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The research of indicators of speed of movements at girls in rowing

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Purpose: *to investigate indicators of physical quality of speed and components of its elements.*

Material & Methods: *girls of three age groups of different sports qualification, who specialize in rowing, were examined. Rate, time and speed of the single movement, frequency of movements were defined by the developed by us technique of measurement of effect of training action, and also sensomotor reactions to sound and light irritants when modeling conditions of training and competitive activity were investigated.*

Results: *the conducted researches characterize specific psychophysiological features of organism of a sportsman. It is possible to apply the offered technique of the research of effect of training action to the purposeful studying and development of physical quality of speed in the training process. Formation and improvement of motor abilities in the concrete aged ranges is carried out in connection with high rates of development of morphological and functional indicators in the sensitive periods.*

Conclusions: *the age of 13–18 years has the most optimum prerequisites for the improvement of motive qualities and formation of speed of movements. Changes of rate, time, speed, frequency of movements, time of sensomotor reactions to sound and light irritants occur under the influence of training.*

Keywords: *rate, time and speed of movement, frequency of movements, time of sensomotor reactions to sound and light irritants.*

Introduction

The physical quality of speed is complex of functional properties of the person, defining high-speed characteristics of motor actions directly and mainly that promotes opportunity to carry out the movements with certain speed in the interval of time, minimum for these conditions, with necessary frequency and intensity, which depend on animal force and, are characterized by time of the hidden period of motive reaction, speed of the single movement, frequency of movements in unit of time and derivative of these indicators – movement speed in space. The reliable interrelation doesn't always exist between separate manifestations of speed, so high speed of movements can be combined with the slowed-down motive reaction [2; 9; 11].

Indicators of speed of movements and their development are defined by mobility of nervous processes, coordination of muscle work of the central nervous system, features of structure and contractile properties of muscles that is observed in specific forms of high-speed and power qualities, including elasticity of muscles, their ability to relaxation, volume of movements in joints, by the level of proficiency in technique in sports practice [7; 9].

High-speed abilities are the least trained physical quality of the person. It is caused, first of all, by the fact that their physiological basis is the property of the central nervous system which is poorly giving in to the improvement – mobility of nervous processes. Elementary forms of manifestation of speed of movements are rather independent from each other and this property is traced throughout age development of pupils [8; 11].

Speed development as physical quality is caused by the sensitive periods and the concept of primary improvement of these or those parties of physical condition of organism when there is their noticeable natural growth. The younger school age is the major for stimulation of motive preparedness of pupils and first of all such physical qualities as speed and coordination of movements. Purposeful pedagogical influence promotes the development of these qualities at higher level [3; 6].

The age from 7 to 11 years is considered the optimum period for the development of high-speed abilities both at boys, and at girls. The muscular strength and high-speed and power qualities most intensively increase at the initial stages of the pubertal period. The muscular strength of back and legs of girls intensively increases from 9–10 years old. Two periods of strength gain of muscles of legs stand out clearly at boys: from 9 to 11–12 years old and from 14 to 17 years old. The growth of various indicators of speed continues till 14–15 years old to a lesser extent. Stabilization of results in indicators of speed of simple reaction and the maximum frequency of movements occurs to this age actually. However, purposeful influences improve the development of high-speed abilities which can increase by 5–20% and at more advanced age at special training [1; 5].

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The development of high-speed abilities takes the important place in physical education of children as many pupils cannot achieve good results in run, jumps, throwing, mainly, in view of underdevelopment of the main motive qualities – force, speed, endurance, dexterity, flexibility. High-speed abilities are necessary in many sports. This quality is closely connected with technique of performance of exercises, muscular strength, flexibility, good coordination of movements. Speed is gathered due to the improvement of these qualities [3; 10; 12].

The purpose of the research

To investigate indicators of physical quality of speed and components of elements – rate, time and speed of the single movement, frequency of motor actions.

Material and Methods of the research

The girls, pupils of Highest school of physical culture and students of HEI, specializing in rowing at the age of 13–14 years (the first group of 27 people, the 2nd sports category), 15–16 years (the second group of 25 people, 2 and 1 sports categories) and 17–18 years (the third group 21 persons, first-grade sportsmen and candidates for the master of sports) were examined. Sensomotor reactions to sound and light irritants were investigated, and also rate, time and speed of one movement, frequency of movements which were studied in three periods of the test were determined by the developed by us technique of measurement of effect of the training action and were registered in the automatic mode. In the first period of the test, lasting 15 s, the task – fast increase in motor actions from scratch to maximum – start push, in the second period, lasting 60 s, – maintenance of optimum speed of movements – remote speed, in the third, during 15 s – finishing acceleration, and also the total indicator on the entire periods of the test characterizing all three types of high-speed work was set. The process of testing models typical conditions of training and competitive activity and estimates performance of task. The technique of the research is published in detail in *Slobozhans'kiy naukovo-sportivniy visnik*, 2015, No. 4(48), pp. 19–25 [4].

Results of the research and their discussion

The following data (tab. 1) were obtained in the investigated group of girls of 13–14 years old, specializing in rowing. Rate of movements was on average 22,3±0,99 at the maximum size of 26 movements and minimum 18 movements, time of one movement was 0,672 s, at the best result – 0,577 s and the worst – 0,833 s; speed of one movement equaled 0,446 $m \cdot s^{-1}$, at the best result – 0,520 $m \cdot s^{-1}$ and the worst – 0,360 $m \cdot s^{-1}$; frequency of movements was noted on average 1,48 Hz, at the best indicator – 1,73 Hz and the worst – 1,20 Hz in the first period of the test of measurement of effect of the training action. The maximum indicators were more average size for 16,46%, and minimum – is 23,95% less.

Rate was defined by the size of 25,2±1,45 movements, at the best result – 33,75 movements and the worst – 22 movements, time of one movement equaled 0,585 s, at the best indicator – 0,445 s and the worst – 0,682 s; speed of one movement was defined by size 0,512 $m \cdot s^{-1}$, at the best result –0,674 $m \cdot s^{-1}$ and the worst – 0,439 $m \cdot s^{-1}$; frequency of movements was on average 1,71 Hz, at the best result – 2,25 Hz and the worst – 1,47 Hz in the second period of the test of the research of effect of the training action. The maximum indicators were more average size for 31,46%, and minimum – is 16,58% less.

Rate was equal 27,4±0,61 movements, at the best result – 35 movements and the worst – 22 movements; time of one

Table 1

Indicators of physical quality of speed (girl of 13–14 years old, rowing)

Indicators			M±m	M_{max}	M_{min}
Effect of the training action	First period	rate (number of movements)	22,3±0,99	26	18
		time of one movement (s)	0,672	0,577	0,833
		speed of one movement ($m \cdot s^{-1}$)	0,446	0,520	0,360
		frequency of movements (Hz)	1,48	1,73	1,20
	Second period	rate (number of movements)	102,5±5,82 (25,5±1,45)	135 (33,75)	88 (22)
		time of one movement (s)	0,585	0,445	0,682
		speed of one movement ($m \cdot s^{-1}$)	0,512	0,674	0,439
		frequency of movements (Hz)	1,71	2,25	1,47
	Third period	rate (number of movements)	27,4±0,61	35	22
		time of one movement (s)	0,547	0,429	0,682
		speed of one movement ($m \cdot s^{-1}$)	0,548	0,699	0,439
		frequency of movements (Hz)	1,82	2,33	1,47
	Total	raet (number of movements)	152,0±3,06 (25,3±1,01)	196 (32,6)	131 (21,8)
		time of one movement (s)	0,592	0,460	0,687
		speed of one movement ($m \cdot s^{-1}$)	0,506	0,652	0,437
		frequency of movements (Hz)	1,69	2,17	1,45
Time of sensomotor reaction					
		Sound (s)	0,210±0,044	0,199	0,222
		Light (s)	0,259±0,017	0,200	0,340

Note. *The data, which were provided to uniform temporary indicator – 15 s, in particular, 102,5:4=25,5 movements are specified in brackets.*

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movement – 0,547 s, the best result – 0,429 s, the worst – 0,628 s; speed of one movement – 0,548 m·s^{-1}, the best result – 0,699 m·s^{-1}, the worst – 0,439 m·s^{-1}; frequency of movements – 1,82 Hz, the best result – 2,33 Hz, the worst – 1,47 Hz in the third period of the test of determination of effect of the training action. The maximum indicators were more average size for 27,51%, and minimum – is 24,83% less.

Rate made 25,3±1,01 movements, the best result – 32,6 movements, the worst – 21,8 movements; time of one movement – 0,592 s, the best result – 0,460 s, the worst – 0,687 s; speed of one movement – 0,506 m·s^{-1}, the best result – 0,652 m·s^{-1}, the worst – 0,437 m·s^{-1}; frequency of movements was defined by the size of 1,69 Hz, at the best result – 2,17 Hz and the worst – 1,45 Hz in the total size of the test of the research of effect of the training action of indicators of physical quality of speed at girls of 13–14 years specializing in rowing. The maximum indicators were more average size for 28,41%, and minimum – is 16,55% less.

Time of sensomotor reactions to sound irritant equaled 0,210±0,044 s on average, at the best result – 0,199 s and the worst – 0,222 s; it was defined on light irritant with an average size of 0,259±0,017 s, at the best result – 0,200 s and the worst – 0,340 s.

The analysis of the conducted researches showed that rate of movements, time and speed of one movement, the frequency of movements big differences of the studied indicators were observed at sportswomen 13–14 years at which in the first period of the test between the best and worst indicators rather with average size made 40,48%; in the second period – 48,27%; in the third period – 52,38%; on total indicator – 44,96%; time of sensomotor reactions between the best and worst indicator changed to sound irritant till 11,24%, light – till 60,78%.

Rate of movements increased by 14,35%, time of one movement decreased by 14,87%, speed of one movement increased by 14,81%, the frequency of movements increased for 15,54%; in the third period in comparison with the first and second periods, respectively, rate increased by 22,87% and 7,4%, time of one movement decreased by 22,85% and 6,95%, speed of one movement increased for 22,87% and 7,03%, the frequency of movements increased by 22,97% and 6,43% compared with the first period in the second period. Rate of movements was more, than in the first period for 13,45%, it is less, than in the second and third periods respectively for 0,79% and 8,31%; time of one movement is less, than in the first period for 13,5% it is more, than in the second and third periods respectively for 1,19% and 8,23%, speed of one movement is higher, than in the first period for 13,45% and less, than in the second and third periods for 1,19% and 8,31%, the frequency of movements is more, than in the first period for 14,19% it is less, than in the second and third periods respectively for 1,18% and 7,69% on total indicator.

The following data were obtained in the investigated group of girls of 15–16 years, specializing in rowing (tab. 2). Rate of movements was on average 26,0±1,25 at the maximum size – 37 movements and minimum – 19 movements; time of one movement was 0,576 s, at the best result – 0,405 s and the worst – 0,833 s; speed of one movement equaled 0,520 m·s^{-1}, at the best result – 0,741 m·s^{-1} and the worst – 0,425 m·s^{-1}; frequency of movements was noted on average 1,73 Hz, at the best indicator – 2,47 Hz and the worst – 1,27 Hz in the first period of the test of measurement of effect of the training action. Rate was defined by the size of 29,0±0,55 movements, at the best result – 32 movements and the worst – 23 movements; time of one movement equaled 0,517 s, at the best indicator – 0,469 s and the worst – 0,652 s; speed of one movement was measured of 0,580 m·s^{-1}, at the best result 0,639 m·s^{-1} and the worst – 0,475 m·s^{-1}; frequency of movements was on

Table 2

Indicators of physical quality of speed (girl of 15–16 years old, rowing)

		Indicators	M±m	M_{max}	M_{min}
Effect of the training action	First period	rate (number of movements)	26,0±1,25	37	19
		time of one movement (s)	0,576	0,405	0,705
		speed of one movement (m·s^{-1})	0,520	0,741	0,425
		frequency of movements (Hz)	1,73	2,47	1,27
	Second period	rate (number of movements)	116,0±2,23 (29,0±0,55)	128 (32)	92 (23)
		time of one movement (s)	0,517	0,469	0,652
		speed of one movement (m·s^{-1})	0,580	0,639	0,475
		frequency of movements (Hz)	1,93	2,13	1,53
	Third period	rate (number of movements)	30,5±1,39	44	24
		time of one movement (s)	0,491	0,341	0,625
		speed of one movement (m·s^{-1})	0,610	0,879	0,480
		frequency of movements (Hz)	2,03	2,93	1,6
	Total	raet (number of movements)	172,0±7,52 (28,6±1,25)	244 (40,6)	136 (22,6)
		time of one movement (s)	0,523	0,369	0,662
		speed of one movement (m·s^{-1})	0,573	0,817	0,453
		frequency of movements (Hz)	1,91	2,71	1,51
Time of sensomotor reaction					
		Sound (s)	0,198±0,006	0,152	0,239
		Light (s)	0,217±0,005	0,167	0,247

Note. *The data, which were provided to uniform temporary indicator – 15 from, in particular, 116,0:4=29,0 movements, are specified in brackets.*

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average 1,93 Hz, at the best result – 2,13 Hz and the worst – 1,53 Hz in the second period of the test of the research of effect of the training action.

Rate was equal 30,5±1,39 movements, at the best result – 44 movements and the worst – 24 movements; time of one movement – 0,491 s, the best result – 0,341 s, the worst – 0,625 s; speed of one movement – 0,610 $m \cdot s^{-1}$, the best result – 0,879 $m \cdot s^{-1}$, the worst – 0,480 $m \cdot s^{-1}$; frequency of movements – 2,03 Hz, the best result – 2,93 Hz, the worst – 1,60 Hz in the third period of the test of determination of effect of the training action.

Rate made 28,6±1,25 movements, the best result – 40,6 movements, the worst – 22,6 movements; time of one movement – 0,523 s, the best result – 0,369 s, the worst – 0,662 s; speed of one movement has made 0,573 $m \cdot s^{-1}$, the best result – 0,817 $m \cdot s^{-1}$, the worst – 0,453 $m \cdot s^{-1}$; frequency of movements was defined by the size of 1,91 Hz, at the best result – 2,71 Hz and the worst – 1,51 Hz in the total size of the test of the research of effect of the training action of indicators of physical quality of speed at girls of 15–16 years old, specializing in rowing.

Time of sensomotor reactions to sound irritant equaled 0,198±0,006 s on average, at the best result – 0,152 s and the worst – 0,239 s; it was defined on light irritant with an average size of 0,217±0,005 s, at the best result – 0,167 s and the worst – 0,247 s.

The essential distinctions in the studied indicators were noted at sportswomen of 15–16 years old. The deviation between the best and worst indicators made rather with average size in the first period of the test: on rate of movements – 79,15%, time of one movement – 64,61%, speed of one movement – 64,86%, the frequency of movements of 78,99%; in the second period: on rate of movements – 36,43%, time of one movement – 36,34%, speed of one movement – 32,28%, the frequency of movements – 36,50%; in the third period: on rate of movements – 71,34%, time of one movement – 71,28%, speed of one movement – 71,17%, the frequency of movements – 71,21%; on total indicator: on rate of movements – 68,51%, time of one movement – 68,31%, speed of one movement – 69,07%, the frequency of movements – 68,37%; time of sensomotor reactions fluctuated: to sound irritant till 51,47%, light – till 37,76%.

Rate of movements increased by 11,53%, time of one movement decreased by 11,41%, speed of one movement increased by 11,54%, the frequency of movements increased for 11,56%; in the third period in comparison with the first and second periods, respectively, speed increased by 17,30% and 5,17%, time of one movement decreased by 17,31% and 5,29%, speed of one movement increased for 17,30% and 5,17%, the frequency of movements increased by 17,34% and 5,18% compared with the first period in the second period. Rate of movements was more, than in the first period for 10,01%, it is less, than in the second and third periods, respectively, for 1,39% and 6,64%; time of one movement is less, than in the first period for 10,13%, it is more, than in the second and third periods respectively for 1,16% and 6,51%, speed of one movement is higher, than in the first period for 10,19% and less, than in the second and third periods for 1,22% and 6,45%, the frequency of movements is more, than in the first period for 10,41%, it is less, than in the second and third periods respectively for 1,04% and 6,28% on total indicator.

The following data (tab. 3) were obtained in the investigated group of girls of 17–18 years old, specializing in rowing. Rate of movements was on average 27,0±1,26 at the maximum size – 31 movements and minimum – 22 movements; time of one movement was 0,555 s, at the best result – 0,483 s and the worst – 0,681 s; speed of one movement equaled

Table 3

Indicators of physical quality of speed (girl of 17–18 years old, rowing)

		Indicators	M±m	M_{max}	M_{min}
Effect of the training action	First period	rate (number of movements)	27,0±1,26	31	22
		time of one movement (s)	0,555	0,483	0,681
		speed of one movement ($m \cdot s^{-1}$)	0,540	0,621	0,441
		frequency of movements (Hz)	1,80	2,07	1,47
	Second period	rate (number of movements)	120,0±6,73 (30±1,68)	148 (37)	100 (25)
		time of one movement (s)	0,500	0,405	0,600
		speed of one movement ($m \cdot s^{-1}$)	0,600	0,741	0,500
		frequency of movements (Hz)	2,0	2,47	1,67
	Third period	rate (number of movements)	31,8±1,26	36	27
		time of one movement (s)	0,471	0,417	0,556
		speed of one movement ($m \cdot s^{-1}$)	0,636	0,719	0,559
		frequency of movements (Hz)	2,12	2,4	1,80
	Total	raet (number of movements)	178,0±6,17 (29,6±1,02)	217 (36,2)	173 (28,2)
		time of one movement (s)	0,505	0,415	0,520
		speed of one movement ($m \cdot s^{-1}$)	0,594	0,723	0,577
		frequency of movements (Hz)	1,97	2,41	1,92
		Time of sensomotor reaction			
		Sound (s)	0,186±0,005	0,159	0,198
		Light (s)	0,203±0,011	0,165	0,248

Note. *The data, which are brought to uniform temporary indicator 15 s, in particular 120,5:4=30 movements, are specified in brackets.*

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0,540 m·s^{-1}, at the best result – 0,621 m·s^{-1}and the worst – 0,441 m·s^{-1}; frequency of movements was noted on average 1,80 Hz, at the best indicator – 2,07 Hz and the worst – 1,47 Hz in the first period of the test of measurement of effect of the training action.

