Cognitive-communicative	Change of having a special purpose options, reasons, change of orientation of consciousness, auto-suggestion, self-odering, seif-convincing, self-examination	Activity

Note. PSA – psychical structure of activity.

Problems arising in self-regulation of one's own state relate first of all to the specific of activity of a subject :

- at cognitive level: with difficulties in authentication of object of self-ascendancy, in vagueness of character of the state, in predominance of involuntary and unrealized methods of self-regulation, in the insufficient degree of mentality of aims, tasks and reasons of this activity;

- at performance level: with insufficient formbuilding and development of skills and techniques of self-regulation, the inadequate and ill-timed use of some or other methods.

On the basis of the conducted researches of L. Dickaya [12] formulates the two-level model of individual style of self-regulation of the state : first, physiological-mechanism of the power provision of self-regulation – ergothrotopic type of the vegetative adjusting; second – psychodynamic providing behavioral and emotional variability of personality.

Interesting material is related to the study of character of the functional state. The last differs from character of professional activity by the low level of

verbalization, high degree of life experiencing. Complication, power, integrity, differentiated capacity is inherent of him [13; 20].

It was shown by researches, that sportsmen, characterized by the developed arbitrary adjusting, are also characterized by integrity, brightness and clearness of characters of the states [10; 15]. At the ordinary terms of activity in the normal functional states it is an involuntary reaction, when the processes of self-regulation at unrealized level (physiological or psychological) take place continuously and involuntarily. A sportsman does not realize these processes, does not notice them, not control consciously. Constantly it takes place the "adjusting" of activating-relaxation processes by the requirements of environment and activity, stipulating his state, conduct and actions. These are reference reactions in reply to an unexpected stimulus; this is an increase of activity at complication of cognitive task. But this activity is masked by working activity and as though it enters as component into the activating component of activity. However, at this level there are some difficulties in self-regulation in maintenance of level of vigil, that is reflected in the involuntary and brief sleep – appearance of "failures" which a subject does not notice and does not realize, but he needs them for renewal of psychophysiological resources, for example, in the conditions of fatigue and protracted monotony. These defects in self-regulation result often in appearance of the problem moments in sporting activity [5; 17; 26].

For overcoming of problems, arising up in sporting activity in connection with changes in the psychophysiological systems, a sportsman begins to apply instinctively skills of the arbitrary adjusting up to the necessary level. In sportsman's state it is reflected in a tense pose, increasing or declines of breathing frequency, muscular effort or relaxation, involuntary emotional reactions, states of expectation or vigilance and the like. In these conditions self-regulation can provide the optimal level of operational tension, not interrupting the process of implementation of basic activity. Difficulties in self-regulation of mental condition on these stages can be related to the lack of psychophysiological resources or the insufficient skills of involuntary self-regulation. But if for a sportsman of various skills of involuntary self-regulation are developed and formed, then problems in self-regulation are not observed, and they are easily overcome while in activity. In normal or some complicated conditions of activity the application of means and forms of involuntary self-regulation are fully sufficient [11].

In the extreme conditions of activity, when disparity between current psychophysiological state and required professional activity for these terms increases sharply then comes forward the necessity of arbitrary methods of self-regulation of mental condition. However, these methods require switching of attention or locus of consciousness from the object of sporting activity for the purpose of self-regulation on the type of the combined activity. It is possible only in the certain types of activity, when temporal possibilities exist for switching on attention from implementation of actions, plugged in any professional activity, on operations in self-control over the state. For example, implementation of complex of exercises of yoga, auto-training, conations on emotional reproduction, to self-control above the state and so on. At performance level success of such combination is determined by the degree of formed both professional skills and actions of sportsman and skills and methods of self-regulation of their psychical states [21; 26].

The analysis of intersystem co-operation at cognitive level showed that success of sporting activity depended on the degree of coincidence of aims and reasons of sportsman, when it is necessary to choose between a duty, sporting results and what, that to secure his own mental condition at optimal health level, pointing all his efforts at self-regulation of the state. In the intersystem co-operation, at which aims, tasks, reasons (and other constituents) of professional activity and activity on self-regulation of the psychophysiological state do not only coincide, but coming into counteraction, observed here is irregularity as an activity, high variability in changing of priorities, determinant, close to a conflict between the constituents of activity. A subject is fully commuted on self-regulation of the state and implementation of sporting activity becomes impossible or vice versa, he works on a wear, without restoring psychophysiological resources, gradually worsening effectiveness of activity, that results in errors, losses, traumatism, catastrophes and the like [11; 18].

In conception of adjusting of mental conditions, developed by A. Prochkhorov [24], a fundamental kernel is a study of system-functional mechanisms of adjusting – functional structures. The basic constituents of functional structure of adjusting are a reflection of the experienced state and idea of the desired state (realized character), actualization of corresponding motivation and personality's sense, and also use of psychophysiological facilities. Due to a reflection, an estimation is carried out of the actual and desired state, a correction is brought in the applied methods and techniques of self-regulation. An adjusting process is accomplished under active part of psychical processes (and not only perception but also ideas, mnemonic processes, thought and others). A regulator process is carried out with support on psychical properties (temperament, character, capabilities and others). It is not effective in the case of absence of corresponding motivation and personality's sense. A regulator process takes place in a concrete social environment on a background of cultural, ethnic, professional and other influences, is carried out in the certain social situation of vital functions : economic, legal, related to the whereabouts of subject in a small group: by its social functions, by statuses, etc. [23].

The integral structure of adjusting of mental conditions is characterized by the different degree of stability, realization, conditioned by the specific of vital functions and features of personality's organization. It is related to the way of life of subject, subjective models of the world, including vital strategies, orientations, values, aims and reflects influence of the last. It displays in the real forms of conduct and types: system-functional mechanisms of adjusting of the states which are their basis [25].

On success of psychical self-regulation of mental conditions of sportsman, as above said, the degree of his realized state, level of formed and adequacy of his character, influence, realistic perception of feeling of experiencing in relation to a situation in sporting activity. The reference-points of the state, allowing the sportsman to describe it are the corporal feelings, breathing, space perceptions, time, remembrance, imagination (characters of the desired state, generated images), feelings, ideas (contents of thought) and others. In the everyday condition a man does not watch for them, his consciousness is concentrated on the object of action or idea, etc. [12; 26].

However, at the change of these indicators of the state in some situations of vital functions or as a result of his own activity the certain methods and techniques of self-regulation are " switched" if necessary. Thus, in the process of self-regulation a

sportsman supports on the pointed indicators and "collates" by their efficiency of adjusting of the mental condition [13; 20].

In researches [14; 20] the role of personality's features is shown including motivation in adjusting of the state of man. In particular, researches [8; 13] demonstrate distinctions in the dynamics of vegetative indexes of the productivity of activity for sportsmen with positive and negative motivation. These distinctions showed up both in a background, and under fatigue and hypoxia. In work of F. . Berezin [2], with the use of large number of indexes, it is shown that persons with predominance of reason of the failure avoidance are characterized by the considerable vegetative and humoral shifts featuring the states of emotional tension. It manifests the motivational processes of subject related to experiencing styles are plugged in adjusting of mental conditions.

As shown also, that motivation assists reconstruction of the emotional states. However, concrete researches, to one or another degree, affecting this theme are not numerous. Existent theories of motivation are concentrated mainly on the rich in content or developing aspects of motivated process, while motivational correlates of mental conditions practically are not examined. Obviously, that the presence of motivation provides efficiency of self-regulation of subject, but this influence is studied so far not enough [1; 7; 17; 23].

As noticed above, the more multidimensional character, the more completed feeling, feelings, emotions are presented in it, the higher degree of realization and the more adequate self-appraisal of the state is, the more possibilities for the man to manage the state, using respiratory, muscular motions, methods of sensory and emotional reproduction, ideomotor ideas, emotional response and also mental order or auto-suggestion [15; 22].

An address to the concept of sense, semantic formations extends the picture of the conscious adjusting of mental condition of subject. The process of self-regulation supposes alteration of semantic educations, the condition of which is their realization. The exactly deliberated semantic formations are the basis of self-regulation, with their help the arbitrary change of semantic orientation, control after direct motives, estimation and correction of actions and deeds are carried out. Obviously, self-regulation of the states can take place when it is certain sense for a subject.

Conclusions:

1. A mental condition is examined as difficult, multistructural, polifunctional phenomenon, characterizing personality at the moment.

2. Basic concepts presented in semantic space of self-regulation, biological (physiological) conceptions of adjusting of vital functions, conceptions of adjusting of psychical activity and states are considered.

3. Adjusting of mental conditions is carried out by means of application of different facilities, methods and techniques which as though "transfer" subject from the state in the state, from one psychological line-up to the other, providing the corresponding "development" of psychological sphere of personality.

4. The process of self-regulation, which supposes formation of the new semantic system, is provided by unity of the number of mechanisms, setting general principles of correlation between reasons and senses, reasons and aims inside the structure of motivational sphere.

5. In self-regulation of mental state the reflection has a special meaning which is correlated with the higher forms of volitional conduct as realization of vital project and by higher forms of experiencing, the result of which is creative transformation of himself and his life in the conditions of impossibility of realization of the former vital project, condition.