Rate was defined by the size of 30±1,68 movements, at the best result – 37 movements and the worst – 25 movements; time of one movement equaled 0,500 s, at the best indicator – 0,405 s and the worst – 0,600 s; speed of one movement was measured of 0,600 m·s^{-1}, at the best result – 0,741 m·s^{-1}and the worst – 0,500 m·s^{-1}; frequency of movements was on average 2,0 Hz, at the best result – 2,47 Hz and the worst – 1,67 Hz in the second period of the test of the research of effect of the training action.

Rate was equal 31,8±1,26 movements, at the best result – 36 movements and the worst – 27 movements; time of one movement – 0,471 s, the best result – 0,417 s, the worst – 0,556 s; speed of one movement – 0,636 m·s^{-1}, the best result – 0,719 m·s^{-1}, the worst – 0,559 m·s^{-1}; frequency of movements – 2,12 Hz, the best result – 2,40 Hz, the worst – 1,80 Hz in the third period of the test of determination of effect of the training action.

Rate made 29,6±1,02 movements, the best result – 36,2 movements, the worst – 28,2 movements; time of one movement – 0,505 s, the best result – 0,415 s, the worst – 0,520 s; speed of one movement made 0,594 m·s^{-1}, the best result – 0,723 m·s^{-1}, the worst – 0,577 m·s^{-1}; frequency of movements was defined by the size of 1,97 Hz, at the best result – 2,41 Hz and the worst – 1,92 Hz in the total size of the test of the research of effect of the training action of indicators of physical quality of speed at girls of 17–18 years, specializing in rowing.

Time of sensomotor reactions to sound irritant equaled 0,186±0,005 s on average, at the best result – 0,159 s and the worst – 0,198 s; it was defined to light irritant with an average size of 0,203±0,011 s, at the best result – 0,165 s and the worst – 0,248 s.

The following distinctions in the studied indicators were observed at sportswomen of 17–18 years. The difference between the best and worst indicators rather with average size made in the first period of the test: on rate of movements – 37,53%, on time of one movement – 37,61%, on speed of one movement – 37,46%, the frequency of movements of 37,46%; in the second period: on rate of movements – 43,33%, time of one movement – 43,46%, speeds of one movement – 43,51%, the frequency of movements – 43,26%; in the third period: on rate of movements – 30,99%, time of one movement – 31,19%, speeds of one movement – 26,82%, the frequency of movements – 30,99%; on total indicator: on rate of movements – 27,25%, time of one movement – 24,66%, speed of one movement – 24,67%, the frequency of movements – 24,95%; time of sensomotor reactions fluctuated: to sound irritant till 23,43%, light – till 45,20%.

Rate of movements increased by 11,11%, time of one movement decreased by 11,0%, the speed of one movement increased by 11,11%, the frequency of movements increased for 11,11%; in the third period in comparison with the first and second periods, respectively, speed increased by 17,78% and 6,0%, time of one movement decreased by 17,83% and 6,1%, speed of one movement increased for 17,78% and 6,0%, the frequency of movements increased by 17,78% and 6,0% compared with the first period in the second period. Rate of movements was more, than in the first period for 9,63% it is less, than in the second and third periods respectively for 1,36% and 7,34%; time of one movement is less, than in the first period for 9,9% it is more, than in the second and third periods respectively for 1,0% and 7,22%, the speed of one movement is higher, than in the first period for 10,0% and less, than in the second and third periods for 1,01% and 7,07%, the frequency of movements is more, than in the first period for 9,44% it is less, than in the second and third periods, respectively, for 1,52% and 7,61% on total indicator.

It is necessary to pay attention to versatile development and improvement of high-speed abilities (speed of reaction, frequency of movements, speed of the single movement, speed of complete actions) in combination with acquisition of motive skills, especially during the sensitive periods, at specialization of children, boys and girls in sports where speed of reaction or speed of action play the essential role in the training process.

The list of the examined sportsmen in each group is non-uniform on functional and psychophysiological state, sports qualification.

It is possible to apply the developed by us technique of the research of effect of the training action, at the same time the methods, consisting in the fastest repeated performance of the trained movements on signal, are most effective, analytical training in the facilitated conditions, speed of reaction and speed of the subsequent movements, definition of communication between speed of reaction and ability to differentiation of microintervals of time for the purposeful studying and development of speed of simple motive reaction.

Therefore, sportsmen perform the motive task with the maximum or various, in advance determined speed, estimate speed of its realization on the feelings and compare to real time of performance of exercise that improves the accuracy of performance of task and perception of time. The result is controlled and compared. Training in free management of speed of reaction happens at the same time.

Conclusions

At the development of physical quality of speed application of physical exercises of versatile orientation, especially those which develop the motor abilities, having high rates of natural increase in concrete age ranges of ontogenesis, is expedient. At the same time use of opportunities of the sensitive periods in physical education is carried out in connection with high rates of development of morphological and functional indicators.

Compliance of short-term high-speed loadings to functionality of teenagers is caused by high excitability of the innervation mechanisms, regulating activity of the motive apparatus, big mobility of the main nervous processes and high intensity of exchange.
High-speed abilities are one of the most important physical qualities, at the same time the teenage age has favorable prerequisites for formation of speed of movements, improvement of motive qualities. There are changes of rate, time, speed, frequency of movements, time of sensomotor reactions to sound and light irritants under the influence of training.

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Prospects of further researches. It is supposed to reveal other functional and psychophysiological indicators which can significantly change under the influence of training along with studying of traditional signs when forecasting sports abilities.

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The previous results of use of ethnic bathing technology in physical rehabilitation at consequences of injuries of the lower extremities

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Purpose: *to define methodical bases and possibilities of application of the modified Arab (as east) ethnic bathing procedure in complex physical rehabilitation of victims with injuries of the lower extremities at the polyclinic stage.*

Material & Methods: *analysis of urgent references, method of collecting empirical expert estimates.*

Results: *possibility of effective application of nonconventional methods of non-drug therapy, in particular, ethnic bathing technologies is defined on the example of the modified Arab (as east) bathing procedure, in complex physical rehabilitation of victims with injuries of the lower extremities at the polyclinic stage.*

Conclusions: *methodical opportunities of application of the modified by us techniques of the Arab (as east) ethnic bathing procedure in comprehensive programs of physical and psychological rehabilitation are confirmed by results of the analysis of literature, test procedures and number of expert estimates.*

Keywords: physical rehabilitation, trauma, east bath, ethnic bathing procedure.

Introduction

The continuous increase in frequency and volumes of armed conflicts, technogenetics catastrophes and natural disasters leads to the progressing increase of number of wounded, patients and victims. Mine-explosive wounds in armed conflicts entered the ten leading causes of death in the world and continue to increase at the beginning of the XXI century [1; 2].

The problem of the fastest restoration of combat preparedness and working ability of wounded and injured military and civilians is urgent decades in this regard for health service of the state of Lebanon. Ukraine has faced the similar problem quite recently on a substantial scale, but the relevance of the subject, unfortunately, constantly increases.

The complex of the held events at mine-explosive and gunshot wounds and injuries unites the concept «medical rehabilitation» [2; 3]. Physical rehabilitation of wounded and victims is the integral link of medical support of staff of armed forces and civilians of any country and strategic source of completion of sanitary military and social-labor losses in modern armed conflicts.

The search and foundation of active and effective ways of the fastest restoration of combat preparedness of the military personnel and civil efficiency of the population with application of new means and methods of physical rehabilitation is the urgent problem of any modern state which is involved in the military conflict.

The carried-out analysis of special literature allowed us to find out that the post-traumatic syndromes and pathological states arising after a while after extract from the patient's hospital with consequences of mine-explosive trauma and its transition to the polyclinic (sanatorium) stage of treatment are reflected in domestic literature sometimes selectively and obviously not enough. The rich orthopedic and neurologic symptomatology is characteristic of post-traumatic syndromes and pathological states after mine-explosive trauma long time, vegetative-trophic violations are shown. Such patients are under observation of neurologists, orthopedists and surgeons long time (N. V. Kornilov, 2006) [4].

Number of authors (N. M. Valeyev, 2004, V. M. Bogolyubov, 2006) [5; 6] consider that the post-traumatic period is clinically characterized by restoration of anatomic integrity of bone (the process of consolidation of fractured fragments comes to the end, wound is epithelized). At the same time, though restoration of anatomic integrity of bone occurred, obvious dysfunction of extremity is observed (muscular atrophy, rigidity in joints, cicatricial contractures, etc.). This period can proceed not only before the formation of secondary bone callosity, but also at the wrong treatment or its absence, drag on for years.

The established stages of treatment and actions of physical rehabilitation of victims in work of the rehabilitation center decide on consequences of mine-explosive trauma by the extent of restoration of functions and provide use at the polyclinic stage of generally blandly-training and training motive modes that allows speaking about rather significant exercise stresses on cardiovascular system and musculoskeletal system. It, in turn, opens opportunities for application as means of physical rehabilitation of hydro-bathing procedures, and both traditional means of hyper-thermal therapy, and elements of ethnic bathing procedures.

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When using the traditional methods of treatment, which are included in individual rehabilitation programs of victims with consequences of mine-explosive trauma, authors of techniques recommend options of the combined action of two or three methods for one session, for example, of combination of the hydro-procedure and manual underwater hydro-massage that, according to them, increases efficiency of physical rehabilitation (I. Ye. Slepenchuk, 1995) [7].

Thus, we have found out that the application problem in rehabilitation of nonconventional means and methods in classical medicine is insufficiently opened in literature and demands further substantial researches in the course of the researches of the current state of question of physical rehabilitation of victims with mine-explosive trauma at the polyclinic stage. Application of ethnic hydro-bathing procedures and ethnic systems of massage in physical rehabilitation at consequences of mine-explosive trauma is almost not investigated. The development and scientific foundation of application of similar methods in physical rehabilitation has not only the medical, but also the social value, which is beyond any one narrow medical specialty (traumatology, neurology, orthopedics, rehabilitation and so on).

Communication of the research with scientific programs, plans and subjects

The researches were conducted within the dissertation work according to the direction of the research work of the chair of physical rehabilitation and recreation of KhSAPC in the section of physical rehabilitation in traumatology, neurology and orthopedics.

The purpose of the research

To define methodical bases and possibilities of application of the modified Arab (as east) ethnic bathing procedure in complex physical rehabilitation of victims with mine-explosive injury of the lower extremities at the polyclinic stage.

Material and Methods of the research

Methodical features of use of ethnic bathing technologies in complex physical rehabilitation of patients with consequences of mine-explosive trauma at the polyclinic stage on the example of ethnic Arab (as east) bathing procedure became clear on the basis of the analysis of modern references, method of collecting expert estimates, number of test procedures.

Results of the research and their discussion

The recommended by authors tested traditional and nonconventional methods of medical rehabilitation, which are used in programs of physical rehabilitation of victims of surgical and therapeutic profile with mine-explosive trauma at the polyclinic stage of treatment, are often not allocated in literature and are discussed fragmentary (L. F. Vasilyeva, 2002., V. G. Zilov, 2003) [8; 9].

Special programs of physical rehabilitation at injuries of the lower extremities are developed in large number, but often with insufficient and selective application of nonconventional methods of physical rehabilitation which role at stages of medical rehabilitation is estimated obviously insufficiently. Meanwhile, the number of works of experts in which there is an attempt to use nonconventional methods of non-drug therapy in physical rehabilitation (reflexotherapy, phytotherapy, ethnic types of massage and hydro-bathing technologies, kinesiotherapy) significantly increases in the last decades (V. G. Vogralik, 2001; W. G. Sutherland, 2000) [10; 11].

The objective estimation of rational share of application of nonconventional means and methods in rehabilitation programs of victims' treats with traumatologic defeats certainly belongs to number of the most important problems of modern physical rehabilitation and recovery medicine. The system of actions for the combined application of nonconventional methods of treatment in the system of physical rehabilitation of victims with consequences of mine-explosive trauma in the conditions of the versatile rehabilitation center at the polyclinic stage, certainly, can significantly increase efficiency of recovery of health of victims and reduce terms of their polyclinic treatment.

We have defined bases of formation of techniques and methods of operating control of condition of the patient at application of the modified technique of the ethnic bathing procedure on the basis of Arab (version east) on the basis of studying of references of authors (I. E. Slepenchuk, 1995, V. N. Pravosudov, 1979; A. N. Azhayev, 1986; I. N. Martynova, 1998) [7; 12; 13; 14] on use problem in physical rehabilitation of persons with fractures of bones of extremities of traditional and ethnic hydro-bathing procedures, mechanisms of medical action of hydro-bathing procedures and detailed consideration of questions of etiology, pathogenesis, clinical and phased treatment of mine-explosive trauma.

We applied the traditional for the state of Lebanon and extended to its territories Arab bath of the mixed type with such constructive and temperature and moist characteristics:

– placement of bath contained five bathing niches with different temperature from +35 C° to +65 C°. Temperature in different rooms is constant;

– temperature of stone bench for massage +35–40 C°. Relative humidity is 30–40%, absolute humidity is 30–60 $g \cdot m^{-3}$. Maximum for this room is at floor, minimum is at ceiling, where there is condensation of water vapor. Temperature drop at floor and ceiling is insignificant – 5–10 C°;

– ventilation is influx-and-extract, natural. Speed of the movement of air is minimum. It is more oxygen, than in other baths, at the expense of large volumes of rooms.

Unlike stereotypic and non-traditional for the majority of other countries of use of bath on type Hamam, where the high content of water vapor in air and humidity to 90% is applied, we used the classical Arab bath on east type with "dry" warming up of the room for soaring and humidity to 40%, without turning on of steam generators. It allowed to lower considerably load of cardiovascular and respiratory systems of patients and gave the chance of more frequent and rhythmical use of this bathing procedure in the course of physical rehabilitation.

The modified by us soaring technique in east bath had some differences from traditional, in particular:

– time of the procedure is limited for 90–100 minutes, unlike

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the four-hour procedure, traditional for the Arab countries;
– the number of procedures in one or two weeks of the procedure (Mo., Th.), unlike the adopted one-time procedure on Friday;

– control of condition of the patient and extent of influence of each procedure which was expressed in control by the doctor of arterial pressure and heart rate before and after the procedure, and also introspection by the patient of physical state;

–warm shower and air cooling, unlike traditional contrast douche of body several times in turn was applied by hot and cold water at the end of the procedure;

–the traditional peeling by the mitten Kese and soap massage were not carried out. The modified by us procedure of east massage with emphasis on backbone and the injured extremity was carried out.

Volumes of temperature influence, pause for rest and cooling, special starting positions at warming up in bathing rooms and the modified technique of east massage were tested by us empirically, by several consecutive procedures of soaring and massage with participation of the voluntary group of experts from 6 people, workers of bathing complex and the staff of the medical center having vocational education and long-term experience of use of bathing procedures of the Arab bath and massage. Testing of the modified soaring technique in the Arab bath was held under control of the doctor of the medical center and subsequently has been analyzed by means of the method of expert evaluations.

Results of medical control of carrying out the modified Arab (as east) ethnic bathing procedure confirmed the predicted results on change of physiological condition of examinees in limits of physiological norm for the corresponding age that allows to speak about the physiological safety of use the modified Arab (as east) ethnic bathing procedure at application at the polyclinic stage (tab. 1).

So, all six experts have expressed opinion that application of the modified soaring technique in east bath allows to reach the necessary extent of warming up in much more short time of the procedure, having reduced thus load of cardiovascular and respiratory systems. Four experts have expressed opinion that application of soaring up to 90–100 minutes in the modified technique can be effectively used more often than traditional application of the bathing procedure, one time a week, duration till four hours. The combined offered by us technique of soaring and massage in east bath for rehabilitation of victims with consequences of mine-explosive injury of the lower extremities at the polyclinic stage according to all six experts, has number of advantages before application of the traditional procedure of the Arab bath, such as: providing necessary physiological indicators of condition of organism of the taking a steam bath for much smaller time of the procedure, easier shipping of the procedure, smaller indicators of heart rate and arterial pressure at the end of the procedure, more fast and deep warming up of tissues with multiple increase in capillary blood circulation of tissues of the injured extremities in direct contact with the heated surface of stone bench, possibility of expeditious change of the thermal mode directly in the course of the procedure, ease of breath, shipping of high temperature in the procedure, speed of warming up of tissues, possibility of safe application several times a week, possibility of local warming up of the injured site, load of procedure for CVS and respiratory systems (tab. 2).

Results of research showed possibility of effective dispensing and rather informative control of extent of influence, and also allowed to assume the possibility of effective application of the modified by us Arab (as east) ethnic bathing procedure in complex physical rehabilitation of victims with mine-explosive injury of the lower extremities at the polyclinic stage.

Everything told leads to conclusions about possibility of creation, clinical approbation and evidential description of comprehensive programs of physical rehabilitation at the consequences of mine-explosive trauma including, besides the MPC traditional complexes, cycles of procedures of ethnic bathing procedures and elements of east massage at the polyclinic stage of treatment of the lower extremities which were injured with mine-explosive trauma.

Conclusions

1. The carried-out analysis of special literature available to us showed that the application of nonconventional methods of physical rehabilitation, which is used in programs of rehabilitation of victims with mine-explosive trauma at the polyclinic stage of treatment, is discussed rather fragmentary, at the same time the Arab (as east) ethnic bathing procedure in complex physical rehabilitation on use, we didn't find works.

2. Such nonconventional methods of physical rehabilitation as hydro-bathing technologies, and the attention is practically not paid to use of ethnic bathing procedures in the medical purposes in traumatology are selectively described non-drug

Table 1

Data of the preliminary and repeated research of dynamics of functional indicators when testing by experts of the modified Arab ethnic bathing procedure

№	Examinees (age)	AP, mm. mer. col		HR, bpm^{-1}		BR, number in min	
		Before the procedure	After the procedure	Before the procedure	After the procedure	Before the procedure	After the procedure
1	Ali. (43)	126/80	128/85	72	76	15	18
2	Ta. (38)	123/77	125/80	70	74	16	18
3	Me. (46)	130/85	132/88	75	78	16	20
4	Ra. (32)	123/74	126/78	65	64	14	16
5	Alz.(36)	125/77	126/78	68	72	16	17
6	Mukh.(42)	128/80	130/86	74	76	15	18

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means of physical rehabilitation of patients with consequences of mine-explosive trauma in the conditions of the versatile rehabilitation center.