6. The important link of adjusting process is a nascent character of the desired state, which "sets" the support points to the future state, providing spatial-temporal borders, and also borders of intensity. These elements make the base (initial) functional mechanism of adjusting.

7. The special value of the problem of self-regulation is for practical aims – as development of methods, trainings, technology etc., extremely necessary for harmonization of psychic sphere of sportsman in the difficult and unsteady pre-contest and competitive conditions of modern sport.

Prospects of further research. The results of theoretical analysis on self-regulation of sportsmen's mental conditions are planned to apply in the system of physical, tactical and psychological preparation at the different stages of sportive activity.

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Natalia Sigal: *PhD (Biology), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*

E-mail: natsigal@mail.ru

Viktoriya Shtykh: *PhD (Biology), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*

E-mail: tori2008_68@mail.ru

Olena Pavlik: *PhD (Psychology), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*

E-mail: natsigal@mail.ru

Yuriy Alexandrov: *PhD (Psychology), Associate Professor; Kharkiv State Academy of Physical Culture: Klochkivska str. 99, Kharkiv, 61058, Ukraine.*

E-mail: ALEKS251053@mail.com

TOMENKO O., DEMENKOV D.

A. S. Makarenko Sumy State Pedagogical University

THE CURRENT STATE OF ORGANIZATIONAL AND METHODOLOGICAL SUPPORT OF STUDY GROUP IN FOOTBALL WITH SECONDARY SCHOOL STUDENTS

Abstract. Purpose: *to study the current state of organizational and methodological support of study group in football with secondary school students. Material:* *the analysis of the regulatory system and professional scientific and methodological literature is made, materials of the Internet, pedagogical supervision. Results:* *the current state of organizational and methodological support of study group in football with secondary school students is discussed. The problems of regulatory system, methodological and organizational support of study group in football with secondary school students are highlighted. Conclusions:* *a number of open issues of organizational and methodological support of study group in football with secondary school students is defined. In order to improve the implementation of football into general educational process, ways of improving organizational and methodological support of study group in football with secondary school students are given.*

Keywords: *schoolchildren, organizational and methodological support, study group in football.*

Introduction. Popular form of physical activity among school children and youth in general is a football, health-improving effect of that is widely used in the practice of secondary schools (A.V. Dulibskyi, 2001; V.M. Shamardin, 2002; V.M. Kostiukevych, 2006; F. M. Impellizzeri, 2006; J. Mallo, 2008 and others). However, it should be noted that despite the popularity of football among school children in educational establishments of Ukraine, it is not yet used as an effective means to overcome the risk factors for many chronic diseases, as well as the factor of formation and maintenance of a healthy lifestyle, the way of diversion of children and youth from the negative influence of "the streets".

Decreasing physical activity and physical development, diseases of the musculoskeletal system, the cardiovascular system – is not an exhaustive list of problems of "modern school", which, unfortunately, can not be solved only by physical training lessons, active-moving breaks, physical training minutes and physical training pauses.

Overall students' health condition has been eroded, the threshold of viability and endurance has been lowered, and the reserve strengths of the body have been reduced significantly over past years [3].

The problem of lack of motor activity of the students is mostly the result of the

intensification of the modern educational process and allocation of small number of hours to physical education in schools. It is assumed, that in solving the problem a significant role should play by effective organization of students' physical education using a variety of additional types of motor activity after school for the full development of personality of students [8].

It is known that the optimal level of motor activity has a positive impact on a range of indicators defined as the term "physical health" [4].

In this vein, the importance of extracurricular work increased as a means of additional physical activity, physical education and retaining health of schoolchildren.

Holding football extracurricular activities in secondary school is one of the most important conditions for the implementation of system of the football education for youth in Ukraine, which could attract different areas of training process of football for youth in a single effective structure.

System of continuous football education was developed in Ukraine: school lesson – competition "Leather ball" – Junior football league. Therein lays the basis of the perspective and potential of socially meaningful content of the program of football development and its further improvement and implementation [10].

The effectiveness of the system in terms of athletic performance is the selection of gifted children and the succession and continuity in their football education [7]. The starting point in this, along with the lesson of physical culture with elements of football, has become a football sections in secondary schools.

The effective functioning of the school football education requires appropriate legal, organizational, human, scientific, methodological, financial, and technical support.

Today we are facing with the problems of finding the most effective means and solution methods for different tasks of physical education in football sections, but with the current state of organizational and methodological support we could not manage urgent issues of organizing and conducting classes in sectional football.

The problem of organization the football lessons in secondary school have been studied by the A.V. Popov (2000), K.L. Vikhrov, E.V. Stolitenko (2001, 2002, 2004, 2013), V.M. Kostiukevych (1997, 2006) and others.

On a current day issues that explored enough are: selection of young football players (Kachany L., Gorskyi L., 1984; Zolotarev A.P., 1997; Boychenko B.M., 2003 and others), planning the training process (Holdenko G.A., 1984; Ayrapetyants L.R., 1992; Maksymenko I.G., 2001, 2004; Lisenchuk G.A., 2004), the development of physical qualities (Shamardin V.M., 1984, Volkov L.V., 1988, Bulatova M.M., 1996, Dulibskyi A.V., 1999, 2001), the formation of individual technical and tactical skills (A.V. Petukhov, 2006) methods of teaching and training (R.I. Nurymov, 2005). However, the problem of organizational and methodical support of football sections in terms of development and new requirements of modern education has been neglected, in addition, much of the developed materials based on the old program of physical training and training program for football sections in 1 – 11 classes of secondary schools [5], textbook "Football at school", which had been designed before new programs of physical education were approved. Developed materials do

not take into account the relationship of program material for sectional football between school of the ball and optional module "football", neither innovative approach in physical education students that definitely reduces the effectiveness of sectional work in football.

Based on above mentioned, scientific and methodical foundation of organizational and methodological support of extracurricular football lessons in secondary schools is an important research direction in the theory and methodology of students' physical education.

Connections to academic programs, plans, themes. The study has been conducted in accordance with the plan of research SumSPU named after A.S. Makarenko, Ministry of Education and Science of Ukraine "Increased health level and physical preparedness of different group of populations by means of physical culture" (state registration number 0111U005736) for 2011–2015 years.

The purpose of the study: explore the current state of organizational and methodological support of sectional football lessons with students.

Material and methods of the study: analysis of the scientific-methodical and professional literature and materials on the Internet, pedagogical observation.

Study results discussion. Football since independence of Ukraine has gained significant development. Introduction of the third lesson – football lesson according to the letter of the Ministry of Education and Science of Ukraine as at 23.07.2001 № 1/9 – 264 in secondary schools can be considered as a significant incitement to the development of school football. The introduction of the third lesson of physical culture in Ukrainian schools has been contemplated by the Law of Ukraine "On Physical Culture and Sports" (enacted by the Supreme Council of Ukraine of 24 December 1993) and by targeted comprehensive program "Physical Education – Health of the Nation", approved by the President Ukraine on September 1, 1998. One of the program realization directions was the adoption of targeted comprehensive program of football development for years 1997-2002 and resolution of the Cabinet of Ministers of Ukraine as at 13 July 2004 № 904, as well as comprehensive football development program for the period 2004-2008 [6]. On 30 of November, 2005 based on this program Ministry of Education and Science of Ukraine and the Football Federation of Ukraine signed the agreement about cooperation in football development in secondary school education in Ukraine during 2005-2008 years, on December 11, 2012 the contract was extended for the years 2013-2016. According to the agreement between the Ministry of Education, Youth and Sports of Ukraine and the Football Federation of Ukraine, obligations of the parties with respect to the development of school football in Ukraine have been identified. Indicated joint obligations are stated below [2]:

- annual conduction of Ukrainian competition with the prizes of the club 'Leather ball' together with Association of amateur football of Ukraine, aiding the participation of teams from each region of Ukraine in all age groups;
- annual conduction of national school football tournament among girls;
- implementation of international and national social school football development projects – 'Open football lessons', 'Open fun football schools' (with SIDA – Swedish International Development Agency and Ministry of Internal Affairs of Ukraine) and 'Fair Game' (with GIZ – German Bureau of International cooperation);

- organization regional football development centers for young people, using the above mentioned social projects. Aiding in organization of the corresponding classes in secondary schools and sports camps;
- implementation to the schools' work existing and development new methodical materials about school football for physical culture teachers and students (textbooks, educational computer software, etc.), attracting to their development leading football experts;
- conducting training course for physical training teachers on football teaching methods in school;
- carrying out promotional activities at national level for physical culture teachers and students: a competition for the best innovation lesson of physical culture and the best lesson with elements of football, UEFA Grassroots football day in Ukraine and national sports festival 'Olympic lesson';
- annual analysis at joint meetings and nationwide seminars the state of school football development and the implementation of this Agreement;
- promoting the school football and aiding extensive coverage of joint activities in the media.

The liabilities of the Ministry of Education, Youth and Sports of Ukraine stated under the contract are the promotion and assistance in organization football sections among secondary schools, starting from primary school.