3. The soaring technique modified by us in Arab (as east) bath has number of differences from the traditional procedure which create possibility of the directed efficiency of this bathing procedure, operating control of condition of patients and dispensing of extent of influence of the procedure in complex physical rehabilitation of victims with mine-explosive injury of the lower extremities at the polyclinic stage.

4. Soaring techniques in the ethnic Arab bath were approved by us empirically, by several consecutive procedures of soaring with participation of the voluntary group of experts from 6 people, workers of bathing complex and the staff of the medical center having long-term experience of use of bathing procedures of the Arab bath and massage. The researches were conducted under control of the doctor of the medical center and were analyzed by means of method of expert evaluations.

5. Methodical opportunities of application of the technique modified by us Arab (as east) ethnic bathing procedure for effective use in comprehensive programs of physical and psychological rehabilitation of victims with mine-explosive trauma at the polyclinic stage are confirmed by results of medical control of holding test procedures and results of expert estimates on such criteria as: ease of breath, shipping of high temperature in the procedure, speed of warming up of tissues, possibility of safe application several times a week, possibility of local warming up of the injured site, load of procedure for CVS and respiratory systems.

Prospects of the subsequent researches. The data obtained in this research are used in scientifically-practical work within the dissertation researches which purpose is creation, approbation and introduction in practice of the effective comprehensive program of physical rehabilitation for victims with mine-explosive injury of the lower extremities at the polyclinic stage.

Table 2

Results of expert assessment of influence of bathing procedures: the ethnic and modified procedure of the Arab bath (in points)

№	Test	Ali.		Ta.		Me.		Ra.		Alz.		Mukh.		Average	
		Ethnic	Modofied	Ethnic	Modofied	Ethnic	Modofied	Ethnic	Modofied	Ethnic	Modofied	Ethnic	Modofied	Ethnic	Modofied
1	Ease of breath (oxygen level in steam room air for the whole procedure)	3	5	2	4	2	4	4	5	3	4	3	5	**2,8**	**4,5**
2	Shipping of high temperature in the procedure	4	5	5	5	4	5	3	4	5	5	4	5	**4,2**	**4,8**
3	Speed of warming up of tissues	5	5	3	4	4	4	3	5	4	5	3	5	**3,7**	**4,7**
4	Possibility of safe application several times in week.	0	5	2	5	0	4	2	5	1	4	0	5	**0,8**	**4,6**
5	Possibility of local warming up of the injured site	3	5	2	5	3	4	3	5	3	5	2	5	**2,7**	**4,8**
6	Procedure of load for CVS and respiratory systems	3	2	4	3	3	1	3	3	2	3	2	4	**2,8**	**2,7**

Note. *1 – minimum quantity of points, 5 – maximum.*

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The analysis of adaptation process of students to teaching in higher education institution with use of means of physical education

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Purpose: *the analysis of process of adaptation of students of higher education institutions to conditions of teaching and the search of ways of its increase of physical culture and sport.*

Material & Methods: *the detection of features of the period of adaptation of students to the educational process was carried out by the method of the analysis of researches, publications and questioning on the subject of adaptation processes at students of higher education institutions. The attention to features of application of means of physical culture and their positive influence on intellectual and physical data of youth is focused.*

Results: *the detailed consideration of all aspects of process of adaptation to teaching found as negative sides of the process (health aggravation of symptoms, psychological discomfort), and positive (high rates in study, all-round development).*

Conclusions: *the means of physical culture which are skillfully selected and correctly used on classes by the teacher will give the chance to the student to get desirable education with comfort.*

Keywords: *adaptation, educational process, physical culture, sport, healthy lifestyle.*

Introduction

Teaching in higher education institution is one of the most important periods of its activity, personal growth and formation, as the expert with the higher education for the modern youth. The search of ways of successful adaptation to the changed social conditions and new activity is the urgent problem for everyone who crossed the threshold of HEI.

According to preservation and promotion of health of student's youth, the most perspective part of society and its future, gains the prime value in structure of universal values which provide the successful realization of the purpose of the personality to submission of tops of social success.

Quality of the solution of tasks which face the higher school, depend on correctly organized work of students in many respects. Therefore, the problem of adaptation to conditions of study is one of the important general-theoretical problems, which are investigated in different scientific spheres.

Adaptation processes get special ponderability at change of the activity environment, first of all at the initial stages of study of young men and girls. They demand from the youth of activation of mechanisms of adaptation which often leads to condition of psychological overstrain.

So, it is proved that the formation of new stereotype of behavior leads to disadaptative syndrome in 35–40% of first-year students during the first year of study.

Difficulties of adaptation of students at the initial stages of study in HEI are caused by the number of features. The system of study is characterized by the large volume of material, independence and responsibility of students in HEI. Features of transition from high school to HEI are connected not only with reorganization of the leading type of activity, but also with entry of the personality into new collective. Therefore, mostly the entrance to HEI becomes the critical event in life of young people.

The urgent task of reorganization of the system of physical education according to requirements of new education, which consists in the statement of the person as the highest social value and opportunity to use its leading means of adaptation process, occurs at scientists and specialists of departments of physical education of HEI of Ukraine in this context.

The purpose of the research

The analysis of process of adaptation of students of HEI to study conditions, and the search of ways of its increase by physical culture and sport.

Material and Methods of the research

The improvement of process of adaptation to conditions of study and the increase in efficiency of renewal of educational efficiency of students during the modern period is rather urgent task of the higher school. Respectively, the analysis of scientifically-pedagogical sources showed that physical culture is the important component of social culture of the modern society. From this point of view, education of the general and special culture of the identity of the student can be considered as the effective way of socialization in higher education institution. Adaptations of students of higher and middle special educational institutions are considered in the works of A. A. Verbytskyi, I. F. Lukyanova (2006) but other at the mo-

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ment. Also experts in pedagogics of study and education on physical education classes of students in HEI, on the problem of formation of the general culture means of recreational and sports-mass work, on the problem of use of contents and methods of physical education in the course of socialization of students pay attention to this problem (M. Ya. Vilensky, 1990; A. V. Lotonenko, 1997; V. V. Belousov, 1990 but other).

We relied on practical experience of physical and sports activity in putting of the problem which is phenomenon of social culture both the society in general, and the certain individuals, its components.

Results of the research and their discussion

The problem of formation of the process of adaptation of the student of higher educational institution to the educational activity, which has to include application throughout study of the most adequate means and methods of its improvement, is urgent in modern conditions of the higher education. And regular trainings by physical culture and sport represent means of physical recreation of the student during study, which are capable to provide the creation of resistant physical conditions for healthy lifestyle, the increase in physical and intellectual working capacity, and adaptation opportunities to the educational activity.

Having become the student of higher educational institution, first-year students mostly feel rise, joy, and emotional lift, own self-assessment grows and so forth. But their considerable part begins to feel certain discomfort in several months (weeks) which main reasons of which are difficulties of adaptation in the conditions of educational institution.

Health of the student is possible to define as ability of organism to store and make active protective and regulatory mechanisms which are capable to provide effective physical and intellectual efficiency and all-round development of the identity of the student in the conditions of the educational activity. Efficiency of the educational process also depends on different factors, adaptation of the student to study conditions, which are rather essential condition that is one of them for the achievement of high level of professional skill from the chosen specialty.

The term “adaptation” is used in different branches of scientific knowledge; however the only thought of its contents is not developed by researchers yet. So, some authors consider adaptation as the process, result of “adaptation”, and others as “interaction” of the person and the object of adaptation or as “interaction” of the person and environment.

The analysis of practice of the higher pedagogical school demonstrates that the most impressionable link of educational work in formation of the positive and active relation of students to study is the discipline “Physical education”. Negative attitude to visit of physical education classes assumes the considerable scale and destructively influences the general state of health, level of physical development and physical fitness of students. Therefore, its optimization, which is impossible without their psychophysiological opportunities, is one of the ways of improvement of the educational process of physical education of students.

Also it should be noted that training by physical culture and sport with students are designed to improve, first of all, state of health, they decide together with education of physical qualities, especially those which development leads to the increase in level of functional and adaptation opportunities of organism.

Therefore, the process of social adaptation of student’s youth means of physical culture has to be significantly improved, if social adaptation is considered as the complete, integrative, systemically organized and differentiated process, which is determined by influence of external and internal factors.

It is proved by scientists that the modern student’s youth, in the majority, feels motive deficiency, which leads to the expressed functional violations in organism, decrease in physical and intellectual working capacity which attracts deterioration in adaptation and shortcomings of the educational activity. Physical culture represents one of the directions of the general culture of the person and in many respects defines the solution of the following questions:

– behavior in educational and professional activity;
– communication with people around;
– promotes the solution of social, educational and improving tasks;
– carries out specific recreational, improving and rehabilitation, educational and sports functions.

According to training by physical culture and sport with students are designed to improve, first of all, state of health, they decide together with education of physical qualities, especially those which development leads to the increase in level of functional and adaptation opportunities of organism.

Use of classes of physical culture and sport promotes the improvement of physical health, normalization of body weight and increase in functionality of respiratory and cardiovascular systems, muscular strength increases occur under the influence of systematic exercise stresses.

Rationalization of the motive regime of students by introduction of classes of improving-training orientation promotes the improvement of physical health –rational physical training allows reaching quickly and effectively increasing in physical fitness and working capacity. Also systematic classes by physical culture and sport allow increasing the level of creative activity of students, to create motivational valuable installations to regular sports activity at them.

Communication on physical education classes is the mighty factor of adaptation of the personality because it actively forms standards of behavior. At this stage students have to be recruited actively and the organizations of sports and sporting events, to master communicative skills which allow them to interact with other people effectively.

Scientists of reforming of the sphere of physical education of students see introduction of effective forms, methods and means, recreational activity in change of approaches and the priority directions. In this regard requirements to teachers of physical education rise. Teachers have to know perfectly the system of knowledge in this branch, constantly update them on the basis of the latest scientific data, find effective transmission media to their students, and also perfectly know skills of scientifically-research and scientifically-methodical work,

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computer diploma, modern information technologies.

Therefore, physical education of student's youth needs to be aimed at the development of professionally important qualities which meet requirements to future experts of different directions. Insufficiency of material and financial security of the process of physical education remains the urgent problem that does not allow using fully wide choice of means of physical education. The solution of this problem has to be from the state and administration of HEI. It is possible to expect positive result from the process of sports activity only with appropriate material and technical resources.

Conclusions

It is possible to claim that physical culture appears the powerful lever in the development of many abilities of the person. The process of classes by new types of motive activity, in which students can realize the potential, is displayed on searches of optimum forms and methods of study. The relation to the process of study and its quality is changed considerably respectively.

Results of questioning will be successful example, which was carried out by the head of the chair of NUKMA V. O. Zhukov (2003) among first-year students concerning influence of regular trainings by physical culture and sport on the optimization of adaptation of students of university to study process. According to his data, expediency of use of physical culture as means of maintenance of working capacity at the optimum level was noted by 18% of first-year students and as option of active recreation – 26%.

These data prove that students owe desire to play sports and to participate in competitions. According to the scientist the large role is played also by the system of estimation, rating, which by itself reminds competition: win who is better adapted to mental and physical tests.

Prospects of the subsequent researches

Due to the constant aggravation of symptoms of physical health of students, it is planned to develop new techniques for motivation of students to physical culture classes.

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Reasons and features of occurrence of excess body weight at students taking into account gender differences

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Purpose: *the definition of reasons and features of occurrence of excess body weight at students taking into account the gender differences, which are connected with irrational lifestyle, violation of food behavior, insufficient physical activity.*

Material & Methods: *students of 1–4 courses of Odessa national medical university, 26 girls and 22 boys, with the excess body weight and obesity aged from 18 to 24 years for the research were selected.*

Results: *reliable differences in adipopexis type, percent of visceral and subcutaneous fat, and also indexes "waist-hip" at the respondents, connected with the article, are found.*

Conclusions: *modification of lifestyle, wrong food behavior, selection of physical activity, has to be carried out taking into account the type of adipopexis and sex of students.*

Keywords: *obesity, students, gender differences, lifestyle.*

Introduction

Now, according to data of WHO, more than 1,5 billion people have excess weight and more than 500 million have obesity [1; 2]. One of vulnerable categories for emergence of excess body weight is the student's youth. It is connected with the fact that the lifestyle of students is sated with factors, which can have potentially negative effect on health, provoking emergence of excess body weight. Among them – irrational ratio of work-rest schedule; decrease in physical activity; the considerable academic and emotional loads, which are connected with examination stress factors; chronic sleep debt; insufficient and irregular food, hobby for fast food and high-carbohydrate food [3; 4; 5].
It was defined in our researches of the structure of pathology, which is revealed during annual medical examinations at students of the I course that the most widespread is pathology of therapeutic profile among which the gastrointestinal diseases, which are followed by the excess body weight and obesity, rather often meet [6; 7]

The analysis of success of performance of test tasks which is carried out by us on physical education by students has shown that high is percent of student's youth, which do not carry out standards [6; 9]. It means that the level of physical fitness – low [6–8; 10].

According to literature, there are distinctions between types of adipopexis at men and women, features and causes of visceral obesity, influence of these factors on the state of health [9].

Communication of the research with scientific programs, plans, subjects

The work is fragment of the research work of the chair of physical rehabilitation, sports medicine, physical education and valueology of Odessa national medical university "The research of features of adaptation reactions of human body to exercise stresses depending on the level of physical development, functional state and state of health, for development of optimum programs of correction by methods of physical rehabilitation and functional food" (No. of state registration is 0113U006426, terms of performance of 2014–2018).

The purpose of the research

To study reasons and features of emergence of excess body weight at students taking into account gender distinctions which are connected with irrational lifestyle, violation of food behavior, insufficient physical activity.

Material and Methods of the research

Students of 1–4 courses of medical university, 26 girls and 22 boys with excess body weight and obesity from 18 to 24 years old to which conducted the research of anthropometrical parameters on standard techniques (the measurement of height, weight, circles of waist and hips) were selected for research.

Body weight index (BWI) is also calculated by the formula: BWI = body weight, kg / length of body, ml. BWI 18,9–24,9 indicators $kg \cdot m^{-2}$ are considered as normal body weight. All surveyed with various degree of excess body weight (BWI>25) were divided into two groups: I group (pre-obesity, excess

Table 1
The characteristic of the studied contingent

I group (pre-obesity) BWI 25–30 (n=30)		II group (obesity) BWI>30 (n=18)	
Girls, n=17	Boys, n=13	Girls, n=9	Boys, n=9

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body weight) – with BWI 25–30 (30 people), II group with BWI>30 with various degrees of obesity (18 people) (tab. 1).

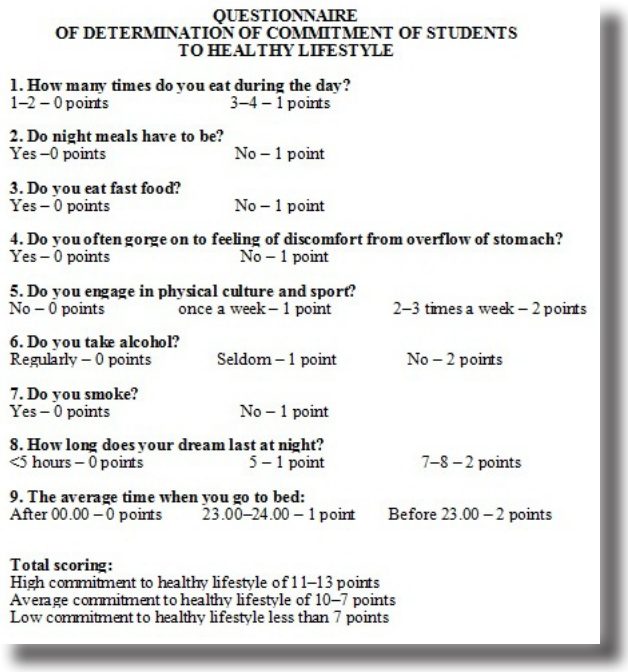
The type of adipopexis was estimated on the index of "waist-hip" (IWH) – the indicator characterizing distribution of fatty deposits in body of the person. According to the protocol of WHO, the circle of waist was measured in the middle between bottom edge of the lower edge and top of iliac crest by means of centimetric tape. The circle of hips was measured around the widest part of buttocks, by the same tape, which is located in parallel to the floor. The calculation of indicator was carried out on the formula: IWH = circle of waist (cm) / hips (cm), index indicators for girls less than 0,85, and for boys less than 0,9 were considered normal.

The measurement of hypodermic and fatty folds was performed by means of electronic caliper-butyrometer Digital Body Fat Caliper which is intended for the determination of thickness of fatty fold for the purpose of assessment of adipopexis and uniformity of its distribution on body of the person. Measurements were taken in four different places: triceps: in the middle between shoulder and elbow joint from back side of hand; biceps: in the middle between shoulder and elbow joint from forward side of hand; shovel: the fold undertook slightly below than shovel at an angle of 45 degrees; on the right side of body on stomach near navel where the vertical fold at distance of 2 cm undertook from it. Holding caliper in the right hand, took skin and fatty fold big and index fingers of the left hand between the distance depending on which thickness of fold has to make from 4 to 8 cm, and soft, without causing painful feeling at surveyed, raised fold on height about 1 cm. The assessment was carried out, summarizing all four indicators according to recommendations of R. Schmidt and G. Tevs (2005).

In spite of the fact that caliperometry and definition of indexes of body weight and "waist-hip" are widely used methods for studying of structure of body, they remain insufficient for determination of various parameters of ratio of components of body which exert the considerable impact on result of the research.

The definition of composite structure of body of the person was carried out by means of the device OMRON BF-508 on the basis of the bio-impedance analysis of components of structure of body on 8-touch technology at which palms and feet are involved. Very small electric current absolutely harmless to the person and not felt during the procedure was passed during the measurement through organism. As a result of measurements data on percentage ratio of fatty and muscular component in body, percent of visceral fat, and also data on the main exchange of the studied students were obtained.

The questioning of student's youth (fig. 1) was carried out for the purpose of the determination of commitment of students to healthy lifestyle (HL) and identifications of violations of food behavior. The questionnaire included questions concerning the number of meals, existence of night consumption of food, fast food in diet of the investigated and also physical activity, observance of sleep pattern and wakefulness. 11–13 points, – 10–7 points were considered to healthy lifestyle as average commitment as high commitment, less than 7 points were estimated as low commitment to healthy lifestyle.



QUESTIONNAIRE
OF DETERMINATION OF COMMITMENT OF STUDENTS TO HEALTHY LIFESTYLE

1. How many times do you eat during the day?
1–2 – 0 points 3–4 – 1 points

2. Do night meals have to be?
Yes –0 points No – 1 point

3. Do you eat fast food?
Yes – 0 points No – 1 point

4. Do you often gorge on to feeling of discomfort from overflow of stomach?
Yes – 0 points No – 1 point

5. Do you engage in physical culture and sport?
No – 0 points once a week – 1 point 2–3 times a week – 2 points

6. Do you take alcohol?
Regularly – 0 points Seldom – 1 point No – 2 points

7. Do you smoke?
Yes – 0 points No – 1 point

8. How long does your dream last at night?
<5 hours – 0 points 5 – 1 point 7–8 – 2 points

9. The average time when you go to bed:
After 00.00 – 0 points 23.00–24.00 – 1 point Before 23.00 – 2 points

Total scoring:
High commitment to healthy lifestyle of 11–13 points
Average commitment to healthy lifestyle of 10–7 points
Low commitment to healthy lifestyle less than 7 points

Fig. 1. Questionnaire

Results of the research and their discussion

Studying of conditions and lifestyle of the examined students with excess body weight confirms tendency, characteristic of the last decade, to the growth of prevalence of addictions among students, violation of diet and night dream, low level of physical activity.

The analysis of biographical particulars of character of eating habits has shown the prevalence of the rare irregular use of food, wrong distribution of daily diet (1–2 times mainly in the evening). Night consumption of food noted 30% of the examined of the 1 group, half of the surveyed from the 2 groups. Frequent taking of fast food is specified by all examined students with excess body weight. Addictions (smoking and consumption of alcohol) met in the identical number of questionnaires at third of the surveyed both the first, and the second

Table 2

Interrelation of the index "waist-hip", index of body weight and % of visceral fat

BWI	I group (pre-obesity) BWI 25–30 (n=30)		II group (obesity) BWI>30 (n=18)	
The investigated contingent	Girls, n=17	Boys, n=13	Girls, n=9	Boys, n=9
Index "waist-hip"	0,96±0,02	1,01±0,03	1,01±0,02	1,4±0,01
% visceral fat	6,2±0,01*	11,8±1,17*	8,7**±0,02	15,2**±1,17

Note. **, ** – distinctions are reliable.*

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groups. However violation of night dream, late withdrawal for sleeping, night meals met with various degrees of obesity more often in the group of persons. Any of the surveyed of the second group did not play regularly physical culture and sport. 6 girls and 3 boys have celebrated classes in groups of physical education among persons with pre-obesity.

The fact of increase in the index "waist-hip" in each of the groups of the examined has attracted attention in the analysis of anthropometrical indicators; however essential differences were noted taking into account gender features. So, in the group of examinees with pre-obesity of IWH made 0,96±0,02 for girls and 1,01±0,03 for boys at norm of indicators of index for girls less than 0,85, and for boys less than 0,9. This index considerably exceeded norm indicators in the second group with various degrees of obesity, namely 1,01±0,02 for girls and 1,4±0,01 for boys. This dynamics and prevalence of indicator in the group of men confirm the development in this contingent of excess amount of visceral fat that is separate predicted adverse risk factor of the development of diseases.

This fact was confirmed by results of bio-impedance research of composite structure of body. In the group of boys with obesity, indicators of visceral fat made 15,2±1,17% at norm from 1 to 9%, similar indicators in group of boys with pre-obesity were lower than 11,8±1,17%, however, did not keep within norm range too. Concerning the examined girls, it should be noted the normal amount of visceral fat which is not going beyond optimum values (1–9%) (tab. 2).

The results were received, demonstrating interrelation of degree of expressiveness of hypodermic fatty tissue, sex of the surveyed and the size of BWI (tab. 3), by comparison of the data on extent of development of hypodermic fatty tissue, which were obtained by the method of measurement of hypodermic and fatty folds by means of electronic caliper-butyrometer Digital Body Fat Caliper, and the method of bio-impedometry. The extent of development of subcutaneous fat on result of summation of size of expressiveness of folds on body at equal BWI was higher at girls, the obtained data correlated with results of the bio-impedance analysis.
Thus, the obtained data allow drawing the following conclusions.

Conclusions

1. Health of students is caused by a number of factors and depends on lifestyle in no small measure. It is possible to carry to the most frequent reasons of excess body weight: violation of food behavior (rare and late meals, prevalence in diet of high-carbohydrate products, existence of food allowance in fast-food) at 83,3% of the investigated of both sexes.

2. Regular physical activity and classes on physical culture and sport noted only 18,75% of the studied students, however all students who are going in for physical culture treated 1 the group (pre-obesity).

3. Indicators of IWH, which can be considered as the indirect indicator displaying degree of visceral obesity exceeded norm both at men, and at women. At the same time, there were essential gender differences of IWH correlating with expressiveness superfluous body weight namely, at BWI 25–30 students were characterized by uniform distribution of hypodermic fatty tissue that insignificantly influenced ratio «waist-hip». The sharp increase in circle of waist corresponding to excess of visceral fat was noted at BWI more than 30 at men.

4. The essential gender distinctions in number of visceral fat were revealed at assessment of composite structure of body by the bio-impedance method. These indicators have made 13,7±1,1% for men that considerably exceeds norm, and women were characterized by the moderate level of development of visceral fat 6,8±0,2% even at high rates of index of body weight. Gender differences on this indicator were expressed most significantly that allows to recommend it as the main criterion at assessment.

Surplus of hypodermic fatty tissue was also increased in proportion, depending on BWI, however had accurate gender distinctions that was shown in increase in total thickness of hypodermic collops at women to 139,3±9,3 mm, this indicator reached value of 119,1±8,1 mm at men that also testifies in favor of features of adipopexis at men and women with excess body weight.

6. Modification of lifestyle and the wrong food behavior with low physical activity has to be used for the benefit of strengthening and preservation of health of student's youth. And the most important and well-tried remedy of prevention of diseases is regular physical activity, at rational application taking into account BWI and sex of students, is able to promote the solution of topical issues of strengthening of health and high performance of student's youth that will serve as the perspective direction for our **further researches**.

Table 3

Interrelation of extent of development of hypodermic fatty tissue, sex of the surveyed and sizes of BWI

BWI	I group (pre-obesity) BWI 25-30 (n=30)		II group (obesity) BWI>30 (n=18)	
The investigated contingent	Girls n=17	Boys n=13	Girls n=9	Boys n=9
Total thickness of hypodermic collops, mm	114,7±8,2*	104,3±7,1	139,3±9,3*	119,1±8,1
% of subcutaneous fat	40,2±3,1	31,7±2,8	47,2±2,2	34,7±2,6

Note. ** – distinctions are reliable.*

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Structural features and characteristic of process of training of the sportsman as the system object

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Purpose: *to specify methodological bases of the system approach in practice of training of sportsmen.*

Material & Methods: *the system of training of the sportsman was considered. The following methods of the research are used: theoretical analysis and synthesis of scientific-methodical information, system analysis, and structurally-functional analysis.*

Result: *structural bases of the system of training of the sportsman, its characteristic properties, types and features of functioning of this system, types of communications between structural educations, between them and complete system of training of the sportsman are defined.*

Conclusions: *the main methodological basis of the system approach to the process of training of the sportsman is the way of its consideration as the system object, definition of properties, characteristic of it, features of its functioning and types of communications between structural elements and in the system in general.*

Keywords: *system, structural elements, communications, training of the sportsman.*

Introduction

The modern system of training of the sportsman was created as a result of the long development of the theory and practice of sport. The complete system of training of the sportsman is made by systems of competitions and competitive activity, the system of sports training and the system of extra training and out of competition factors increasing efficiency of training and competitive activity [16; 19; 24; 25]. It is known that the main attention was paid directly to the system of sports training as the fundamental part of training of the sportsman at the first stages of its development, since Ancient Greek times [20].

The system of training of the sportsman represents considerable capacious both on depth, and according to contents concept in modern look. Success of functioning of this system is provided with complex and set of knowledge, principles, laws and regularities of interaction of organizational and administrative forms, conditions and rules of competitive activity, means and methods of training, different types of preparation and external factors.

Effectiveness of competitive activity first of all depends on maturity and coherence of interaction of all structural formations of the system of training of the sportsman. Initial prerequisite to increase in efficiency of training of the sportsman (development of his fitness, formation of sportswear) is vision of the whole process of preparation as the system object.

Besides, the contradictions often arising between big loads and functionality of the sportsman, between model characteristics and his specific features, are removed in the process and in the process of sports growth by the means and receptions which are in the system unity with structural formations of the system of training of the sportsman at the accounting of laws of general communication of development and system representation of the happening changes in the sportsman's organism.

Effective transformation of the saved-up organism reserves in the course of long-term transformation in high sports result is possible at the accounting of properties of system of training of the sportsman, knowledge of communications, characteristic of it, features of its classification and functioning.

The analysis of numerous scientific publications demonstrates that they have accurate focus on permission of the urgent problems, which are connected with practical problems of training of the sportsman. But, as V. N. Platonov (2015) notes, they are far from the real problems of training of the sportsman on the methodological approach.

Proceeding from the above, it is possible to conclude that now there is need of specification of methodological bases of the theory and practice of sports preparation and definition of the corresponding methodological approaches to the modern level of development of sports science and practice of sport.

Communication of the research with scientific programs, plans, subjects

The research is executed according to the Consolidating plan of the research works in the sphere of physical culture and sport for 2011–2015 on the subject 2.6 "Theoretic-methodical bases of improvement of the training process and the competitive activity in the structure of long-term training of sportsmen (No. of the state registration is 0111U001168)".

The purpose of the research

To specify methodological bases of the system approach in practice of training of sportsmen.

Research problems:

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1. To give characteristic to the process of training of the sportsman as to the system object.

2. To establish characteristic properties, types and features of functioning of the system of training of sportsmen.

3. To define communications, characteristic to the system of training of the sportsman.

Material and Methods of the research

Research methods: theoretical analysis and synthesis of scientific and methodical information, system analysis, structurally-functional analysis.

Results of the research and their discussion

The system of training of the sportsman, which has developed in Ukraine, includes the state and public organizations of the central, regional and local level as which at the legislative level obligations for assistance of development of sport in various organizations are fixed. However, the direct process of training of the sportsman (object of management) is carried out by the coach. His administrative decisions provide the growth of skill of the sportsman and his sports result. Thus, the coach in system of preparation is the subject of management (operating subsystem).

In general the whole system of training of the sportsman should be considered as the isolated set of three subsystems: the operating subsystem (coach), the subsystem of sports preparation (influence subsystem) and the operated subsystem (sportsman) (fig. 1). Each of them has the qualities, characteristic of it, properties. Their close, long-term interaction and interference allow creating the system with new properties, qualities and opportunities, i.e. to train the sportsman ready to win at competitions.

Considering that each subsystem of the complete system of training of the sportsman in the analysis is considered as the independent system, with all to it characteristic properties, in this work the above-stated subsystems will be called systems.

The operating and operated systems (the coach and the sportsman) are natural, organic and self-organized systems.

The system of sports preparation is developed by the coach and is the system of influence. It represents the set of the organized ideas in plans, training programs, actions and is the result of cogitative activity of the coach. Due to stated, it is called the conceptual system. Its components became: the system of competitions and competitive activity; the system of sports training, the system of extra training and out of competition factors. The conceptual system is inorganic, artificial system.

Full functioning of the whole system of training of the sportsman, close and effective interaction of the managing, conceptual and operated subsystems is provided with two types of communications. These are the direct connections, which are going from the managing to the operated system and the feedback, which is directed from the subject (sportsman) to the object (coach) of management.

Direct connections are the team communications defining the purpose, tasks, look, contents and the mode of necessary activity.

The contour of feedback allows to create the closed, complete system and to obtain full information on the level and quality of result of action, "price" of the reached result and

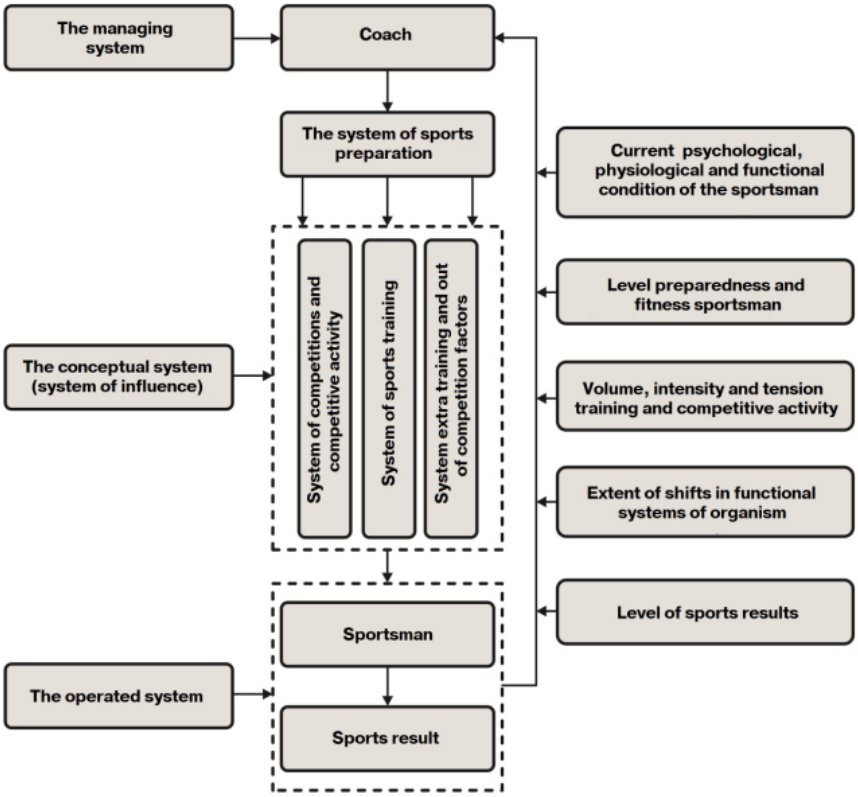

Fig. 1. The system of training of the sportsman

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current state of the operated system (the sportsman's organism).

Thus, the "ring of management" (N. V. Zhmarev, 1989) providing the device and effective interaction between components of the complete system is formed (see fig. 1).

The system of sports preparation represents the isolated set of specific structural formations of three subsystems. At the same time each component of the specified structural educations has the specific functional purpose which is focused on the achievement of ultimate goal – high sports result (fig. 2).
Today each of structural formations of the conceptual system comprehensively is also rather fully studied. So, proceeding from publications of V. N. Platonov (1986; 2004; 2015), V. S. Keller (1987; 1995), F. P. Suslov (1995; 1997), the system of competitions and competitive activity is considered as the basis of creation of system of training of the sportsman.

Structural components of the analyzed system: types and competition calendar, rules of carrying out and refereeing of competitions, structure of technique, tactics and estimates of competitive activities for the functional orientation allow to define the winner of competitions, to create the model of preparation and preparedness of the sportsman, is means and method of sports training, control and management of training and competitive activity of the sportsman.
Thus, the system of competitions and competitive activity is the main system-formative and integrating factor of the whole process of training of the sportsman.

The system of sports training is the basis of sports preparation. Structural formations of this system allow determining the content, character, orientation of training process, to distribute training load in various structural educations, beginning from training task to the program of long-term training of the sportsman. All parties of preparedness of the training sportsman are improved in the course of training activity. At the same time successful prerequisite for the achievement of high level of sports preparedness is genetic predisposition to this or that type of physical activity, good breeding and level of mental ability of the person (fig. 2).

On the present many aspects of sports training have gained the development in scientific works of N. A. Bernstein (1940–1991), N. G. Ozolin (1949–1984), L. P. Matveyev (1964–2010), D. Kharre (1971), Yu. V. Verkhoshansky (1973–2005), V. N. Platonov (1980–2015), A. P. Bondarchuk (1986–2005).

Recently, it becomes harder and harder to coaches to provide the growth of results of the sportsman due to creation of the effective program and structure of the training process every year. Along with it, the accurate tendency of essential increase in role and the importance of system of the extra training and out of competition factors, promoting increase in system effectiveness of sports training, are observed (fig. 2).