The liabilities of the Football Federation of Ukraine include:

- aiding the general educational institutions in all regions of Ukraine in establishing playgrounds and football fields with artificial covering;
- aiding the general educational institutions in all regions of Ukraine in providing them with the soccer ball;
- providing the best secondary schools in the area of school football development with kits of tools and methodical materials 'All for football lesson'.

In 2005, a training program for football sections for 1-11 classes of secondary schools was developed. Learning program involves the study of theoretical issues in football, physical, technical, tactical training, homework and acceptability learning standards and requirements. However, in our opinion, the current program requires further improvements, namely:

- taking into account the succession of program and regulatory support between primary and secondary school;
- consideration of basic skills and skills that students need to get under the program;
- consideration of succession in learning basic theoretical knowledge of physical training between primary and secondary school;
- establishing the connection of program material on sectional football between ball school and variant module "football";
- clarification and supplementing exercises for the development of physical qualities in different age periods;
- inclusion to the content of the curriculum approximate grid distribution of teaching hours;
- inclusion to content explanatory notes that would fully disclose the implementation specificities of the curriculum;

- addition to program content acceptability standards of physical development and preparedness of students.

The rapid development of program material, as a lesson of physical culture with elements of football [9] and sectional work with football in secondary schools took place during 2008-2013. Over these years, there was developed and implemented textbook 'Football at school' [1], which addressed methodological and organizational issues of teaching and conducting studies football at school, football history, technique and tactic of the game, the physical and psychological preparation.

Football Federation of Ukraine devotes much attention to the development of methodical support for teaching football at school, including sectional work. During 2008-2013 years, several electronic media programs were developed: 'School football' (2011), 'Your health is in your hands' (2008), 'Football and health' (2008), 'Football is a source of health' (2008), 'Methodical materials for preparation of young football players' (2008), 'Selection on the initial stages of preparation of young football players' (2008); training manuals: 'Respect your health' (2011), 'Fair Play' (2011), 'Physical training of pupils of grades 1-11 in the process of training of football' (2013), which contain the theoretical material, teaching methods of studying technical, tactical elements in football, photo and video materials, self-study development works on tactics, models of filling of school documentation needed to the teachers, planning and monitoring of the dynamics of physical and technical training of students.

Analysis of the current state of organizational and methodological support of sectional football at schools has defined the problem areas:

- imperfection of legislative support for the development of football;
- lack of cooperation mechanism between central and local executive authorities, local authorities, Football Federation of Ukraine, other stakeholders in football, enterprises, organizations and institutions in addressing issues related to the development of football;
 - collapse of the program of implementation in secondary schools lessons of physical culture with elements of football;
 - improper conditions for playing football in the secondary schools, as most of the school playgrounds are in poor condition and are traumatic;
 - lack of centralized programs of construction sites with natural and artificial covering for school football, programs of support educational institutions with soccer balls, sets of tools, equipment and materials;
 - the disbalance of the system of involving children and young people to mass football lessons at the place of residence and places of mass rest of the population;
 - the lack of a sufficient number of equipped and accessible places, where various population groups can play football;
 - ineffective actions of the state, the public and the private sector on popularization of football among children and youth;
 - insufficient number of modern sports facilities of the national football that belong to state or municipal property, and the discrepancy to the international standards of the vast majority of existing of such constructions;
 - discrepancy to modern requirements of scientific-methodical and medical-biological support of football development.

The study of the planning documents for physical culture has showed that, the main idea of calendar plans is the optimal distribution of training hours by elements of program material, but in most cases, the calendar plans are formal and do not support their creative use at work. However, advanced skills teachers prepare these documents taking into account the availability of the material base of schools, and the specificities of physical development and preparedness of students, because they prepare calendar plans for each class separately. In most cases in observed schools calendar plans for parallel classes were indistinguishable [7].

Conclusions.

1. School football, at present, is one of the most effective mechanisms of mass attraction of children to playing football and increasing their physical activity. The effective functioning of the school football education requires appropriate legal, organizational, human, scientific, methodological, financial, and technical support.

2. In recent years, there has been a rapid development of methodical maintenance of sectional football lessons in the secondary schools. Significant role in this development was played by Agreements between the Ministry of Education and Science of Ukraine and the Football Federation of Ukraine.

However, there still remain a number of outstanding issues in organizational-methodical support of sectional football lessons, namely:

- discrepancy to modern requirements of scientific-methodical and medical-biological support of football development;
- the state of sports tools, equipment, sports facilities and their total lack;
- the level of qualification of sectional football teachers at school;
- significant number of methodological materials do not meet the requirements of modern school and do not serve as systematic continuation of variable modules on physical culture.

3. Obviously, the system approach is needed to increase efficiency of football introduction in general educational institutions, that could define both organizational (selection and preparing places for training, material logistics, organization of the lessons, management of the group, selection training methods) and methodical support (the existence of government programs that meet modern requirements, planning of work, schedule of classes, methodical recommendations and other) of sectional work in football.

Prospects for further research. Further research on improvement of organizational and methodological support of sectional football lessons in the secondary schools is relevant.

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Alexander Tomenko: *Doctor of Science (Physical Education and Sport), Associate Professor; Sumy state pedagogical University name is A. S. Makarenko: Romenskaya str. 87, Sumy, 40002, Ukraine.*

ORCID.ORG/0000-0002-1097-965X

E-mail: rehabsc@rambler.ru

Denis Demenkov: *Sumy state pedagogical University name is A. S. Makarenko: Romenskaya str. 87, Sumy, 40002, Ukraine.*

ORCID.ORG/0000-0001-5683-0052

E-mail: denisdemenkov1@mail.ru

TYAGUR T.

Vasil Stefanyk Precarpathian National University

SCOLIOSIS PROBLEM IN MODERN ORTHOPEDICS

Abstract. Purpose: *this paper discusses the modern aspects of scoliosis in orthopedics. Material and methods:* *analytical review of modern specialized sources proposed by researchers of modern orthopedics. Results:* *the main issues highlighted features of the disease based on a systematic analytical approach highlights. The occurrence of scoliosis and progression of the disease should be considered a multifactorial process in terms of biomechanics. Spinal deformity is accompanied by a lateral curvature and torsion changes. The offset of the overall center of gravity of the body in toward the vertical axis of the spine has the great importance in the development of the disease. Manifestation of symptoms depends on the duration of the disease and the degree of scoliotic curvature. Progression of the disease often occurs in puberty child. Scoliosis may affect lung function and lead to heart failure. Conclusions:* *most rational classification, according to which all patients with scoliosis are distributed into two groups: those with congenital and acquired forms.*

Keywords: *scoliosis, spinal deformity, torsion, curvature of the spine.*

Introduction. One of the pressing issues of Orthopedics is the problem of Scoliosis. Scoliotic disease characterized by multiplanar deformity of the spine with damage to internal organs and body systems, manifested mainly in children and adolescents, and its frequency exceeds 15% of in the pathology of the musculoskeletal system, the detection rate does not tend to decrease. Scoliosis III-IV degree with significant cosmetic and functional impairment ranged from 1.5 to 2% [6].

Scoliosis is found in 2-3% of the population aged 10 to 15 years. This disease affects adolescents and adults, regardless of race or socioeconomic status. According to epidemiological studies, curvature of the spine in girls occurs 10 times more often than boys [17]. As noted by A. Sutula currently in the structure of morbidity in children and young people of school age is one of the first places are disorders of the musculoskeletal system, such as posture and scoliosis [13].

Scoliotic disease is one of the most common orthopedic diseases of childhood and adolescence. Specific factors course of scoliosis depends on the patient's age and the angle of curvature. The specificity of the disease characterized by high levels of disability caused by lesions in vital organs and systems progresses, due to disturbances that affect the quality of life [16].

Connection with academic programs, plans, themes. The research was conducted as part of the planned research work (research) 4/06 "Study of peculiarities of the adaptive capacity of the organism in ontogeny" (state registration

0106U000583), a component of research of theory and methodology of physical education and sports' development, experimental testing and implementation in the practice of physical rehabilitation measures health status of different population groups".

Goal of research: to investigate the current state of the children scoliosis problem.

Material and methods of research: the analytical overview of modern specialized sources proposed by researchers of modern orthopedics.

Results of research and discussing. Scoliosis is a pathology of the musculoskeletal system, accompanied with the syndrome such as:

- spinal curvature in the frontal and sagittal planes;
- torsion of the vertebral bodies and the ribs with a complex deformity of the chest;
- the gradual formation of costovertebral hump;
- changing the symmetry of the pleural cavity and lung volume;
- mediastinal shift;
- dysfunction of the cardiovascular and respiratory systems;
- dysfunction of the biomechanics of the spinal column;
- the presence of connective dysplasia syndrome [14].

A typical scoliosis feature is the spinal curvature, its lateral curvature and torsion changes (twisting), which is the earliest and accurate diagnostic symptom of such pathology. The main cause that leads to the progression of scoliosis is common center of gravity displacement of the body away from the vertical axis of the spinal column. Among the causes of scoliosis the various environmental factors and individual development are described. The most common causes of scoliosis are disadvantages of motor activity and inactivity that provoke lack of development of ligament-muscular system: weakness of the trunk, back and abdominals muscles. Definitely a negative impact on the performance of individual human organs and systems, especially on the cardiovascular, respiratory, central, autonomic, digestive systems. The degree of asymmetry naturally increases with the severity of pathology.

The research proved that the spinal curative of functional nature is common among preschool children in 25-30% of cases. The incidence of this pathology increases significantly in the age groups of 7-9 years (41%) and 13-15 years (63%), i.e. in the periods of intensive growth. Spinal curative of structural nature is often can be found in older students in 18-20% of cases. There is a predominance of frontal disturbances in the girls and the sagittal disturbances in the boys in all age groups. [7]

Scoliosis is usually characterized by a three-dimensional deformity of the spine, including curvature in the sagittal, frontal and transverse plane [1]. It is believed if the initial form of scoliosis is not detected in time specialists, podiatrists, or in some cases, patients do not seek help, then it leads to diagnosis only in years when the deformation begins much progress [4].

In the literature there are some discussions about the causes of scoliosis, which is not completely understood, but among the main reasons for the numerous experimental studies and clinical observations, many researchers are the main link in

the pathogenesis finds two main groups – congenital and acquired causes of scoliosis [15].

The most rational classification is proposed, in which the authors divide all patients with scoliosis in two groups: congenital and acquired forms. By congenital scoliosis forms are those which are formed in utero. They arise as a result of profound disturbance of regional differentiation of the spine in embryogenesis. Offset segments in early fetal life, or disturbance of ossification nucleus hypoplasia of the vertebral body leading to abnormalities of the vertebrae (defect brackets splitting vertebral body synostosis ribs, wedge-shaped vertebrae and halfvertebrae, extra ribs, hypoplasia of discs followed synostosis bodies on their level malformations of the neural tube lumbarization) [12, p. 154].

General view shows that the presence of one factor alone is not sufficient for the emergence and progression of scoliosis [3] because clinicians determine the complex factors that lead to changes in the torsion spine: 1) primary pathological factor (dysplastic changes in the spinal cord, vertebrae, discs); 2) metabolic or hormonal disorders that cause primary factor expression in a whole segment of the spine; 3) Article dynamic excitation – a factor necessary for the formation of vertebrae structural changes [9].

The appearance of scoliosis and the development of scoliosis disease should be considered a multifactorial process in terms of biomechanics – the result of the interaction of effects that violate the vertical position of the spine, and aim to maintain vertical figure [4].

The growth of the spine occurs with different speed at different periods. Particularly intensive growth is noticeable during the first year of life. Further there is some slowdown in the growth of the spine. During the spine formation four physiological torsions are being formed. Two torsions, pointing to the front, are called the cervical and lumbar lordosis, and two torsions, pointing to the back, are thoracic and sacral kyphosis [2].

The child's organism is constantly being rearranged morphologically as well as functionally. In the early school age, 7-12 years old, the skeletal system is not stable, because it is full of soft cartilage. At this age children are more excitable and mobile. Because of weakness and not completion of the skeletal system's development in case of unsustainable and irrational burden there is a development of variety of pathological changes and most often it's a lateral curvature of the spine. These features of the spine explain the ease of the development of different curvatures (scoliosis, kyphosis) that tend to occur mainly in the period of most rapid growth in children. In the high school age bones become stronger and thicker, but ossification processes are still ongoing. The spine becomes more resilient and it can withstand heavy loads. The muscle strength is noticeable increased. The formation of scoliosis is completed and the appeared defections are hardly amenable to reformation [3].

Scoliosis, when developing in children, progresses as long as the child grows. At this time, the progression is most expressed in the prepubertal period due to the asymmetry of growth, unlike adults who have scoliosis developing due to disc degeneration and osteoarthritis phenomena [5].

Up to 90% of bone mass is formed by the end of the teenage period and the beginning of the adolescent period, boys – by 18 years old and girls – even earlier [8]. Adolescence and first years of mature age are characterized by the end of growth processes and the final formation of morphological and functional components of basic life support systems [17].

The development of scoliotic deformity accompanied mioadaptive postural responses that improve muscle tone and shortening one side and hypotension, symmetric stretching the muscles on the other hand [15]. At the heart of structural forms of scoliosis that progresses – the pathological mechanism of a closed circle – curvature of the spine creates an asymmetrical pressure on the vertebrae, eventually developing wedge deformity of the vertebral bodies, which exacerbates the distortions and leads to more asymmetric loads. It is believed that the presence kyphotic or asymmetric posture is one of the leading factors that give rise to curvature of the spine or progression [15].

Among experts, it is believed that the first torsion rotator is formed due to deformation of the intervertebral cartilage, and then, as the disease progresses, changes the bone structure of the vertebrae and there is torsion deformation [10]. It is proved that asymmetric prolonged static load on the spine, which increases can result in the development of a true scoliosis with structural changes in the vertebrae [11]. Early clinical signs of scoliosis is the asymmetry of the shoulders, the deviation of the line of spinous processes from the midline asymmetry standing height blades and asymmetry angle distances between the blades and the line of spinous processes, asymmetry "lumbar" triangles muscle "roller" asymmetry of the iliac wing.

At the beginning of the formation of scoliosis, in the case of small lateral curvature of the spine, on the convex side of the reflex develops a compensatory increase in functional activity of deep paravertebral muscles: long and short. This process increases the load on the deep paravertebral muscles convex side distortion and reduce the load on the muscles concave side. In case of progression of scoliosis occur degenerative changes overloaded muscles convex side of scoliotic arch and unfunctional muscle concave side, which reinforces scoliotic injury. Primarily affects both surface and deep back muscles [5].

How complex pathology of the musculoskeletal system at children and adolescents with multiplanar deformity of the spine, thorax and pelvis, scoliosis leads to morphological changes, which are involved in the disease to the heart, lungs, abdominal organs: characterized by functional impairment in many other organs and systems: cardio-respiratory, neuromuscular, digestive, urinary, accompanied by respiratory failure and hemodynamic appearance of pain [9].

Of pain, caused by stress and hip extensor muscles of the back in order to establish a balance in an upright position to connect with lumbar lordosis, which reduces dampening properties of the spine and eventually leads to the development of early degenerative changes [11].

Scoliotic curvature with significant rotation can lead to cosmetic deformities. In addition, large scoliotic curvature may affect lung function and in the most severe cases can lead to cardiac failure [1].

A characteristic feature of scoliosis is its tendency to progression. The fastest the process observed during puberty the child, and the associated rapid growth of the skeleton [8]. Progression of structural lesions of the spine results in deformation shape of the chest and pelvis. The main factor of these reasons is the lack of general and special developmental motor activity of the child – hypokinesia. Physiological needs of the child in motion during normal development – 17-22 thousand movements per day. Most children realizes this need only 60-70% [11].

In dysregulation of muscular work based change of posture and static spinal deformity. Muscle as determined by their tone as well as proprioceptive regulation and connective tissue structures. The development of scoliotic deformity accompanied the formation of a natural intervertebral functional blocks compensatory hypermobility, regional imbalances a postural muscles suboptimal static and dynamic stereotype. [10]

In the progressive development of scoliotic deformity distinguish the following main stages: torsion; lateral curvature; the presence of elements of kyphosis; deformity of the chest; strengthening the lumbar lordosis in the lumbar spine; low back pain in older age at adolescents; secondary changes in the pelvis; unilateral contraction of muscles; displacement of the heart and blood vessels; compression of the lungs by the retraction of the chest; change of the spinal cord and roots.

Curvature of the spine has always functional and structural components, the ratio of which depends on the type of scoliosis etiopathogenetical, disease duration and age of the patient [1]. Structural components of spinal deformity caused by vertebral wedge changes, torsion and fixation of organic elements, such as osteophytes, ossification communication, destruction and fibrosis of the intervertebral discs. Functional components – a shortening and sprains, muscle asymmetry of muscle tone, the initial stages of forming a vicious movement patterns [5].

Conclusions. On the basis of the scientific and methodological literature states that scoliotic disease – a disease of the whole organism, characterized by a complex of morphological changes of the spine, chest, body and internal organs. The main symptom of the disease is scoliotic curvature of the spine in the frontal plane and torsion of the vertebrae. The most rational classification is proposed, in which the authors divide all patients with scoliosis in two groups: congenital and acquired forms.

Prospects for future research is to conduct scientific developments aimed at early detection of scoliosis and its correction.