One of the reasons of such shift of accents in the system of training of the sportsman is politicization of sports progress and commercialization of sports activities. It leads to essential expansion and activation of circle of the organizations participating in the process of training of sportsmen namely: private companies, commercial organizations, scientific institutions, industrial enterprises, public authorities. At the same time these organizations not so much are interested in problems of training of the sportsman, how many their efforts are directed to the improvement of manufacturing techniques of stock, equipment, conditions of competitive activity, sports food, pharmacological providing. In turn the advanced developments of the technological plan demand revision and recon-

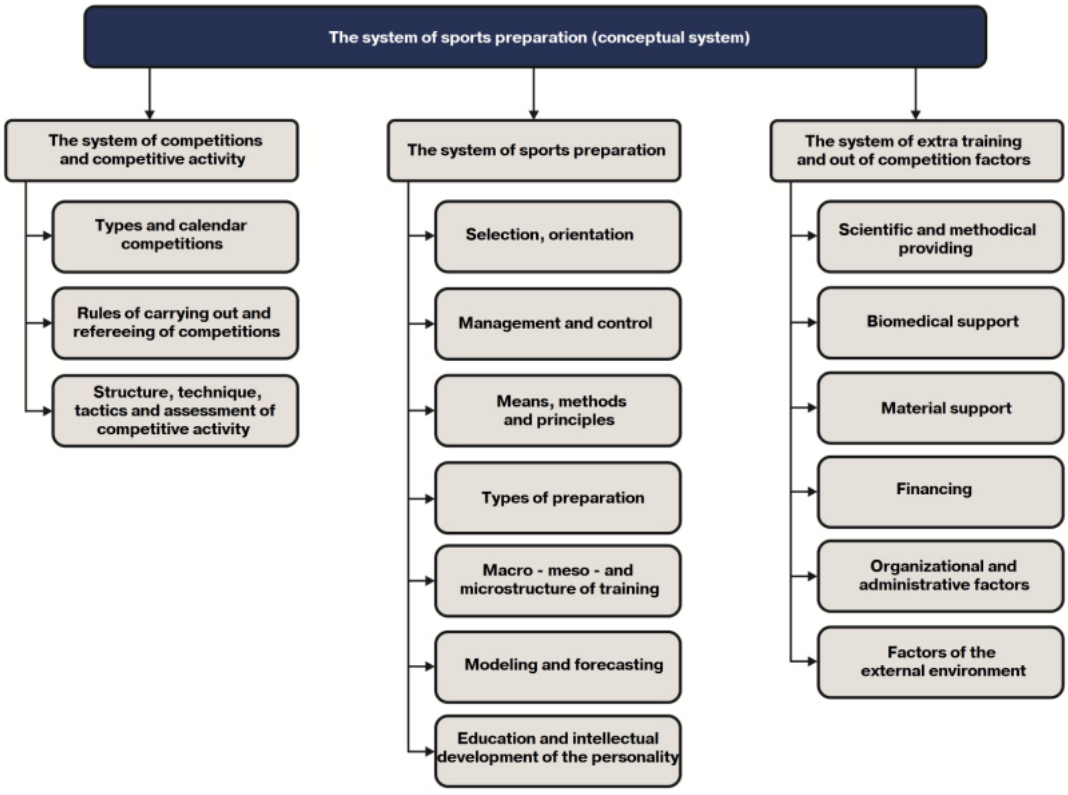

Fig. 2. Structure of the system of sports preparation

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sideration of role and the importance of separate elements of system and system of training of athletes in general.

Other reason of increase in the importance of the above-stated system is connected with use in the system of sports training of nonspecific means of training (multipurpose trainer, devices, pressures chamber, cryobaths, training in the complicated or facilitated conditions – in water, at various heights, at various humidity, etc.).

Questions of use of the extra training and out of competition factors influencing efficiency of sports training are to some extent displayed in the scientific-methodical works of F. P. Suslov (1983, 1997, 1999), F. Z. Meyerson (1981, 1986, 1988), V. N. Platonov (1988, 2010), I. P. Ratov (1995), A. A. Grushin (1998), O. O. Borisova (2007), O. S. Kulinenkov (2009).

Analyzing the complete system of training of the sportsman (fig. 1, 2) and scientific publications [4; 6; 20; 23], it should be noted that the system of training of the sportsman is the difficult and dynamic system, and, owing to impact of set on it of the forcing-down factors, in many cases achievement of goals (victories at competitions) has probabilistic character. To increase probability of achievement of good result by one of the most effective directions is the choice of the correct methodological approach to the organization of training of sportsmen. Such methodological basis is the system approach allowing considering process of training of the sportsman as system object. Proceeding from the above, it is possible to define that the system of training of the sportsman has to be under construction on the integrative beginnings, based on unity of direct and return communications, interrelations and interactions of structural bases of sports preparation with expressiveness and orientation of urgent and long-term adaptation and adaptive reactions of organism of the sportsman – organic subsystem in the system of training of the sportsman.

Transformation of the saved-up organism reserves owing to long-term adaptation in high sports result is possible at the accounting of the characteristic and properties of complete system of training of the sportsman, types and characteristics of its functioning, communications characteristic to this system (fig. 3).

Characterizing the system of training of the sportsman, except above the specified characteristics (complexity and dynamism), it should be noted that it is the open, artificial, purposeful, cybernetic (operated) system representing set organic (the coach, the sportsman) and conceptual (systems of sports preparation) systems (see fig. 2; 3).

The openness of this system is defined by the fact that its functioning is closely connected with the environment, since training and competitive activity are carried out mainly in open, natural conditions taking into account extent of influence of external factors.

The system of training of the sportsman, in spite of the fact, that it is created by the organic system trainer for improvement of the biological system of the sportsman, who is capable to achieve good results, is the purposeful and artificial system.

Because the studied system is difficult, dynamic system, contains the operating and operated subsystems, functions on the basis of exchange of information through straight line and feedback, the principles of self-organization and self-government, such system, according to V. M. Zatsiorsky (1969), V. V. Petrovsky (1973), N. V. Zhmarev (1986) are peculiar to it, can be called cybernetic system.

The following characteristic properties are peculiar to the system of training of sportsmen: degree of structure, hierarchy, integrity, information and communication with the environment (fig. 3).

The degree of structure of system is defined by the fact that characteristics, the description of system are carried out through the establishment of its basic structural units. The concept of structural unit of the system is meant as structural educations – elements which are definitely ordered and integrated on signs, concrete, characteristic of them.

Hierarchy is presented in the form of the inter-structural relations in the system which is characterized by the sequence, orderliness and organization of interactions between elements on the vertical line.

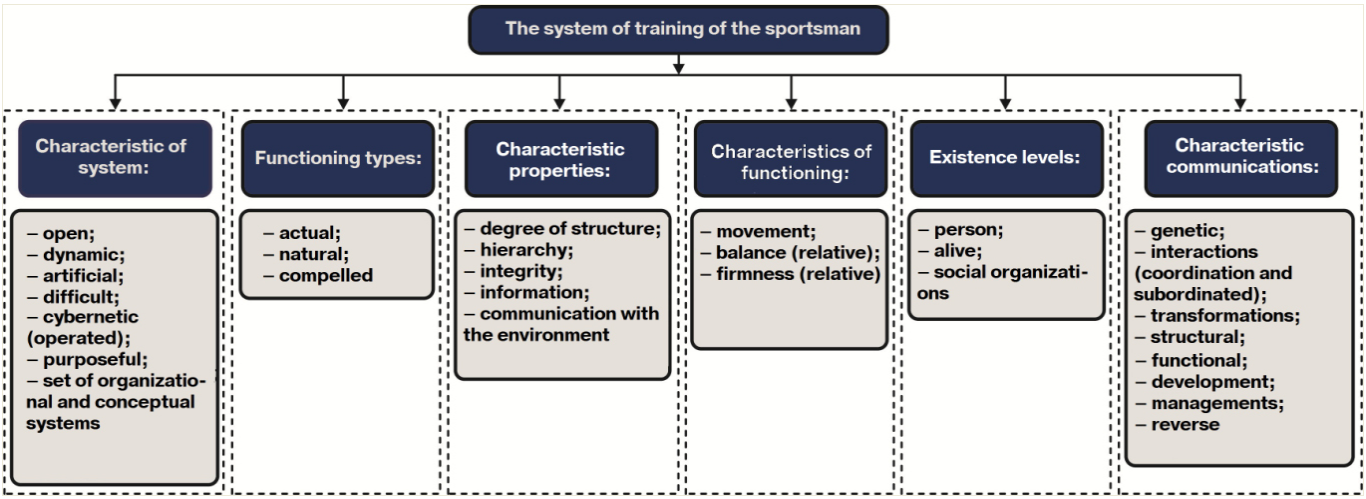

Fig. 3. General characteristic of the system of training of the sportsman

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Integrity of the system is defined by the fact that properties of the whole do not consist of properties of its separate structural educations (elements), and their properties at close interrelation and interaction give new properties and qualities to the complete system. Thus, the system as integrity gains the new properties, new qualitative characteristics which are not contained in separate in the structural educations forming it. New integrative properties significantly expand possibilities of the system.

Important characteristic property of the system of training of the sportsman is the information. It is shown by the fact that each structural element of the system is the carrier of certain information on concrete structural education or process.

Information can be expressed in discrete (faltering) and continuous form [4]. The discrete form of information allows expressing quantitatively a number of indicators (pulse rates, rate of movements, quantity of steps, fungi, number of throws, hits, etc.). Continuous information can accept any values, for example, change of body temperature, arterial pressure and time of overcoming pieces of competitive distance. The obtained information allows the coach to correct process of management of sports preparation.

The process of training of the sportsman is inseparably linked with the environment. The accounting of extent of influence of factors of the external environment, at the corresponding approach, allows increasing efficiency of sports training.

The analysis of level of existence of the system of training of the sportsman has shown that on the level of hierarchy of subsystems, openness of system, self-keeping of its structure, its controllability, the system of training of the sportsman belongs to live systems (fig. 3).

As this system is formed by the operating and operated systems, in the person of the coach and the sportsman, to it manifestation of creativity, process of consciousness, thinking is characteristic, the system of training of the sportsman corresponds to the level of “person”.

Because of the studied system allows to reach the socially important value (sports result) and difficult human emotions are characteristic to it, this system can be carried to the level of “social organizations”.

As functioning the system of training of the sportsman is actual, natural and compelled (fig. 3).

Factuality of the system is defined upon its creation and real functioning for the purpose of achievement of socially-important result.

The natural type of functioning of this system can be determined by features of its formation and by its activity in the conditions which are in harmony with the environment.

The compelled type of functioning of the system of training of the sportsman is connected with professional duty and activity of the trainer, and also interest of the sportsman to increase the level of sporting achievements.

Characteristic of functioning of the system of training of the sportsman is shown in its movement, in relative balance and firmness (fig. 3). The movement of the system is connected with process of its transition of one state in another that occurs in development of preparedness of the sportsman. The whole system of training of the sportsman is reconsidered with exit to other level of preparedness. The whole system is in the relative balance at the same time at each level of preparedness, at certain stage of time, as a rule, on macrocycle. The system shows firmness in relative balance on the specified period.

The functional association of structural elements of subsystems in the complete system is necessary for full and effective activity of the system. Such association of structural educations, their interference and interaction is carried out by varied in form, direction and types of communications.

Communications between the same and single-row elements are provided with horizontal communications, and between various levels of system – vertical.

High-quality management of activity of system is reached when using direct and return communications.

Objects of communication are classified on such types in difficult system: interaction communications, genetic, transformations, structural, functional, development and managements (see fig. 3).

Communications of interaction between structural educations in the system objects are implemented through coordination and subordinated communications. Coordination communications are carried out both between elements, and between elements and subsystems. As the system of training of the sportsman on the level of existence corresponds to the level of the person and the social organizations, coordination communications take special form. Specifics of these communications are that they are mediated by the aims which are pursued by each of the parties of interaction – the coach and the sportsman. In this regard there can be cooperative and conflict communications between them. Naturally, the big effect is rendered by cooperative communications for the achievement of main objective.

The subordination of communications in the system of training of sportsmen is shown in the natural sequence of formation of new structural associations with new, higher level, qualities on the basis of elements of the previous level.
Genetic linkages are characteristic to organic systems. The operated system (sportsman) is the carrier of genetic information in the system of training of the sportsman. It is known that prospects of the sportsman e in this or that sport are genetically determined [14]. In this regard, this type of communication in the system of sports training is extremely important.

Communications of transformation are type of communication, systems which are implemented at interaction of two or several structural educations in the course of which and thanks to communication between them the structural element gains new, higher level quality.

Structural communications arise in difficult system objects, between big structural educations (subsystems). These communications promote association of subsystems, including subsystems conceptual and organic systems, in the complete

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system.

Functional communications are the communications providing activity of organic system, its functioning and its work. Variety of functions of structural formations of this system defines respectively and distinction of communications of functioning in this system.

Communication of development is characteristic of the developing object, in this case, organic, operated system – to the sportsman. There are essential structural and functional changes owing to long-term sports training in organism of the sportsman. The existing forms of functioning of bodies and systems of organism change in the course of its development. In turn, the exit of organism of the sportsman to the new level of functioning demands entering of amendments into the content of structural formations of the system of sports preparation. Thus, communications of development cause the process of change of the whole complete system.

Communications of management are communications which depending on their concrete look are created by kinds of functional communications or communications of development. These communications have the system-formative and integrating character and are implemented through straight line and feedback.

Feedback is the communications, which are going from the operated object to the operating subject or from the environment to the system. They show difference between expected and valid results of impact on the operated system. Feedback is subdivided on positive and negative. Positive feedback arises at compliance of degree and result of this influence, and they promote development of the system. Negative feedback arises in case actions of the system of influence are not effective and do not allow to achieve the goal. In that case stabilization of development of the system occurs.

Violation of feedback involves violation of management of the system, decrease in efficiency of action of the system of influence and activity of the system of training of the sportsman in general.

Conclusions

The system of training of the sportsman, which is supporting the managing system, operated systems and the system of impact on the operated object is the open, dynamic, multicomponent, difficult, and purposeful and artificially created, operated system.

Characteristic properties of this system are degree of structure, hierarchy, integrity, information and communication with the environment.

Effective functioning of this multilevel hierarchy of difficult system is provided by varied in form, contents, direction and types of communications.

The main methodological basis for creation of the system of training of the sportsman and the system approach to it is the way of consideration of process of training of the sportsman as the system venue of which establishment not only unilateral communications between structural formations of the system, but also the accounting of extent of interaction and interrelation between various elements at which not only integrated properties of the system determine content and properties of separate elements, subsystems is characteristic but also, in turn, the characteristic of structural educations influences formation of integrated properties of the complete system.

Further researches will be directed to the definition of algorithm and the characteristic of system approach to the process of training of the sportsman.

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Innovative trends in recreation: aspects of psychoanalysis and art resources

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Purpose: *the problem of updating the art features of psychoanalytic concepts in the perspective of innovations in the recreation.*

Material & Methods*: theoretical analysis and synthesis of domestic and foreign publications on the research problem.*

Results: *analyzed current trends current research in the field of health and recreational activities. The paper considers the classical aspects of the art modification of psychoanalysis in the context of innovation strategies in recreation.*

Conclusions*: theoretically probable positive effect of the implementation of the ideas of psychoanalysis and possibilities of art in productive innovation recreative process.*

Keywords: *personality, health, recreation, innovation, art therapy, psychoanalysis, art, creativity.*

Introduction

The improving-recreational periods are necessary stages in preservation, strengthening of health and maintenance of socially active personality, in the sphere of sporting achievements of XXI century. The determination of constructive balance between productive creative working, sports, educational activity and restoration of effective working capacity becomes the existential task of the modern person, both at the level of self-preservation instinct, and from the position of the rational civilized approach to own health-saving. The optimum balance-compromise – in the structure of intense socially useful employment and specifics of normalization of health of the personality – guarantee modern professional recreational systems. At the same time the indispensable condition of progress is the improvement of traditional methods and technologies, innovations that stimulates the creative approach at experts in the recreational activity.

Somewhat mystifying the phenomenon of «intuition», operates with the concept «creative instinct», with the probable realization of factor of personal forecasting: «subconscious spirit of the time» which is capable to compensate installations-stereotypes of consciousness according to the psychoanalyst, and allows to expect future changes intuitively, considering features of various options of creative professional activity, the representative of the psychoanalytic concept K.-G. Jung [16]. Productive professional changes of XXI century focus on innovations. Creative innovative tendencies of the present include the integrative professional processes, which are urgent and for the sphere of health-saving, recreational field of knowledge.

The considerable arsenal of native and foreign scientific-practical health saving developments, many-sided experience in the sphere of recreational and improving technologies [1–20; 22], in our opinion, promote progressive changes «in the spirit of the times» and assume the innovative strategy in the recreational activity according to the social requirement inquiry of the present. The Ukrainian experts providing improving-recreational services are obliged to be guided in the professional activity as intuition (which, according to the experimental data of the academic psychology is based on the symbiosis of special knowledge and professional experience), and to possess «basic professional competence" [5]. Need for mastering information on specifics of "innovative approaches", naturally, with fundamental special knowledge of "features of providing rehabilitation and improving-recreational services" is specified in the system of these competence.

The ability to innovations in the professional recreational activity declared in quality of fundamental competence, openness to new experience in the range of cross-disciplinary fields of knowledge without being limited to narrowly professional interests – will demand from the expert in the sphere of recreation of special personal creativity. At the same time it is important that actually "recreational activity" [15] promotes the disclosure of creative potential of participants of the recreational process, it is directed to formation and implementation of creative personal activity in activity of recreants, produces "reorientation" of the subject by re-creative methods and technologies with "passive" (contemplation) on "active" creative (active) interaction with the outside world. Conditions of recreation generate favorable opportunities and for realization of intellectual potential of new generation [17]. In situation of rest, physical activity, intellectual and physical recovery outdoors – youth, in collective creativity of thematic tasks, performing psycho-training exercises, develops and improves mental abilities.

The provided information on tendencies and conclusions of modern researches in the sphere of recreation confirms the

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certain increase in requirements to professionalism, responsibility of the identity of the head by the recreational group, the organizer of improving-recreational actions. Aspects of formation of health saving responsibility at students in perspective of physical culture and physical training [12], ethnic features of responsibility of the professional in the field of recreation are analyzed [13]. Also results of psychological researches [14] inform that such personal qualities as high level of social intelligence, emotional maturity, ability to empathy, ability to influence people, congruence, self-confidence, etc. are basic for the successful solution of professional tasks, career development of the teacher-organizer of recreational establishment. The researcher has developed the program of psychological maintenance in the situation of professional selection at professional formation of the identity of "teacher-organizer" of the recreational system on the basis of the obtained data.

Art therapy is actively propagandized now in the context of psychological maintenance in the course of rehabilitation, recreative-improving activity, for health-saving of the personality [6–11; 22]. Problem prophylactic, recreative, developing, psycho-correctional and medical-rehabilitation opportunities of art is presented multidimensional in modern theoretic-practical researches of foreign and Ukrainian authors (F. Barbe-Gall, S. Jennings, A. I. Kopytin, I. Kulka, A. Minde; E. E. Gant, L. T. Levchuk, I. A. Podduda, Z. P. Tkemaladze, I. O. Chernukha, etc.). When studying historical dynamics of professionalizing of art therapy as therapeutic direction means of art, it is established [6; 7] that strategically important structural element of conceptual basis of art and therapeutic approach is psychoanalysis. At the present stage of demand of recreational researches, in our opinion, interaction, cooperation and co-authorship of classics and the present, namely the system "psychoanalysis-art-recreation" is insufficiently considered, that is of scientific professional interest.