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Tyagur Taras: *Vasil Stefanyk Precarpathian National University: Shevchenko street 57, Ivano-Frankivsk, 76018, Ukraine.*

E-mail: taras.morozenko@gmail.com

WANG XUE MAN

Khebey Institute of Physical Education, China

THE ROLE OF THE MASS MEDIA IN THE FORMATION OF A HEALTHY LIFESTYLE IN STUDENTS OF THE PEOPLE'S REPUBLIC OF CHINA

Abstract. Purpose: *to define the attitude of students of the People's Republic of China to the role of the mass media in the formation of a healthy lifestyle. Materials and methods:* *the analysis of literary sources and documents, the systems analysis methods, a survey (a questionnaire – 90 students of the People's Republic of China), the methods of mathematical processing of data. Results:* *the students consider television to be the most meaningful mass medium in society that is noted by 40% of respondents. Further, they mark the World Wide Web (31%), print media (20%) and radio (9%). The most popular choice is television broadcasting and webcast of team sports competitions (31%), track-and-field events (19%), and children's competitions (17%). Conclusions:* *72% of students consider that the mass media are able to form the positive attitude to a physical culture in a population, while 49% of respondents suppose that the mass media can motivate a population to take physical exercises, and 51% insist that the mass media cannot do it.*

Keywords: *mass media, young students, taking physical exercises.*

Introduction. Television, print media, radio and World Wide Web play an important role in the formation of social processes. Due to the mass media, a population receive the information about the developments within a country and outside its national territory [1; 2]. Consequently, the need for the extension of information space in the direction of the formation of the positive attitude to physical culture and healthy lifestyle in society takes place. For this purpose, the public opinion about further perspectives of the mass media activity in this direction among the youth of China was studied in the process of the research.

The individual issues of a popularization of taking physical exercises among the people of various age groups in China through the mass media were touched in the works of such scientists as A.S. Bondar, 2009; Van Tszipu, 2000; Lan Davey, 2007; Ma Chinghan, 2004; Shi Dunlin, 2007, Zhu Feng, 2009 and others. A.I. Prikhodko, 1999, examined the historical aspects of physical culture popularization in native journalism, and L.N. Taran, 2002 and others – in visual art and broadcasting.

The goal of the research: to identify the attitude of students of the People's Republic of China to the role of the mass media in the formation of a healthy lifestyle.

The material and methods of the research. In order to realize the goal of the research, the complex of such methods as the analysis of literary sources, the systems

analysis, the survey (a questionnaire) among the Chinese students (90 respondents), the methods of mathematical processing of data, was used.

The research results and their discussion. In regulatory documents, which regulate physical education in educational institutions of the People's Republic of China, it is marked that it is necessary to carry out a systematic explanatory work with students and pupils, concerning the influence of physical exercises on their health, for effective mastering the learning material [4; 5]. Today, the mass media, as the additional sources, are able to solve the given tasks. The survey of students showed that currently the mass media, according to the opinion of 72% of respondents, are able to form the positive attitude to physical culture in young students of the People's Republic of China (Table 1). However, when it came to the possibility of the mass media influence on forming the motivation of a population for regular taking physical exercises, the opinions divided: 49% of respondents consider that the mass media are able to fulfil this function, and 51 % believe that the mass media cannot do it.

Table 1

Some aspects of the mass media functioning as for the formation of the positive attitude to physical culture in society

The survey direction	The number of answers
The general regularities	
The most influential mass medium in society	
a) Newspapers, magazines	20
b) Television	40
c) Internet	31
d) Radio	9
The presence of advertisement for alcoholic drinks and cigarettes during sports broadcasts	
a) Yes	17
b) No	63
c) Not sure	20
The part of information in the mass media about the positive influence of physical culture on human health	
a) 100%	33
b) 50%	53
c) 25%	12
d) 10%	2
e) 5%	–
f) 0%	–
The sources of receiving the information about the use of physical exercises	
a) Newspapers, magazines	16
b) Television	42
c) Internet	27
d) Radio	15
The informative part of the specialized sports mass media	
a) Only about professional and Olympic sports	11
b) About professional and amateur sports	16

c) About amateur and mass sports	13
d) About children's sports	22
e) About all the above-mentioned	38
The peculiarities of public opinion of the youth	
The informative part of the common mass media regarding the physical culture	
a) About the results of sports competitions	64
b) About mass sports	22
c) About the development of children's sports	14
d) About the positive influence of taking physical exercises on human health	–
The most popular sports programs	
a) The broadcasts of team sports competitions	31
b) The broadcasts of track-and-field events	19
c) The broadcasts of gymnastic events	15
d) The broadcasts of other sports competitions	7
e) The children's competitions	17
f) The reports on mass physical culture	11
The ability of the mass media to form the positive attitude to physical culture in society	
a) Yes	72
b) No	28
c) Do not know	–
The ability of the mass media to have a positive effect on a population and motivate it to take physical exercises on a regular basis	
a) Yes	49
b) No	51
c) Do not know	–
If the presence of obligatory time quota for the coverage of physical culture is necessary during the licensing of the mass media	
a) Yes	54
b) No	36
c) Do not know	10

The students consider television to be the most meaningful mass medium in society that is noted by 40% of respondents. Further, according to significance level, they distinguish the World Wide Web (31%), print media (20%), and radio (9%) (Fig. 1). The answers of respondents about the sources of information, from where they receive the data on the use of physical exercises, were divided in a similar way: television – 42%, the Internet – 27%, print media – 16% and radio – 15%.

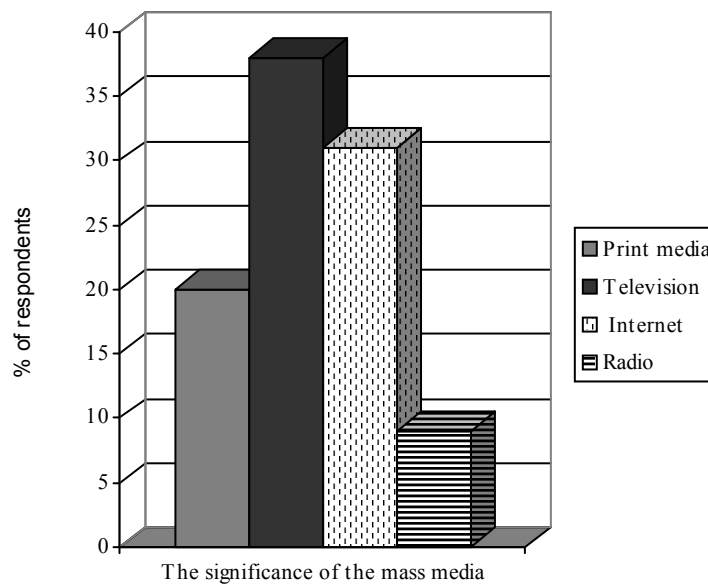


Fig. 1. The significance of the mass media for pupils and students of Hebei Province

According to the opinion of 53% of respondents, nearly a half of information blocks of the mass media should be oriented towards the presentation of any events, connected with physical culture (see Table 1).

In the informative part of the common mass media, the main part of information should consist of data on the sports competitions results (64%), the issues of mass sports – 22% of total information content, and the issues of children's sports – 14% (see Table 1).

During the determination of the informative part of the sports mass media, the respondents differed in opinions. Thus, 11% of students want to observe only the news of Olympic and professional sports in the sports mass media, 16% – the issues of professional and amateur sports, 13% believe that the stated mass media should be devoted to the mass and amateur sports events, and 22% of respondents suppose that they should cover the issues of children's sports. At the same time, 38% of respondents suggest including all the mentioned directions in equal proportions. Nevertheless, it is necessary to take into account that the most popular choice among the respondents is television broadcasts and webcasts of team sports competitions (31%), track-and-field events (19%) and children's competitions (17%) (Fig. 2).

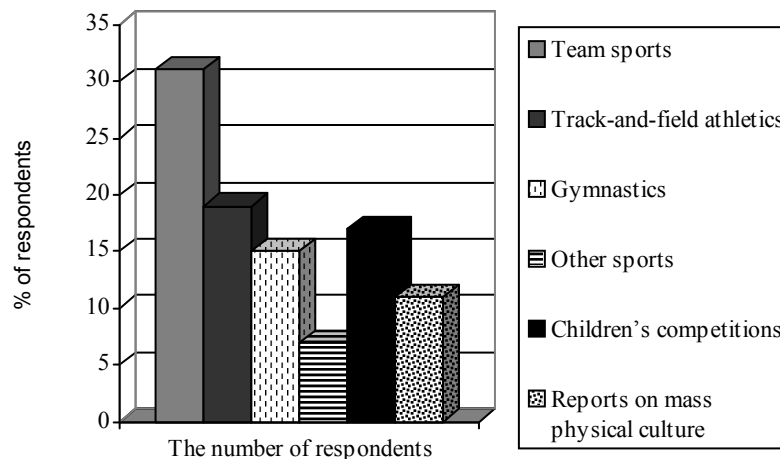


Fig. 2. The popularity of the kinds of sports competitions among students and pupils of Hebei Province

The television programs viewing showed that, during the broadcasting of sports competitions, the advertisements for alcoholic drinks and tobacco goods take place. At the same time, 63% of respondents would not want to see the advertisement for alcoholic drinks and cigarettes during viewing the sportscasts and physical culture programs (Table 1)

According to the opinion of 54% of respondents, the part of information, devoted to physical culture issues, should be regulated by the government at the time of the execution of a license for carrying out activities of the mass media. At the same time, the stated quota in the mass media, which could be controlled by government agencies, should be fixed.

The analysis of the matters, represented in Table 1, showed that young students and pupils are unanimous in determination of the part of the mass media materials, covering the issues of the use of physical exercises for human health. Thus, about a third of respondents suppose that the percentage of such information should be maximum – 100%, while 53% of the youth of the People's Republic of China consider that it should be limited to 50%. A majority of young respondents also unanimously admit that it is necessary to prohibit all kinds of the advertisements for any alcoholic drinks and cigarettes during the sports competitions and broadcasts.

Conclusions:

1. Some young students (72%) believe that the mass media is able to form the positive attitude to physical culture. At the same time, 49% of respondents consider that the mass media can have a positive effect on a population and motivate it to take physical exercises, and 51% of students insist that the mass media cannot do it.

2. A majority of the respondents (64%) consider that in unspecialized mass media the sports competition events should be covered by way of news.

3. A major part of the young respondents (54%) believe that statutory standards of indispensable quota for printing areas and broadcast time, allocated for

the issues of a healthy lifestyle, should be the obligatory condition during the mass media licensing.

The perspectives for further researches. The issue of the influence of the mass media on people's motivation for taking physical exercises requires the further scientific study.

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Wan Xue Man: *PhD (Physical Education and Sport); Khebey Institute of Physical Education: No. 82, Xuefu Road, Chang'an District, ShiJiazhuang,, HebeY, China.*

E-mail: wangxm949@yahoo.com.cn

VERENGA YU.

National Academy of Internal Affairs

THE STATE OF PHYSICAL TRAINING OF INTERNAL AFFAIRS OF UKRAINE EMPLOYEES ON THE STAGE OF PROFESSIONAL FORMATION

Abstract. Goal: *to explore the level of development of physical qualities of employees of Internal Affairs of Ukraine with different service-appointment categories on the stage of the professional formation. Material and Methods:* *the study involved 104 employees of the first age group with different service-appointment categories: 1-st – 32, 2-nd – 37, 3-rd – 35. The results of run on 100 m, pulling-up on a cross-beam and run to 1000 m during initial examinations on the courses of primary training were analyzed. Results:* *it is set, that the level of physical fitness of law enforcement officers on the stage of the professional formation is insufficient. The lowest level of physical fitness is definite at employees of 1-st category ($r < 0,05 - 0,001$). Among physical qualities the worst level of employees of all categories is fixed in the indicators of endurance. Conclusions:* *the results of research testify necessity of improvement of the operating program from physical training with employees of 1-st category on the courses of initial training by the increasing of level of basic physical qualities (endurance in particular).*

Keywords: *physical training, physical fitness, endurance, employee, stage of the professional formation.*

Introduction. Vocational training of Department of Internal Affairs (DIA) employees is a crucial factor in the quality of law enforcement, guarantee of lawfulness and the fight against crime. Physical training as an integral part of vocational training promotes the effective implementation of the service tasks, personal security of police officers and their environment. [5; 8; 9]. Basics of vocational training are laid into future DIA employees at in cadet years while studying at higher education institutions (HEI) of Ministry of Internal Affairs (MIA) of Ukraine.

However, analysis of the personal files of employees showed that on service in the Department of Internal Affairs (DIA) of Ukraine are about 40% of law enforcement officers who did not study at HEI of MIA of Ukraine. For professional formation of such employees initial training courses were organized while studying there is the formation of specialized knowledge and skills needed to law enforcement officer order to perform their duties in a given appointment [3; 8; 10].

Employees who did not study at HEI of MIA of Ukraine it is difficult to adapt to new conditions and employment activity in the Department of Internal Affairs

(DIA), because yesterday civilians fall into new conditions and employment activity, new real-life situation, which is accompanied by a substantial restructuring of mental and physiological states.

In works of many scientists [1; 4; 6; 7] found that physical training as one of the main subjects of the initial training has significant opportunities to accelerate the process of adaptation to the new conditions of service and employment activities, health promotion, improving the functional capacities of employees, advanced development of special physical qualities, building the skills necessary to perform service tasks.

However, analysis of regulations on the organization of physical training on the stage of professional formation[9; 10] enabled us to discover a number of reasons, which reduces its effectiveness: the low level of physical fitness and health of candidates for service; inadequate accounting for baseline physical state of employees; insufficient account of service and employment categories and specificity of future performance detention order; a significant amount of employment on special physical training.

Analysis of scientific works of S.M. Bespalyi, M.I. Anufrieva and other scientists [2; 4; 8], leads to the conclusion that the direction of solving a specific problem is to improve the existing program of physical training of DIA of Ukraine for initial training through the introduction of a new order of the planning and organization of physical training with employees depending on the service and employment categories.

Connection with academic programs, plans, themes. The study was performed in accordance with the Master Plan of research work in the field of physical culture and sports in 2011-2015. Ministry of Ukraine for Family, Youth and Sports, within the theme 3.8 "Theoretical and methodological basis of building a system of mass control and assess the development and physical fitness of different populations" (state registration number 0111U000192).

Goal of the research: explore the level of development of physical abilities of the MIA of Ukraine officials of different categories of service and at the stage of professional formation.

Materials and methods of the research: analysis and synthesis of the literature, teacher observation, testing, statistical methods.

To investigate the level of physical fitness of employees of different service and employment categories, we analyzed data of physical fitness test results during entrance examinations for initial training courses in different HEIs of MIA of Ukraine in 2009-2011 year. The study involved employees of the first age group (n=104) of different categories: 1st – 32 pers., 2nd – 37 pers., 3rd – 35 pers. We analyzed the results of running at 100 m, pulling-up and running at 1000 m. Evaluation was conducted in accordance with the order of MIA of Ukraine of 25.11.2003, № 1444 "On organization of training soldiers and official grandeur of the bodies of internal affairs of Ukraine" with amendments.

Results of the research and its' discussion. Stage of professional formation – is vital to the performance of each employee. To proceed efficiently stage marked for

employee of MIA of Ukraine initial training was organized [9; 10]. Initial training – a process of forming at DIA employees' special knowledge and skills necessary to perform their duties on a particular appointment [10]. Initial training is carried out sequentially in three stages: first – study of the post under the direction of supervisors and mentors (duration – 1 month); second – study at the initial training courses (4-6 months); third – internship positions on the appointment (2-4 months) [10].

System of physical training of DIA stage of professional formation includes a overall physical condition (OPC) and special physical training (SPT) [8; 10]. Scientists [2; 6; 8] argue that the high level of OPC allows us to develop the basic physical quality, improve the functionality of the body, improve health, increase performance and form the basis for the development of the special abilities of employees. In the absence of adequate levels of OPC is impossible to develop and enhance the special physical qualities and improve the efficiency of professional activity.

Depending on the nature and specificity of service all the permanent staff of the DIA is distributed on three service-employment categories [5; 10]: 1st – overbearing of the Office of Ministry of Internal Affairs of Ukraine, the staff of research institutions, educational institutions, Ministry of Internal Affairs of Ukraine; 2nd – private and overbearing part of city, district, linear bodies, state automobile inspection, police protection, patrol; 3rd – private and overbearing composition rapid reaction units, special and special purpose.

It should be noted that the physical training at the stage of professional formation should be organized in accordance with the service and the categories of officials and consider the requirements of specific jobs for trained employees. However, an analysis of curricula initial training courses showed that almost all courses most of the time, which is defined for classes in physical training, emphasis on special of physical training. For example, on the initial training of employees, adopted by an investigator (2nd category) of 54 – 50 hours allocated for lessons on special physical training; of employees on courses taken in the Special Forces ("Titan", "Griffin" (third category)) of 30 – 28 hours allocated to a special physical training; on the initial training of the National Academy of Internal Affairs (1st category) from 78 hours to 52 hours allocated to a special physical training. Thus, the analysis showed that if the initial training courses for employees of third category ratio means OPC and SPT is sufficiently substantiated, for the of employees of the 1st category system for organizing and conducting physical training on the initial training needs to be improved.

To investigate the physical fitness of employees of different categories we analyzed the level of development of their physical qualities while studying at the initial training courses. Thus, analysis of the results of running at 100 m showed that the level of high-speed qualities of employees of 1st service and employment categories are the lowest (14.1 s) between the studied groups of employees (Table 1). Results of employees of 2nd category in races at 100 m are the best in comparison to police officers of the 1st category with 0.1, but the difference is unreliable ($p > 0,05$).

Table 1

Level of physical fitness of employees MIA of Ukraine of different service-appointment categories (2009-2011 yy, $\bar{X}\pm m$, n=104)

Examined parameters	Service-appointment category			Significant		
	1-st (n=32)	2-nd (n=37)	3-rd (n=35)	P1-P2	P2-P3	P1-P3
Running at 100 m, sec	14,1±0,12	14,0±0,11	13,1±0,10	>0,05	<0,001	<0,001
Pulling up on the bar, times	10,9±0,49	12,1±0,44	14,3±0,37	>0,05	<0,001	<0,001
Running at 1000 m, sec	231,2±4,16	218,4±3,67	201,3±3,42	<0,05	<0,001	<0,001

Note. P1-P2 – a significant difference between the rates of development of physical qualities between employees of 1st and 2nd categories; P2-P3 – a significant difference between the indicators of employees of 2nd and 3rd categories; P1-P3 – a significant difference between the indicators of employees of 1st and 3rd categories.