The purpose of the research

Updating of the problem of certain art criticism features of the psychoanalytic concept in foreshortening of innovations in recreation.

Research problems:

1. To analyze the productive strategy of modern recreative-improving researches.
2. To consider aspects of psychoanalysis and potential of art creativity in the recreational activity at the present stage.
3. To formulate conclusions and to specify prospects of further researches.

Material and Methods of the research

For carrying out the research were used: theoretical analysis and synthesis of information of native and foreign references on the research problem.

Results of the research and their discussion

Results of the research, in the context of the theoretical analysis of publications on the problem of progressive tendencies in recreation and features of the psychoanalytic concept in art range, allow actualizing number of the concepts and recommendations, which are specified by modern writers on which we are focused in the scientific work.

"Recreation" is presented in the research [2] as complex of the improving actions, which are directed to restoration of normal health and working capacity, in general, mentally and physically healthy person in exhaustion situations. Actions of recreational character reach improving effect in perspective of elimination of emotional pressure and negative consequences of loads, normalization and increases in functional condition of the personality.

"Recreative physical culture" is considered in the work [20] as active recreation, restoration of psychophysical opportunities of human body with realization of resources of physical education and accentuation of positive influence of the environment. Necessary conditions and results – creation of positive emotional background, improvement of mood, increase in motivation in achievement of the personal and professional purposes. Recreants make active intellectual and physical working capacity, there is leveling of fatigue and stabilization of optimum health for the solution of professional tasks owing to what optimism and vital prospect appear.

Success of "resort -recreational therapy" as I. A. Yurov [22] emphasizes, is caused in many respects by psychological component in "rehabilitation (recovery) process". Based on the professional experience, the scientist notes that "complex use of climatic conditions in combination with psychological methods allows intensifying rehabilitation of sportsmen". Achievement of resort-medical effect, according to the researcher, is determined by "psychological maintenance" of resort-recreational therapy. The author marks out effectiveness of art therapy as psychological maintenance: as in the context of "the distracting psychotherapy" – switching of attention of the subject from negative factors, weakening of fixing of negative states, and for "the activating psychotherapy" – mobilization of the general vital activity of the personality.

Analyzing need of the society for recreational services as reflection of need for rest, improvement, new positive impressions for prophylactic and medical-recovery actions, G. P. Hrokhova [3] gives options of types of recreational activity for health-saving of citizens. We were interested in classification of types of the recreational services "on functional purpose", namely: "cultural-informative" which assume the organization of visit of the museums and exhibitions. Improving function of esthetic component as the significant component of the recreational activity, it is noted in a number of modern researches: in respect of receiving new socio-cultural impressions [3; 4], favorable influence of esthetics of natural landscapes, climatic factors in combination with beauty, appeal of movements in different types of physical culture and sport [1; 2; 4; 20]. Esthetics, art creativity causes constructive recreational mechanisms, which are focused in art therapy. The fundamental situation belongs – to psychoanalysis, with emphases on subconscious processes and progressive potential of art in leveling of destructive installations for harmony of the personality in theoretical justification of the concept of art therapy as applied field of knowledge.

Recognizing influence of art on the individual, S. Freud [16] as "public function" of art creativity designates ability of art, artistic images to actualize feelings of unification and "identity", "identification" which stimulate cultural unity of society "in the

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general experience" esthetic impressions. Similar tendencies are characteristic of recreational "cultural-informative" actions [3]. Practice of discussion of pictures of the famous artists and own drawings by participants of psychotherapy exists "creative self-expression" (clinic-psychotherapeutic method) in therapy situations [6; 7]. The considerable positive psychotherapeutic effect which is determined by group social activity, discussion in the context of identical and contrast esthetic-emotional impressions is noted. Creation of similar situations can probably have positive resonance and in interpersonal communication of recreants. The practical experience showing importance and efficiency of communication in the course of recreation is reflected in publications of recreative of researches of empirical contents [1; 2]. When providing recreational services of certain types [3] it makes sense to initiate "noncritical stories" at participants of recreation that renders relaxation effect on mentality, imitating "method of free associations" [16], characteristic of psychoanalysis and known for effectiveness in improvement of mental health of the personality owing to reproduction of information from subconsciousness.

"Subconscious sincere processes", according to S. Freud [16], are the basis of mental activity of the personality and are subordinated to "the principle of pleasure". It is also important for activity of the subject – "the principle of reality". It is emphasized in art criticism modification of psychoanalysis that in art – the principles of pleasure and reality reach "consent", "reconciliation". The person is interested in performing his own desires, following the principle of pleasure. The compromise is possible thanks to art: using the process of imagination, the subject creates new type of reality as valuable reflection of reality. Lack of need of cardinal transformation of the outside world promotes leveling of the intra personal conflict, disharmony of contradictions between desirable and possible, ambitions and talent – the personality creates own zone of comfort, space of positive self-affirmation in creative self-realization.

Allocating imagination role, S. Freud [16] considered that "imagination" represents the essence of the work of art which purpose consists in the creation of own reality according to the principle of pleasure. Transformation of individual reality in art is actually separated from reality (on psychoanalysis), but leads to finding of harmony between interior, realization of his subconscious preferences, features of mentality and reality of the outside world, reality. The art phenomenon, according to K.-G. Jung [16], at the solution of esthetic tasks, is consisted in "performance of educational psychological work": unification of feelings of the person in the difficult and contradictory process of "self-understanding" of own inner world, resulting in harmony last experience, changes of the present and the project of the future.

Synthesis in studying of the problem "psychoanalysis – art – recreation" allows summarizing that specific of influence of art on the personality hold specific place in the psychoanalytic concept. Constructive aspects of self-knowledge and self-realization of the personality, updating of creative potential, leveling of psycho-traumatic experience and inferiority complex, emergence of vital prospect – in many respects is certain result of deep psychological impact of art on the person and, respectively, is of scientific interest in the sphere of professional activity of psychoanalysts. The noted categories of improvement of mental health, increase in viability of the person, personal growth are in range of tasks and modern recreation.

The retrospective analysis demonstrates that psychoanalysts sought to understand the art nature, investigated uniqueness of creative activity and offered artists the conceptual and empirical help [16]. Now the theoretic-practical experience of psychoanalysis and resources of art can promote the solution of recreational tasks, increasing effectiveness of improving-recreational activity. Interpretation of the Freudian ideas as rather convincing frame of reference for explanation of features of activity in the field of art, recreative strategy can serve as the global reference point for professionals in creative designing innovative.

The peculiar differentiation is observed in art criticism modification of psychoanalysis: activities of the personality in art and real transformation of reality. At the same time the positive role of art in harmonization, stabilization of mental functions, and social adaptation of the person is reasoned. We consider that the specified ideas emphasize recreative nature of art: opportunity for some time to separate from call of duty, internal and external activity in respect of personal and professional duties and to restore psychophysical tone, "composure" in the course of art creativity (or receiving impressions as the viewer at visit of the museums and exhibitions). In the topics of the subject of graphic activity [8; 9; 11] are projected: experiences of the author, situations increasing the uneasiness, images causing fault complex, psycho-traumatic experience etc. As a result – stressogenetic of the professional factors and personal reasons provoking concern understands, in nonverbal form expression in the long term activity of the person finds desirable, constructive solutions of problems (it is expedient to recruit versions of decisions in the group). As a result, neutralizing experiences of negative modality – recreants are also morally ready to acceptance and implementation of responsible, strategically important decisions in emotionally stable, balanced state, with the increased resistance to stress, viability – intellectually. The maximum professional self-realization of the personality, harmonious interaction in society, achievement of the sports ambitious, creative goals with optimum health and high performance are possible. Thus, it is possible to recommend updating of opportunities of art with psychoanalytic accents for the increase in efficiency of recreation, using aspects of psychoanalysis and considering art resources during the creation of innovative strategy and technologies in the improving-recreational activity.

Conclusions

The problem of health-saving of citizens, sportsmen, and student's youth as social resource of future achievements is actively developed in the Ukrainian-European socio-cultural, scientific space. Native psychology and pedagogical, valeological, recreational researches [1–20] emphasize the priority of improvement of health, increase in efficiency of the nation at the present stage of development of the society. Innovative recreative tendencies of the present in range of modernization of recreational systems of Ukraine are concentrated on projects of professional integration. The integrative model «psychoanalysis-art-recreation» allows realizing professionalism in cross-disciplinary cooperation: applying the ideas of world-wide recognized psychoanalytic approach, globally universal remedies of art in the effective modern recreational-improving process.

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The present demands innovations in the sphere of recreative services. Innovations assume manifestation of creativity by experts of this field of activity. The statement that «era – creates the creator, the creator and his time» defines his ethical and esthetic ideals» in the context of the psychoanalytic problem «[16], testifies to natural need of modern creative installations at the professional. At the same time we, certainly, agree with the statement of A. Dyuma [21]: «There is no classification, there is no etiquette, there is no school old or new, and there is what concerns at all times, admires, consoles, improves, lives, there is what is beautiful and noble in the art «. In our opinion, the combination of classics and the present in art criticism modification of psychoanalysis is constructive option for the solution of urgent innovative problems of recreation.

Prospects of further researches consist in studying of recreative effectiveness of tasks of art therapy as the symbiosis of the concept of psychoanalysis and psychotherapeutic opportunities of art in the sphere of the higher education in higher education institutions of sports orientation.

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Features of content of competitive activity of highly skilled players of different functional classes in basketball on wheelchairs

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Purpose: *to define features of performance of the main technical-tactical actions in competitive activity by players of different functional classes in basketball on wheelchairs.*

Material & Methods: *62 official protocols of the Basketball World Cup on wheelchairs are analyzed; game indicators of 189 sportsmen are analyzed, from which representatives of functional class 1–1.5 made 47 players, 2–2.5 – 41 players, 3–3.5 – 46 players, 4–4.5 – 55 players.*

Results: *features of performance of technical-tactical actions are established on the basis of the analysis of competitive activity, which need to be considered when training sportsmen of different functional classes in basketball on wheelchairs.*

Conclusions: *specifics of basketball on wheelchairs consist in the dominating functions on the platform of players of different functional classes in the course of competitive activity when performing of the attacking and protective actions by them.*

Keywords: basketball on wheelchairs, technical-tactical actions, competitive activity.

Introduction

The qualitative and quantitative analysis of competitive activity in sports gives the important theoretical, methodical and practical information which needs to be realized in the course of training of players. It is one of the most urgent problems of modern sports training in basketball [3; 13].

The competitive activity of each basketball team has the specific features that demands carrying out special researches and pedagogical observations [14]. Number of authors considers that one of the urgent directions of researches in basketball is the definition of key components of realization of competitive activity by players of high qualification [1; 15].

The assessment of the main technical-tactical actions is carried out for the definition of efficiency of competitive activity of basketball players. Despite of universalization of technical-tactical actions in modern basketball, players of different roles have distinctions in the content of competitive activity and its efficiency [2; 6].

The competitive activity has even more difficult character in wheelchair basketball, which is caused by the presence of players with different extent of violations of the musculoskeletal system [23]. It complicates the process of assessment of competitive activity and demands the search of the criteria of definition of its efficiency, adequate to complexity and multi-factor of competitive fight of players of different functional classes. The objective assessment of actions of players has to have complex character which would consider various aspects of game and feature of competitive activity which assessment is expedient to carry out following the results of the whole competitive tournament, but not separately taken game [2].

Communication of the research with scientific programs, plans, subjects

The research was carried out according to the Consolidating plan of research works in the sphere of physical culture and sport for 2011–2015 of the Ministry of family, youth and sport of Ukraine on the subject: 1.4 “Theoretic-methodical principles of development of sport of disabled people” (number of the state registration is 0111U006470).

The purpose of the research

To define features of performance of the main technical-tactical actions in the competitive activity by players of different functional classes in wheelchair basketball.

Material and Methods of the research

The analysis of technical-tactical actions of 189 sportsmen of which representatives of functional class 1–1.5 has made 47 players, 2–2.5 – 41 players, 3–3.5 – 46 players, 4–4.5 – 55 players, making the list of official statistical protocols of games of the World Cup among men, which was taking place under the auspices of the international federation of wheelchair basketball (IWBF), has been carried out. In total protocols of 62 games have been analyzed, from which: 24 protocols of games of the preliminary tour, 24 protocols of games of the second circle, 6 protocols of games for 5–16 place, 4 protocols of games of the quarterfinal, 2 protocols of games of the semi-final, 1 protocol of the game for the 3rd place and 1 protocol of the final game. Standard methods of statistical data processing were applied to the analysis and the arithmetic average and standard deviation was defined.

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Results of the research and their discussion

Twenty game indicators of technical-tactical actions, which can conditionally be divided into two main groups, were used for the detection of specifics of competitive activity of players of different functional classes: 1) throwing indicators; 2) active game actions in defense and attack (tab. 1).

The analysis of indicators of game actions has allowed defining the domination of players of functional class 3-3.5 and 4-4.5 that, in our opinion, is connected with the smaller extent of functional defeats of organism in comparison with classes 1–1.5 and 2–2.5.

Results of statistical processing of materials demonstrate that average effectiveness of players fluctuates from 1,79 to 7,52 scored points for one game. At the same time the smallest effectiveness is shown by players of functional class 1–1.5 (1,79), and the highest players of class 3–3.5 (7,23) and 4–4.5 (7,52) as sportsmen of these functional classes, as a rule, play positions of forwards and center.

Indicators of throws from the game were more informative. So, sportsmen of functional class 1–1.5 carry on 1,97±0,56 2-point and 0,02±0,015 3-point on average for the game, players of class 2–2.5 – 3,38±0,87 and 0,45±0,32, and respectively players of class 3–3.5 – 6,50±1,34 and 0,79±0,44, and class 4–4.5 – 6,89±1,24 and 0,58±0,30. Considerable differences in indicators of quantity of throws from the game demonstrate more effective actions of players of class 3–3.5 and 4–4.5 which owing to rather bigger motive mobility compensate the weak game of sportsmen of class 1–1.5 and 2–2.5.

The analysis of 2-point and 3-point throws has shown that the priority in the attack of rim from average and near distance is traced at players of all functional classes. So, 8 attacks by 2-point throw are the share of one attack by 3-point throw in classes 2–2.5 and 3–3.5, and in class 4–4.5 12 attacks from average and near distance are the share of one attack from the long range. Therefore, the quantity of 2-point throws and their effectiveness (1–1.5 – 0,85±0,29, 2–2.5 – 1,43±0,46, 3–3.5 – 2,90±0,64, 4–4.5 – 3,12±0,65) has the direct dependence on the number of scored points for the game. It is confirmed by almost identical indicators of percent of effectiveness of 2-point throws and percent of productive throws from the game. Players of functional class 1-1.5 have 33 2-point % and 32% from the game, 2–2.5 – 38% and 36%, 3–3.5 – 43% and 42%, 4–4.5 – 41% and 40% respectively.

Table

The comparative analysis of efficiency of realization of technical-tactical actions of basketball players of different functional classes on average for the game, $\bar{X}$±m

Technical-tactical actions	Functional class			
	1–1.5 (n=47)	2-2.5 (n=41)	3–3.5 (n=46)	4–4.5 (n=55)
Number of the scored points for the game (points)	1,79±0,62	3.51±1,30	7,23±1,63	7,52±1.57
Quantity of 2-point throws for the game (quantity of times)	1,97±0,56	3,38±0,87	6,50±1,34	6,89±1,24
Quantity of productive 2-point throws (quantity of times)	0,85±0,29	1,43±0,46	2,90±0,64	3,12±0,65
Percent of effectiveness of 2-point throws (%)	32,64±6,96	37,66±6,36	43,39±5,30	41,38±3,86
Quantity of 3-point throws for the game (quantity of times)	0,02±0,015	0,45±0,32	0,79±0,44	0,58±0,30
Quantity of productive 3-point throws (quantity of times)	0,003±0,005	0,10±0,09	0,21±0,13	0,16±0,11
Percent of effectiveness of 3-point throws (%)	16,6±2,12	22,69±3,73	26,84±5,52	27,58±5,79
Quantity of free throws for the game (quantity of times)	0,21±0,12	0,66±0,35	1,38±0,33	1,44±0,31
Quantity of productive free throws (quantity of times)	0,08±0,06	0,35±0,27	0,81±0,21	0,79±0,22
Percent of effectiveness of free throws (%)	39,47±6,99	54,69±10,46	58,97±9,39	56,33±8,01
Percent of productive throws from the game (%)	32,47±6,95	36,44±6,10	41,61±5,29	40,31±3,73
The number of assists for the game (quantity of times)	0,29±0,9	0,82±0,27	1,89±0,54	1,39±0,43
The number of rips for the game (quantity of times)	0,30±0,08	0,36±0,10	0,70±0,19	0,67±0,16
The number of blockings for the game (quantity of times)	0,019±0,023	0,042±0,025	0,08±0,04	0,09±0,03
The number of rebounds for the game (quantity of times)	1,11±0,24	1,76±0,51	3,60±0,66	4.51±0,90
The number of rebounds for the game on the board (quantity of times)	0,67±0,14	1,24±0,40	2,74±0,52	3,48±0,73
The number of rebounds for the game on others board (quantity of times)	0,44±0,14	0,52±0,14	0,86±0,20	1,02±0,21
Quantity of the fouls, which are made by the player for the game (quantity of times)	1,25±0,23	1,12±0,25	1,38±0,24	1,39±0,23
The number of turnovers of the ball for the game (quantity of times)	0,54±0,12	0,83±0,24	1,34±0,29	1,19±0,28
The time spent of the player for the platform for the game (min)	9:54±1:48	10:51±1:40	10:31±1:12	10:21±1:26

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Indicators of performance of free throws in many respects depend on activity of players on others board and efficiency of defensive actions of the rival. Players of class 3–3.5 and 4–4.5, in comparison with others, carry out more throws from the line of free throw (1,38±0,33 and 1,44±0,31), at the same time players of class 3–3.5 have their best realization (59%). Features of tactics of attack in wheelchair basketball lead to the fact that the main quantity of the fouls, which are made by the rival, is carried out on players of class 3–3.5 and 4–4.5. It is also necessary to mark out players of class 2–2.5 who carry out on average 0,7 throws from the penal line, but at the same time show rather high precision of free throws, making 55%.