The best indicator of the development of high-speed qualities is fixed at employees third category – with 13.1 sec, 0.9 sec better than at employees of 2nd category ($p < 0,001$) and 1 sec – the 1st category ($p < 0,001$) (Table 1). Level of speed qualities in all categories of employees meets regulatory requirements. However, when employees of 1st and 2nd categories this level is assessed as "satisfactory", law enforcement officers of third category – have "good".

Examination of power indicators of firstly certified employees of different categories of service and appointments on the results of pull-ups on the bar indicates that the worst of all employees have an average value of the 1st category – 10.9 times (Table 1). Employees of 2nd category have higher power rates, in comparison with similar employees of 1st category 1.2 as large ($p > 0,05$), and law enforcement officers have the third category – 3.4 as large ($p < 0,001$). The difference between the results in pull-ups of employees of 2nd and 3rd categories is 2.2 times and is reliable ($p < 0,001$) (Table 1).

In accordance with the installation of a physical training power rates of MIA of Ukraine employees of all three service-appointment categories are within regulatory requirements and meet the "good".

Analysis of the endurance level of MIA of Ukraine employees showed that the worst indicators in races at 1000 m were found at employees of 1st service-appointment category. They are to 231.2 sec (3 min 51 sec) and in comparison with regulatory requirements are assessed for "unsatisfactory" (Table 1). Employees of 2nd category in endurance indicators are significantly better than those at law enforcement officers of 1st category with 12.8 sec ($P < 0.05$), are from 218.4 sec (3 min 38 sec), but also assessed for an unsatisfactory rating.

The best results on the run at 1000 m were found at employees of third category. They are to 201.3 sec (3 min 21 sec) and are significantly better in comparison with employees of 2nd category, with 17.1 sec ($P < 0,001$), and the 1st category – with 29.9 sec ($p < 0,001$) (Table 1, Fig. 1).

Analysis of endurance level of employees of third category in comparison with the standards for this category of employees has shown that they meet the "good". This indicates that the physical fitness of employees for special purposes of

subsections (third category) put high requirements and accordingly, law enforcement officers who are selected in these units have a high initial level of overall physical condition.

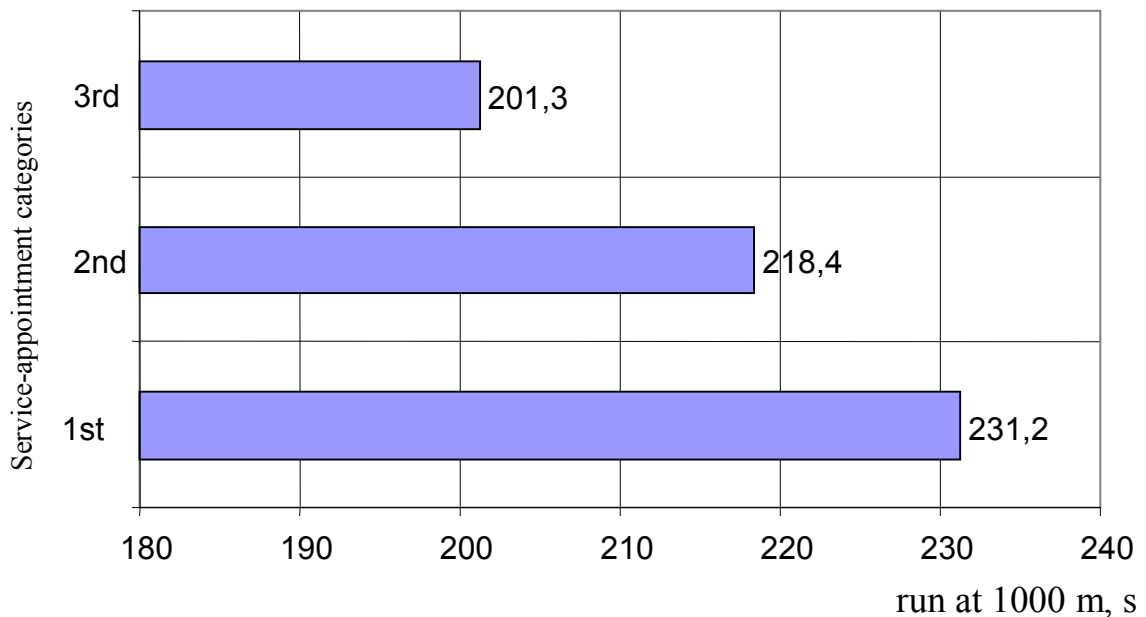


Fig. 1. Endurance level of MIA of Ukraine employees of different service-appointment categories on the results of run at 1000 m (n=104, s)

Analysis of position on Physical Training of DIA of Ukraine № 1444 from 25.11.2003 year revealed that the overall assessment of physical training of employees is determined by the results of the three control exercise (running at 100 m, pull-ups, running at 1000 m). Found that in the case of an employee evaluation "unsatisfactory" for the implementation of one of three exercises, and other at least "satisfactory" and "good" overall rating will be positive.

Thus, the analysis of data passing standards of employees of 1st service-appointment category when applying for initial training courses showed that 67.3% of employees who were rated "unsatisfactory" in running at 1000 m, due to the successful completion of the other two standards received general rated "satisfactory". Employees of 2nd category overall rating of physical training is defined as "satisfactory", at law enforcement officers of third category – is "good".

Comparative analysis of physical fitness level of MIA of Ukraine employees of different service-appointment categories showed that the lowest level of development of physical qualities registered at employees of 1st category, which determines the need for in-depth study of the problems of physical training of this particular category. Physical qualities of newly-certified employees have the worst level of physical endurance.

The analysis we've made emphasizes the importance of developing basic physical qualities (eg endurance) of employees of 1st service-appointment category on initial training courses, using means of overall physical condition. This demonstrates the need for improvement of the existing physical conditioning program with employees of 1st category on initial training courses to accelerate the process of

adaptation to new conditions of training and service, enhance their health, forming the basis for improving the performance SPT, improvement efficiency subsequent performance.

Conclusions. It was found that the physical fitness level of MIA of Ukraine employees at the stage of professional formation is not sufficient to ensure a high level of future service activity. The lowest level of physical fitness found at employees of 1-st service-appointment category ($p < 0,05-0,001$). Among the physical qualities of the worst level of all categories of employees registered in terms of endurance. At law enforcement officers of 1st category average results on the run to 1000 m 3 min 51 s and assessed for "unsatisfactory".

Prospects for the following studies are to analyze indicators of physical condition and physical health of employees of different service-employment categories and determining the relationship between indicators of their physical fitness and health at the stage of the professional formation.

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Yuriy Verenga: *National Academy of Internal Affairs: Sq. Solomenskaya, 1, Kiev, 03035, Ukraine.*

E-mail: verenga@ukr.net

JATSULYAK H., VOVKANYCH A.

Lviv State University of Physical Culture

REHABILITATION EXAMINATION OF PATIENTS WITH HUMERUS FRACTURES AFTER A STABLE FUNCTIONAL OSTEOSYNTHESIS

Abstract. Purpose: *to establish the initial functional state of the upper limbs of patients with humerus fractures after a stable functional osteosynthesis. Material and methods:* *the study, based on the hospital № 1 of Drohobich city, involved 30 patients of mature age. Results:* *the main problems of patients are the presence of pain, edema of a limb, decrease in range of movement in shoulder and adjacent joints, reducing the power capabilities and muscle tone. Conclusions:* *in comparison with a norm, the significant deterioration in the functional state of the affected upper limb of the patient after surgery regarding a fracture of surgical neck of humerus, and, in particular, the range of movement of flexion and extension, adduction and abduction of the shoulder of the affected limb of patients, is identified.*

Keywords: *physical rehabilitation, fracture, humerus, osteosynthesis, examination.*

Introduction. The upper limb is a complex biomechanical system, the elements of which are functionally interconnected. Thus, the injuries of one or another part will lead to the dysfunction of all upper limb in whole. The affection of a shoulder joint elements and reduction of its functional activity cause maximal unfavorable influence on the upper limb functioning [6].

The fractures of surgical neck of humerus belong to severe injuries and have a negative traumatologic characteristic [7]. The significant number of fractures nonunions and their complications induced the doctors to development and usage of new treatment techniques and refusal of single-step reduction with the subsequent plaster fixation. It also concerns the treatment with a help of skeletal traction method, which is used only as preparation for surgery now. Currently, the preferred treatment is the operative one, and the conservative treatment is used only in extreme cases [5].

In native literature, only individual physical rehabilitation techniques for the patients with various injuries and musculoskeletal system disorders are considered, but they do not provide for the initial analysis of movement functions state [3].

The important component of the activity of physical rehabilitation specialist is carrying out the rehabilitation examination with further identification of motional limitation and main functional disorders of a patient, which is of key importance for making a rehabilitation diagnosis, planning and prediction of physical rehabilitation process [4].