Exact and timely assist of the ball to the partner – characteristic of basketball. The number of passes in attack which have ended with productive throws in rim at players of class 1–1.5 and 2–2.5 is averaged 0,3 and 0,8 for the game, and at players 3–3.5 and 4–4.5 – 1,9 and 1,4 for the game respectively.

Estimating complex of defensive actions at players of different functional classes, it should be noted what higher quantitative indices of players of class 3–3.5 and 4–4.5 in this game component is explained by the direct proximity of players to board at the time of realization of the attacking actions of the rival and higher functionality of organism in comparison with classes 1–1.5 and 2–2.5.

The analysis of average indicators of rips of the ball has shown that players of functional class 3–3.5 and 4–4.5 have notable advantage at players of class 1–1.5 and 2–2.5. Players of class 1–1.5 and 2–2.5 on average for the game do 0,3 and 0,4 rips, and players of class 3–3.5 and 4–4.5 – 0,7. Distinctions in indicators are connected generally with impossibility of sportsmen of class 1-1.5 and 2-2.5 to carry out lean pressing sideward, and sometimes turn from behind damages of functions of spinal cord.

Now the design of basketball wheelchair gives the chance to certain high quality players, to apply block shots in the game. In general basketball players on wheelchairs carry out this technique only episodic what low average values for game testify to (class 1–1.5 – 0,02, 2–2.5 – 0,04, 3–3.5 – 0,08, 4–4.5 – 0,09).

The essential distinctions, which are connected with specifics of functional points of players, are revealed by the efficiency of number of rebound for the game. Rebound of the ball on personal and others' boards is generally provided with players of class 3–3.5 (3,6) and 4–4.5 (4.5), and here their superiority over class 1–1.5 (1,1) and 2–2.5 (1,8) is indisputable. Players of functional class 4–4.5 rebound in defense on average 3.5 rebounds, and in attack – 1. These indicators are respectively equal 2,8 and 0,9 rebounds at players of class 3–3.5. The specific feature of position of players of class 1–1.5 and 2–2.5 in basketball wheelchair, which is directed to the increase in mobility of sportsmen, demands the decrease in their maximum height that influences fight for the jumped aside ball. Rebound of the ball by players of these classes on the board fluctuates ranging from 0,7 to 1,2, and on the rival 0,4–0,5.

Active defensive actions and high intensity of motive activity in wheelchair basketball lead to violation of the rules both from forwards, and from defenders. The mistakes, which are caused by technical defect, when players incorrectly technically carry out game techniques in competitive activity of basketball players of different functional classes, meet almost equally. So, on average for the game, players of class 2–2.5 receive 1,1 personal remarks, and sportsmen of classes 1–1.5, 3–3.5 and 4-4.5 – from 1,3 to 1,4. The standard deviation from average values of fouls in all functional classes is in limits ±0,23–0,25. It demonstrates that the level of technical preparedness at the best players of the world, independently on functional point, does not differ significantly.

The intense and intensive game in wheelchair basketball leads to turnover of the ball. Indicators of number of turnovers of the ball on average for the game, which are ranging from 0,5 to 1,3, are also confirmed by the high level of technical preparedness of players in wheelchair basketball. The minimum quantity of turnovers – 0,54±0,12, is made by players of class 1–1.5 that first of all is connected with small time of possession. The greatest number of turnovers of the ball is made by representatives of class 3-3.5 (1,34±0,29) which is connected with the fact that many sportsmen when landing in wheelchair place emphasis on the maximum height to the detriment of stability of trunk. Sportsmen of class 2–2.5 and 4–4.5 lose the ball on average 0,83 and 1,19 of times for the game respectively.

The analysis of the time spent of players for the platform has not revealed essential differences at sportsmen of different functional classes that are connected with specifics of competitive activity in wheelchair basketball, on the basis of the rule of balancing of the team (rule limit of 14 points), demanding existence on the platform of players of different functionality. In general players of different functional classes are on the platform on average for one game: class 1–1.5 – 9:54±1:48 minutes, class 4-4.5 – 10:21±1:26, class 3-3.5 – 10:31±1:12, class 2-2.5 – 10:51±1:40.

The quantitative analysis of game activity in the conditions of competitions has allowed defining specifics of performance of the main technical-tactical actions of players of different functional classes.

Functional classification in wheelchair basketball is of great importance [21]. Coaches have to have a clear idea of functionality of sportsmen and understand basic provisions of classification [10; 17; 18; 24]. Each player is capable to perform the certain operations, which are based on its functionality [9; 12]. As number of experts specifies [19; 22], it is necessary to control constantly functionality of the sportsman, that is as the player is capable to perform various physical actions inherent in wheelchair basketball. Therefore, the coach has to be guided in functional distinctions of players that will allow training the sportsman taking into account ability to perform motor actions [7; 8]. Sportsmen, in turn, have to realize clearly the functionality and, thus, use all possible muscular groups for performance of motor actions [11].

Researches of native experts [4; 5] note the importance of problem of individualization of training of players in basketball. This perspective is important more in wheelchair basketball. It is connected with the extent of defeats of the musculoskeletal system and distinction of functionality of the players, playing in one team. For improvement of quality of the training process, the coach of wheelchair basketball has to approach planning of means and methods of training which are oriented on group of the sportsmen, having different functionality [25] creatively. According to foreign authors [16; 20] as much as

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possible to use the potential of each sportsman, it is necessary to consider distinctions in functional features of sportsmen and to consider them within context of training and development of the sportsman.

Conclusions

Players of different functional classes have to perform game operations, specific to them, during the game in wheelchair basketball.

So, players of functional class 1-1.5 perform generally defensive operations on the platform and provide the organization of team game in attack. The tactical role of these players consists in blocking of the rival, and also performance of large number of screens, giving help to the partners in counteraction to the rival's resistance, and at the same time carries out many short breakthroughs on the platform.

Players of class 2–2.5 provide appropriate conditions of the organization as attacking, and defensive actions of the team on the platform. Due to the features of design of basketball wheelchair and landing in it, players of this functional class, as a rule, are more high-speed. Players very often apply breakthroughs and enter the power antagonism, first of all, which is connected with rebound of ball, thanks to speed.

Players of functional class 3–3.5 provide communication of back and forward attacking line which is traced in performance by them of the greatest number of assists, rips and throws from the average and long distance. Also players of this class participate actively in blocking of players of the rival, in fight for rebound of ball on their or others board and counteract the attacking actions of players of the rival.

Players of functional class 4–4.5 are «goal-scorers» of teams that is traced in performance by them of the greatest number of throws, the number of scored points and movements in the course of competitive activity. Feature of players of this functional class is that they, according to the functionality, use basketball wheelchair with the maximum height, which is allowed by the existing rules. In this regard, these players most effectively act on the near distance from rim and in zone of 3 seconds.

Prospects of further researches consist in the development of programs of training of players taking into account their functional class for the improvement of quality of the training process.

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Structure and content of competitive group compositions in sports aerobics

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Purpose: *to make the analysis of modern competitive group compositions in sports aerobics.*

Material & Methods: *pedagogical, sociological and methods of mathematical statistics were used. 10 coaches took part in the experimental part; analysis of protocols and video records of competitions of the aged category of children of 9–11 years old, who perform in the nomination of triplets and quintuples (group exercises), is carried out.*

Results: *the content of competitive compositions and the allocated indicators are studied which defined it.*

Conclusions: *the basic structural elements, which characterize competitive compositions, are allocated. Their components, quantity and time of performance are defined. It is established that variety of aerobic contents, spaces, and means of registration, musical compliance and logicality of creation of the whole competitive composition at high quality of performance characterizes teams – winners.*

Keywords: *sports aerobics, competitive composition, group exercises (triplets and quintuples), aged category, 9–11 years old.*

Introduction

Now the growth of complexity of competitive programs, the search of new original elements, bringing of technical skill to the level of virtuosity in the difficult and coordination sports, which are connected with art of movements, the leading tendencies of development. Sportsmen include maximum of elements of the highest difficulty from various structural groups in the programs and carry out them innovative [1; 6; 7; 9, etc.]. At the same time superiority will remain for those sportsmen who will be able to combine various complexities, technically perfect execution in original compositions with special expressiveness and virtuosity. In this case only the esthetic party can serve as that moment which gives a certain advantage to sportsmen.

However the concept "sportsman's aesthetics", which is connected with the manifestation of such parties of mastery as expressiveness, culture of movements, efficiency and harmony, artistry and musicality, virtuosity, are among difficult defined, indistinct concepts and need detailed specification and identification of criteria for their assessment [2; 3; 8; 14, etc.].

Questions of identification of objective criteria for evaluation of mastery are consecrated in works of wide range of authors in gymnastic and dancing sports [5; 10; 12; 13, etc.]. These publications are united by one purpose – the aspiration to reduce subjectivity of referee's assessment. However it remains not clearly how to estimate and increase mastery level in the training process what movements and actions to apply to the achievement of artistry and expressiveness in exercises. This problem can be solved by disclosure of artistic and emotional skill of sportsmen by drawing up competitive compositions.

There are no concrete recommendations about the quantitative analysis of content of competitive exercises in sports aerobics. The general short requirements for drawing up and assessment of contents of programs (exercises) of sportsmen are provided in competition rules on sports aerobics. There are no accurately differentiated concrete criteria for evaluation of indicators of staginess of execution, virtuosity of the sportsman, originality of techniques, complexity and the sequence of execution of exercises. Therefore, the work in this area of the research is urgent.

Communication of the research with scientific programs, plans and subjects

The research is executed according to the subject of the Consolidating plan of the research works in the sphere of physical culture and sport of MES of Ukraine for 2015–2016 within the subject 2.2.4 "Improvement of mechanisms of management of motive activity of sportsmen".

The purpose of the research

To make the analysis of modern competitive group compositions in sports aerobics.

Research problems:

1. To study theoretic-methodical condition of problem of maintenance of competitive group compositions in sports aerobics.

2. To investigate structural elements of competitive group compositions in sports aerobics.

Material and Methods of the research

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13 of Kharkov. 10 coaches took part in its experimental part, and documentation of age category of children of 9–11 years, competing at competitions to the group program, was investigated (triplets and quintuples). The complex of scientific methods of research was used: pedagogical methods of the research (analysis and synthesis of data of scientific and methodical literature, analysis of documentary materials; analysis of video records; pedagogical observation); sociological methods of the research (poll and questioning); methods of mathematical statistics.

The pedagogical observation was made within the year at the competitions, which are held by the Ukrainian federation of sports aerobics and, in particular, the Kharkov regional federation of sports aerobics and fitness.

2 main starts were seen – Cup and Championship of Ukraine, and also 6 open championships of the Kharkov and Sumy regions. The questioning of coaches, referees is carried out, the corresponding conclusions of protocols of last competitions are studied and drawn.

Results of the research and their discussion

Pedagogical observations according to video records of official competitions were made for the definition of structure and the maintenance of competitive compositions of triplets and quintuples in the category children of 9–11 years old in sports aerobics [4; 11; 15]. The analysis of programs was made on the allocated by us indicators. Requirements for creation of compositions, which are described in competition rules on sports aerobics and special literature on drawing up voluntary exercises in sports views of gymnastics (tab. 1), are the basis for it.

The received results testify to various contents of competitive programs, both on structure of elements, and on time of implementation of the program. The average duration of the program in the age category children of 9–11 years makes 75 seconds that conforms to requirements of modern competition rules. 41 seconds (54,7%) on average from them are the share of basic steps and their versions. 12,9 seconds (17,3%) are allotted on average on transitions and interactions. From 16 to 22 seconds (21,3–29,3%) are allotted on elements of complexity. The expressive movements, jumps of registration and elements of acrobatics have a design character and are carried out on average on 2,47 seconds (3,3%).

Counting percentage ratio of time of performance of different movements in competitive composition, we revealed that 25,3% is required on average on elements of complexity, the rest of the time (74,7%) is taken by the connection of aerobic tracks (CAT), registration jumps, expressive movements, acrobatics elements, transitions and interactions (fig. 1).

Table 1

The indicators, defining the maintenance of competitive compositions of group exercises in sports aerobics for the age category children of 9–11 years

№	Group of indicators	Indicators	Detailed description
1	Elements of complexity and combination	Elements of group A	Push-ups, circles and swings over legs, helicopter
		Elements of group B	Emphasis
		Elements of group C	Jumps and jumps with landing in split
		Elements of group D	Balances and flexibility
		Combination from 2 elements	2 elements of complexity combined directly from one or different groups, but from various subgroups (families) with the additional cost of 0,1.
		Elements of the highest cost	Element worth 0,4.
2	Sports specific contents	Basic steps (connection of aerobic tracks CAT)	7 basic steps
		Transitions and interactions	The ordinary connecting steps which are carried out for preparation for complexity elements (lowerings and rises, transitions, etc.)
3	Means of registration	Expressive movements	Accent stop of the sportsman, or the pose executed by part of body, combined with sharp sound effect of music
		Registration jumps	Jumps which have character of registration and do not belong to complexity elements
		Acrobatics elements	The elements executed on floor (kind of spins, weak links), on forearms, from A1 to A3, excepting elements with flight phase, are resistant, rise by extension - all from A4 to A7
4	Space (constructions and evolutions)	Movement (horizontal plane) — Geometrically correct	Movements on the platform (on diagonal, around, forward, back, to the right, to the left). Sharp and exact image of construction (drawing)
		Movement (horizontal plane) — Difficult constructions	Change of positions and provisions between sportsmen in group (pair work, work on the three, groups in interaction and without)
		Space (vertical plane)	In standing positions on floor or in air
5	Musical compliance	Musical compliance	Total result of quantity of accent points, dancing and subject elements and number of change of rhythm
6	Intensity	Rate of execution	Total result of quantity of movements in unit of time

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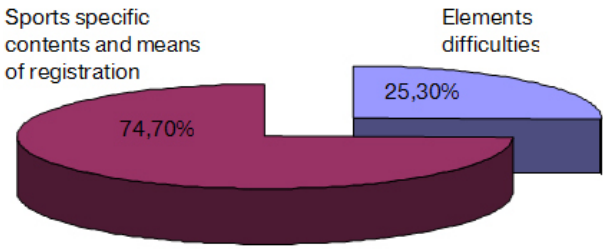

Fig. 1. Percentage ratio of time of maintenance of competitive compositions of group exercises in sports aerobics

Thus, the main maintenance of competitive compositions in sports aerobics is made by "program choreography" – the work of art which is free for creativity. Restrictions are available only from competition rules. It concerns time, sizes of the platform and quantity of the elements, defining complexity for a concrete age.

Conclusions

The analysis of maintenance of competitive group compositions, allowed defining components, quantity and time of their performance. It is revealed that the most part of time of the whole program is occupied by basic steps (connection of aerobic tracks) and their version – 41 seconds (54,7%), 12,9 seconds (17,3%) are the share of transitions and interactions. The insignificant part of time is almost evenly distributed between other components, having a design character: expressive movements – 0,5 seconds (0,66%), acrobatics elements – 1,2 seconds (1,6%), registration jumps – 0,77 seconds (1,02%). 18,9 seconds (25,3%) are on average allotted on elements of complexity. Thus, the main maintenance of competitive combinations in sports aerobics is made by «program choreography».

Studying of features of creation of competitive compositions in sports aerobics is **in the long term further researches**.

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Increase in efficiency of game by feet in modern rugby

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Purpose: *to define the importance of successful carrying out kicks of realization in rugby for the end result of the match.*

Material & Methods: *the analysis of scientifically-methodical literature and the analysis of the developed results of matches in the rugby World Cups.*

Results: *the reasons of the developed structure of effectiveness in rugby are described; the developed analysis of results of the final part of the World Cups in rugby of 2011 and 2015 is submitted.*

Conclusions: *the significant place is taken not only by the brought attempts, and both their successful realization and other game elements by feet because of the high density of the final results and high level of preparedness of teams. The detailed analysis of results of the research demonstrates what not only realization is of great importance in points taking for the final result, but also all kicks by feet what their big percent at points taking testifies to.*

Keywords: *rugby, attempt, attempt realization, penalty kick, drop-goal.*

Introduction

In rugby the team consists of 15 players who make three lines of game roles: attack, half-back and defense. The game lasts two halves on 40 minutes; the referee has to continue the game on the termination of playing time so far the ball will not become "dead". Also the team which gathered most of all points will be considered as the winner. Points in rugby are given for the executed attempts – ball landings to the valid field of the rival, at the same time the team gathers 5 points, the team receives 2 points for realization – successful shoot for goal, which is carried out directly after attempt. Also the team can receive two points for goal kick during the game [1].

Until recently the analysis of effectiveness of rugby teams was carried out by the analysis of number of the won and lost matches, thus progress of teams both in domestic, and in foreign scientifically-methodical literature was analyzed. So, it is noted in the scientific works in Elisabeth Ranson and Paul Somers (2003) that the game came down to active actions only in respect of kicks to ball to change of assignment of points for attempts as two successful goals could block themselves all attempts to break through defense from 15 players. There were continuous kicks and a little contact fight at the game as it was not awarded adequately. Accents in game exchanged for the benefit of carrying out successful attempts, having pushed aside kicks on the second plan after change of rules of assignment of points in 1991 [8]. Other British scientist Kenneth Quair connects unseemly attention in the analysis of competitive activity in rugby to kicks, in connection with the above-mentioned fact. The competitive activity in 582 rugby matches at the international level is analyzed in his works (2002–2011). Conclusion of his work was the fact that goal kicks were successful in 72% of cases, and more attention of the analysis of competitive activity, proceeding from carrying out kicks has to be paid in sports statistics on rugby [11; 12].

In general, analytical activity becomes more diversified at this stage of development of rugby, that is, needs big criteria for the comprehensive analysis. The special relevance in such conditions is acquired by studying of kicks of realization which lit not enough in scientifically-methodical literature, in spite of the fact that their importance for the end result grows in match.

The purpose of the research

To define the importance of successful carrying out kicks of realization in rugby for the end result of match.