The rehabilitation process plan should ground on basis of movement abilities of physical condition, the presence of concomitant diseases or postoperative complications [2].

The meticulous examination of a patient and making his rehabilitation diagnosis is the basis of rehabilitation program construction. The rehabilitation examination includes the analysis of complaints and anamnesis of a patient, the conduction of clinical and instrumental examinations [8].

The connection of the subject with important scientific or practical plans.

The work is fulfilled according to the consolidated plan of research in the sphere of physical culture and sport for 2011-2015 on the subject «Physical rehabilitation of disabled people with musculoskeletal system disorders».

The goal of the research: to establish the initial functional state of the upper limbs of patients with humerus fractures after a stable functional osteosynthesis.

The tasks of the research:

1. To conduct the rehabilitation examination of functional state of the affected limbs after surgery at fractures of humerus.

2. To conduct the analysis of the received data of output level of functional state of the affected and healthy limbs and determine the main problems of the patients.

The material and methods of the research. On basis of the traumatologic department of the hospital № 1 of Drogobich city, 30 patients at the age from 36 to 60 (among them 26 women and 4 men), which were under medical treatment after a stable functional osteosynthesis because of humerus fracture in proximal part (surgical neck), were under our observation.

Since the examined patients had the identical kinds of humerus fractures and the same kind of stable functional osteosynthesis, all of them were combined into one group for carrying out the rehabilitation examination for the assessment of functional state disorder of a limb.

In order to determine the level of functional capacity of unaffected limbs of the patients of mature age that makes it possible to control the quality of rehabilitation activities and identify the dynamics of renewal processes, the following methods of the research were used: the analysis of scientific methodical literature, pedagogical observations, biomedical methods (goniometry, dynamometry, pain, and edema), and mathematical statistics methods.

The rehabilitation examination of all patients was conducted on the second day after surgery: the complaints of the patients were ascertained and medical history taking was carried out.

The assessment of subjective painful sensation of the affected limb of examined patients was determined on ten-point visual analogue scale VAS [8].

The measurement of circumference of the affected and healthy limbs segments was carried out with a help of a measuring tape. The measurement results of circumference of the affected and healthy limbs segments were compared with the received indicators of circumference of the healthy limbs segments of each person taken separately and the increase of circumference in the affected limb in percentage terms in relation to the healthy limb was identified. This percentage allows assessing the size of edema.

In order to determine the functional state of the injured limb, the manual examination of the affected shoulder was carried out.

For identifying the scope of movements in upper limb joints, we conducted the measurements of active range of movement, as passive movements in the surgically operated upper limb after a fracture of surgical neck of humerus are contraindicated [1].

The received results were assessed according to the recommended standards of Boychuk T. [8].

The results of the research and their discussion. The rehabilitation examination was begun with identification of vital indicators: body temperature ($^{\circ}\text{C}$), arterial tension (mm Hg) and heart rate (HR, BPM^{-1}). According to data of our examination of the patients, any abnormality was not marked.

All the examined patients complained of shoulder pain, describing it by intensity – severe, that is the indicant of acute inflammatory process. The patients estimated the pain at 8 points on average. During the rehabilitation examination, we discovered one more reason, which considerably increased the pain. It was a trigger point, which was situated on teres major muscle and was formed because of the forced attitude of a limb. Patients characterized the pain as intensive, deep, and dull one, which increased during pressing. The pain irradiated into shoulder and neck.

The results of the measurement of circumference of the affected and healthy limbs segments suggest that during the primary examination all patients had edemas in the area of the shoulder of operated limb. The average indicator of circumference at the level of the shoulder of the affected limb of those patients, which belonged to main group, was $34,52 \pm 0,84$ cm, and on the healthy limb – $31,47 \pm 0,64$ cm.

The comparison of the range of movements in the joints of the healthy upper limbs of the patients with age norm indicators shows that the indicators of flexion and extension, adduction and abduction in a shoulder joint of the healthy arm are within normal limits (flexion – 180° , extension – 60° , abduction – 180° and adduction – 40°). It is the evidence of the absence of functional limits of the range of movements in the healthy limb (Table 1).

Table 1

The indicators of active range of movement in joints of the upper limbs of the patients

The name of movement	The healthy limb	The affected limb
	M \pm m, $^{\circ}$	M \pm m, $^{\circ}$
The shoulder flexion	173,33 \pm 1,65	14,77 \pm 2,15*
The shoulder extension	59,27 \pm 0,32	32,70 \pm 1,29*
The shoulder abduction	171,67 \pm 1,16	34,93 \pm 1,99*
The shoulder adduction	38,70 \pm 0,37	10,13 \pm 0,76*
The flexion of elbow	142,83 \pm 1,01	86,33 \pm 3,56*

Note. The accuracy between limbs indicators is $*p < 0,000001$

As for the affected limb, the range of movements of flexion and extension, abduction and adduction of a shoulder is considerably below normal. Thus, the average indicators of active range of movements of a shoulder joint in the affected limb of the patients are the following: extension – 54,5%, flexion – 8,2%, adduction – 25% and abduction – 19% from the norm.

The identified indicators of the range of movements of flexion in elbow joint in the affected limbs were 58% from the norm. The received results prove that the patients had contractures, which were caused by the pain in the affected limb after surgery. The pain and edema have an influence on the limitation of the range of movements not only in a shoulder joint, but also in adjacent joints [1].

For identifying the muscle strength, the manual muscle testing (MMT) on ten-point scale was used. The identification of outcome indicators of muscle strength was carried out on the third or fourth day after surgery, since a general contraindication to conducting MMT is the first days after operation [1; 8].

The indicators of manual muscle testing of the upper limbs are provided in Table 2.

Table 2

The indicators of muscle strength of upper limbs (points)

The group of tested muscles	The shoulder flexor muscles	The shoulder extensor muscles	The shoulder abductor muscles	The shoulder adductor muscles	The forearm flexor muscles	The forearm extensor muscles
The affected limb, M±m	0,93±0,13	1,40±0,10	1,10±1,12	1,10±0,10	1,17±0,12	1,30±0,13

The average indicators of MMT group of muscles of the affected limb were significantly less than the norm ones. In particular, the muscle strength of the shoulder flexor muscle of the affected limb was 0,93±0,13 points. The considerable decrease of the muscle strength is explained by the tissues destruction in consequence of an injury and surgery. Consequently, the muscle strength decrease influenced the reduction of the active range of movements in the limb.

During the research process, the testing, which involved the active movement performance without external load, within the limits of the grade «3», was carried out. The grade «3» points is the most objective one, and the grades «4» and «5» are the subjective ones and, besides, they are often overestimated. The manual muscle testing was carried out only on the affected limb, as the strength of the muscles of the healthy limb was normal.

The dynamometric research on the injured limb was not conducted, as at the beginning of the rehabilitation treatment any loads on such limb are contraindicative [8].

Thus, the received results made it possible to determine the main problems of the patients after surgery regarding a fracture of surgical neck of humerus, such as pain, edema, reduced range of movements, decrease of the strength and tone of muscles of humerus and elbow bone and other complications, which allow formulating the corresponding goals and select the effective means and methods of the rehabilitation intervention.

The conclusions:

1. The analysis of the conducted rehabilitation examinations indicates the considerable deterioration in the functional state of the affected upper limb of the patient after surgery regarding a fracture of surgical neck of humerus, and, in particular, the range of movement of flexion and extension, adduction and abduction of the shoulder of the affected limb of patients in comparison with a norm. Thus, the

average indicators of active range of movements of a shoulder joint in the affected limb of the patients are the following: extension – 54,5%, flexion – 8,2%, adduction – 25% and abduction – 19% from the norm. The identified indicators of the range of movements of flexion in elbow joint in the affected limbs were 58% from the norm.

2. The main movement problems of such patients, which demand the correction with a help of physical rehabilitation means and methods, are the following: the presence of pain, edema of a limb, decrease in range of movement in shoulder and adjacent joints, reducing the power capabilities and muscle tone.

The perspectives for further researches. Hereafter, we will use the dynamometric method for receiving a complex information about the functional state of hand muscles, the stage of their development. The fixation of results of the research of dynamometry at the beginning of the examination on a healthy hand will further give a possibility to control effectiveness of the rehabilitation process and quickness of lost functions recovery on the affected limb.

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Halyna Jatsulyak: *Lviv State University of Physical Culture: Str. Tadeusz Kosciuszko, 11, Lviv, 79000, Ukraine.*

ORSID.ORG/0000-0002-1870-7755

E-mail: jaculjakg@mail.ua

Andriy Vovkanych: *PhD (Biology), Professor; Lviv State University of Physical Culture: Str. Tadeusz Kosciuszko, 11, Lviv, 79000, Ukraine.*

E-mail: avovrinfiz@i.ua

AUTHORS

A

Alexandrov U. 122–127
Alexandrov U. 128–137

B

Bezpaliiy S. 92–98
Bublyk S. 115–121

C

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N. Kantsedal

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Kharkiv State Academy of Physical Culture

Klochkivska Str. 99, Kharkiv, 61058, Ukraine

+38 (0572) 705-21-02

sport-kharkov@mail.ru