Material and Methods of the research

The following *methods of the research* were used for achievement of the purpose of the research: the analysis of scientifically-methodical literature and the analysis of the developed results of matches in Rugby World Cups.

Results of the research and their discussion

Game by feet in rugby takes the important place and is highly appreciated very much. The oval form of the ball predetermines complexity of performance of these or those kicks. Kicks are divided on: volley kick; drop kick; kick from the earth; kick from support.

The kick from support is used for formation of skill of realization. The technique of this kick is following – the ball is put on counter by sharp part towards flight from top to bottom. The forward part of the ball rises above the ground. The tilt angle of the ball is selected the player who carries out the kick, proceeding from his individual skills. The kick is carried out from running start in two-three steps, instep, also kicks are allowed by boot sock.

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The difficult technique of the kick from support predetermines low percent of its successful performance. Especially it is shown at kicks from acute angles concerning gate [1; 7].

However the developed analysis of dynamics of effectiveness of teams in the final part of Rugby World Cups in 2011 and 2015 shows that effectiveness of kicks of realization grows (tab. 1, 2).

Analyzing results of 2011, we can see that the team, which won, could not make any realization. Also the analysis of performances showed that levels of preparedness of teams differ very much, and their results are separated even in those which reached the final [9].

It is possible to see from table 2that results of the World Cup considerably differ from previous, unlike them they dense and have no big separation [9].

Also from the above-stated tables we can see that the percent of successful realization of attempts during the period from 2011 to 2015 increased from 61% to 78%. It is connected with increase in density of results, the general level of preparedness of all teams, the high level of all teams and the absence of pronounced favorites. The exchange of experience by signing by teams of the contract with foreign coaches promoted it. So, English national team for the whole history of the existence signed the contract for 2016 with the foreign coach Eddie Jones. It is proved that density of results of the brought attempts, solving in the final result, there are other factors: such as number of successful realization, penalty areas and drop-goals [10].

All these technical elements which influence recently effectiveness and result of matches to a large extent have in basis kicks [2–6, 14].

Therefore the more detailed analysis of set of points by teams in final parts of the World Cups of 2011 and 2015 submitted in figures 1 and 2. It is established that kicks have more powerful contribution in comparison with the brought attempts, even in 2011 [13].

The percent of the reckoned points by means of attempts in 2011 made 44%, and realization – 7%. The general percent of the gathered points for the account different kicks made 56% [9].

We can see by results of the analysis of 2015 that the percent of the points, which are gathered due to attempts, decreased by 1% that is not essential change, effectiveness of realization grew by that in twice and as a result we have 14% [9].

It is visible from the submitted data that successfully punched realization has rather powerful value on decisive result recently. Besides, also it became clear that not only successful realization has great influence on result as a result, but also other kicks which earn winning points for teams. And, above all that their percent in comparison with attempts rather considerable and it though slowly, but grows. Therefore it is necessary to pay attention to it and to pay more attention by preparation to these game elements.

Conclusions

It is established by results of the carried-out analysis:

1. It was necessary to find other effective methods of set of points through density of results and level of preparedness of teams; therefore the number of the successfully realized attempts grew in twice from 7% in 2011 to 14% in 2015.

2. The detailed analysis of results of the research demonstrates what not only realization is of great importance in set of points for the final result, but also all kicks about what their big percent testifies to at set of points, both in 2011, and in 2015.

Table 1

The developed analysis of results of the final part of Rugby World Cup of 2011

Place	Teams-finalists	Attempts				Realizations				%
		N. Z.	France	Austr.	Wales	N.Z.	France	Austr.	Wales	
1	New Zealand	–	1	1		–	0	0		0
2	France	1	–		0	1	–		0	100
3	Australia	0		–	2	0		–	1	50
4	Wales		1	2	–		0	1	–	33

Table 2

The developed analysis of results of the final part Rugby World Cup of 2015

Place	Teams-finalists	Attempts				Realizations				%
		N. Z.	Austr.	S. A.	Argen.	N. Z.	Austr.	S. A.	Argen.	
1	New Zealand	–	3	2		–	2	2		80
2	Australia	2	–		4	2	–		3	83
3	South Africa	0		–	2	0		–	1	50
4	Argentina		0	1	–		0	1	–	100

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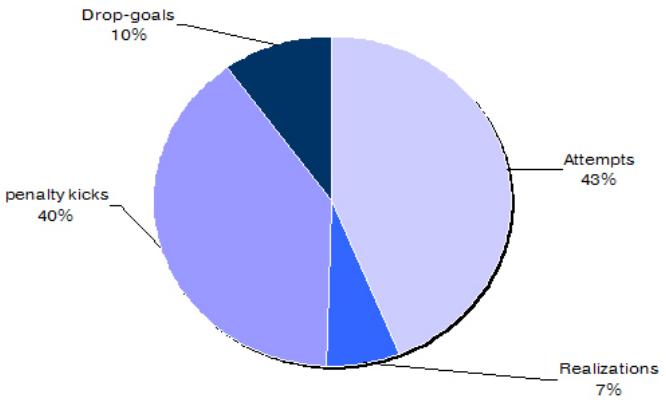

Fig. 1. The analysis of destiny of contribution of different components of set of points by all teams rugby-union in the final part of the World Cup of 2011

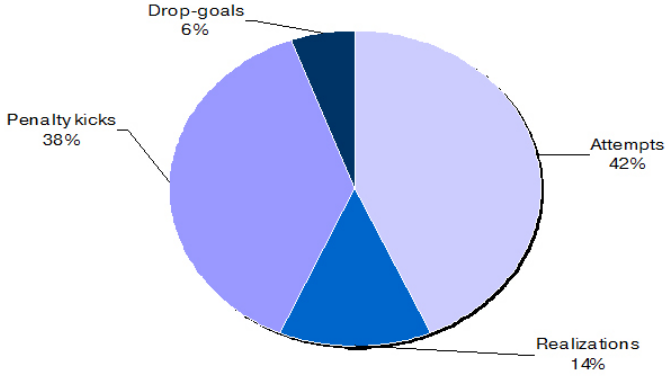

Fig. 2. The analysis of destiny of contribution of different components of set of points by all teams rugby-union in the final part of the World Cup of 2015

3. It is established that need of improvement of method of execution of realization of attempts became still significant, through similarity of all game elements by foot which have powerful influence on set of points in the final result.

Prospects of the subsequent researches

The subsequent researches will be directed to the expansion of selection for more fundamental statistical processing, will be more in details dynamics of changes of structure of sports results in rugby is analyzed. Also the structure of effectiveness of the Ukrainian teams, with display of changes of its dynamics will be considered.

Studying of quality of technical component of performance of kicks in rugby, examining of the advanced techniques of improvement of method of execution of shock actions, and also development of own technique, on the basis of the analysis of the best practices of foreign and domestic scientists, perhaps, with loan of methods and techniques in adjacent sports will be separate point of researches.

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Influence of bodybuilding activities on physical qualities of skilled female athletes in different phases of peculiar biological cycle

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Purpose: *to conduct research on the impact of training female athletes engaged in bodybuilding and fitness bikini on the manifestation of physical qualities in different phases of the ovarian-menstrual cycle.*

Material & Methods: *researches were conducted in sports fitness-clubs of Kharkov "Feromon", "Gorod", "King" with the skilled female athletes who are engaged in bodybuilding and fitness-bikini within 3 months of the preparatory period in number of 14 people. We used as methods of the research: the analysis of references and testing of level of motive qualities in separate phases of OMC.*

Results: *the theoretical analysis of features of the accounting of phases of OMC at female athlete is submitted and the testing of the level of development of physical qualities in different phases of the specific biological cycle at the qualified sportswomen, who are going in for bodybuilding, is held.*

Conclusions: *the received results demonstrate that physical efficiency of the the skilled female athletes, who are engaged in bodybuilding, is not identical in phases of the ovarian-menstrual cycle. It is revealed that the best conditions for performance of considerable exercise stresses in post-ovulatory and post-menstrual phases of OMC, therefore it is expedient to plan them in the preparatory periods of the qualified sportswomen, who are going in for bodybuilding.*

Keywords: *testing, phases of OMC, physical qualities, bodybuilding, female athlete.*

Introduction

One of the most significant differences of the female body from the male is the structure and functioning of the reproductive system and its hormonal regulation [6; 16]. Therefore, any recommendations of health systems should be based on the particular features of their impact on women in the different phases of the ovarian-menstrual cycle. First of all, it should be noted that these changes during the cycle taking place not only in the genital system of women, and subject to a number of other organs and systems (nervous, cardiovascular, endocrine, respiratory, immune, and others) [18; 19; 20; 21].

There are two main points of view on the relationship between the ovulatory-menstrual cycle and performance. Some experts deny the dependence of the performance of its phases in female athletes [2]. Other researchers [1; 4; 17] believe that the different concentrations of sex hormones in the body during the ovulatory-menstrual cycle, changes the functional status of the vital systems of the body, can not affect on the level of performance of female athletes. Meanwhile, it is proved that not in all phases of the biological cycle of the female athlete is able to perform training and competition loads.

For example, Ukrainian investigators [5; 12; 14; 16; 17] dealing with the problem of women's sports for many years, we came to the conclusion that all women have different levels of manifestation of motor abilities during the ovulatory-menstrual cycle is not constant and varies in accordance with the cycle phases.

At the same time, the researchers did not deny the influence of menstrual function in the operation, pay attention to the personality of its dynamics in the individual phases in the different female athletes [11; 15].

Researchers who have studied the muscular activity of women, found that, depending on the character of the ovarian-menstrual cycle and the dynamics of the health of all female athletes can be divided into categories. Thus secrete such group of women at which stability of working capacity during an ovarian-menstrual cycle is observed, and group of sportswomen in whom there is a sharp decrease in working capacity in a menstrual phase. Other groups, dedicated scientists, different: it is the female athletes, reach the menstrual phase of maximum performance, and female athletes show the maximum level of performance during ovulation [17].

It should be noted that the L. G. Shahlin classifies women as a result of subjective self-assessment of state of health in the menstrual phase [17]:

1 group – female athletes with good health and good condition of the objective. Sports results do not depend on the phase of ovarian-menstrual cycle.

2 group – female athletes who complain of drowsiness, weakness, reluctance to exercise; typically it has reduced blood pressure.

3 group – female athletes who have headaches such as mi-

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graines, pain in the lower abdomen and lower back, irritability blood pressure have often increased and the pulse quickens.

4 group – female athletes are poisoning symptoms: loss of appetite, nausea, joint pain, aching, restless sleep, sometimes increased heart rate, respiration, blood pressure, temperature rise.

The study G. Erdeby shown that in those sports where female athletes get great exercise (cross-country skiing, different types of rowing), they are deep menstrual dysfunction (amenorrhea, hypomenorrhea, dysmenorrhea, etc.). Moreover, the author notes that during the period of reduction of both physical and mental stress in their normalization observed occurrence of ovarian-menstrual cycle [18]. The negative effect of intense exercise on the course of the cycle in female athletes is reported in a number of scientific papers [3; 7–10; 13].

Studying the question changes in other systems female athletes body in connection with a comparison of the various phases of the menstrual cycle, the inventors have determined, firstly, their presence, and secondly, the dependence of the depth of functional metabolic changes in organs and tissues of ovarian-phase of the menstrual cycle.

There are studies in which the authors are confident that female athletes can continue to practice and perform at competitions throughout the ovarian-menstrual cycle [9]. The authors who hold this view say that, with the participation of female athletes in competitions in the premenstrual and menstrual phases of ovarian-menstrual cycle and achieve results significantly deteriorated.

The analysis of literature data to announce that most of the authors involved in this issue, expressed the unanimous opinion of the high level of expression of the essential physical qualities (except flexibility) in the postmenstrual and postovulatory phases, and a decrease in performance during menstruation, ovulation and menstrual period. However, the question of the existence of a specific minimum level of quality motor for ovarian-menstrual cycle remains open.Tthe study also conducted in various sports are not fully reflect the specificity of sports activities power character, to which the body-building, which requires research.

Communication of the research with scientific programs, plans, subjects

Scientific research performed on the topic Consolidated Plan

Table 1

Indicators of physical fitness in different phases of the ovarian-menstrual cycle qualified female athletes engaged in bodybuilding (n=14)

Indicators	Phases OMC				
	I	II	III	IV	V
Running on 30 m, s	5,4±0,09	5,1±0,08	5,2±0,08	5,0±0,09	5,3±0,08
Shuttle run 3x10 m, s	10,1±0,1	9,8±0,09	10,0±0,09	9,7±0,08	10,0±0,09
Raising the body of the supine position, count times	39,8±2,45	47,9±2,26	41,7±2,31	48,7±2,37	40,9±2,33
Jump up from the place, cm	29,8±0,75	33,7±0,81	30,1±0,77	34,2±0,80	30,2±0,76
Long jump from the place, cm	168,2±3,18	179,7±3,26	170,6±3,21	180,6±3,27	169,9±3,20
Flexion and extension arms in emphasis lying, count times	32,7±1,76	41,6±1,83	34,8±1,79	42,4±1,84	32,1±1,80
Tilt forward from a seated position, cm	11,2±1,03	13,7±1,05	11,5±0,98	13,8±1,04	11,9±0,99

Note. *Phase OMC: I – menstrual; II – postmenstrual; III – ovulatory; IV – postovulyatory V – before menstrual.*

Table 2

Matrix reliability of difference in terms of running 30 meters and 3x10 m shuttle run in different phases of the OMC skilled female athletes involved in bodybuilding (n=14)

Phases OMC	II	III	IV	V
I	t=2,50; <0,05 t=2,24; <0,05	t=1,67; >0,05 t=0,75; >0,05	t=3,15; <0,01 t=3,13; <0,01	t=0,83; >0,05 t=0,75; >0,05
II		t=0,91; >0,05 t=1,58; >0,05	t=0,83; >0,05 t=0,83; >0,05	t=2,50; <0,05 t=1,58; >0,05
III			t=1,67; >0,05 t=2,50; <0,05	t=0,91; >0,05 0
IV				t=2,50; <0,05 t=2,50; <0,05
V				

Note. *In the numerator – Running on 30 m; in the denominator – shuttle run 3x10 m.*

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of research work in the field of physical culture and sports in 2011–2015 by theme 3.7 «Methodological and organizational-methodical bases determination of individual standards of physical condition of man» (state registration 0111U000192).

The purpose of the research

To conduct research on the impact of training female athletes engaged in bodybuilding and fitness bikini on the manifestation of physical qualities in different phases of the ovarian-menstrual cycle.

Material and Methods of the research

Research conducted in the sports fitness clubs Kharkiv City "pheromone", "City", "King" of skilled female athletes involved in bodybuilding and fitness bikini for 3 months during the preparatory period amount of 14 people. As research methods were used: analysis of literature and testing of motor skills in certain phases of the OMC.

Results of the research and their discussion

When planning the training process of female athletes engaged in bodybuilding, it is important to distribute physical loads taking into account the performance in different phases of the OMC. Therefore, we conducted studies during 3 mesocycles of the preparatory period with the determination of the influence of individual phases of OMC on the manifestation of physical qualities, the results of which are presented in the table 1.

The results of the exercises with the use of the run, the best performance obtained in postmenstrual and postovulatory phases (table 2).

In run 30 meters mean group indicator female athletes study group was as follows: in phase II – 5,1 s, in IV – 5,0, which is significantly better than in the I and V phases of OMC ($p<0,05$). Results shuttle run 3x10 also higher in phases II and IV, compared with phase I ($p<0,05$) and IV with respect to the V phase ($p<0,05$).

Implementation of jumping exercises also higher in phases II and IV OMC (tab. 3): jump up from their seats in the second phase of 3.9 cm, III – 4.4 cm towards the best results of phase I (t=3,55, 4,00; $p<0,01$). In phase III results was significantly lower in relation to Phase IV (t=3,73; $p<0,01$), and the V phase

Table 3

Matrix reliability of difference in the parameters of the jump up and in length jump from the place in different phases of the OMC in skilled female athletes engaged in bodybuilding (n=14)

Phases OMC	II	III	IV	V
I	t=3,55; <0,01 t=2,53; <0,05	t=0,28; >0,05 t=0,53; >0,05	t=4,00; <0,01 t=2,72; <0,05	t=0,38; >0,05 t=0,38; >0,05
II		t=3,36; <0,01 t=1,99; >0,05	t=0,45; >0,05 t=0,20; >0,05	t=3,18; <0,01 t=2,15; <0,05
III			t=3,73; <0,01 t=2,18; <0,05	t=0,09; >0,05 t=0,16; >0,05
IV				t=3,70; <0,01 t=2,34; <0,05
V				

Note. *In the numerator – jump up from the place; in the denominator – long jump from the place.*

Table 4

Matrix reliability of difference in the parameters of the raising the body of the supine position and in flexion and extension arms in emphasis lying in different phases of the OMC in skilled female athletes engaged in bodybuilding (n=14)

Phases OMC	II	III	IV	V
I	t=2,43; <0,05 t=3,52; <0,01	t=0,56; >0,05 t=0,84; >0,01	t=2,61; <0,05 t=3,83; <0,01	t=0,33; >0,05 t=0,24; >0,05
II		t=1,92; >0,05 t=2,81; <0,05	t=0,25; >0,05 t=0,31; >0,05	t=2,16; <0,05 t=0,23; >0,05
III			t=2,12; >0,05 t=3,14; <0,01	t=0,24; >0,05 t=1,13; >0,05
IV				t=2,35; <0,05 t=4,01; <0,01
V				

Note. *In the numerator – raising the body of the supine positionin the denominator – flexion and extension arms in emphasis lying.*

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relative to the phase V (t=3,70; p<0,01).

A slightly smaller difference between the results of the female athletes of the study group was obtained in a long jump from the place (table 3). The highest rates were obtained in phase IV (180,6 cm) and phase II (179,7 cm), which was significantly better than in phase I (t=2,72; 2,53; p<0,05, respectively), and also in phase IV relative to III (t=2,18; p<0,05) and V (t=2,15; p<0,05) phases.

The results of strength training, which is one of the most important for the preparation of bodybuilding, also tend to decrease in I, III, and V phases (table 4).

Number of raising the body of the supine positionin in phases II and IV was 47,9 and 48.7 times and was the highest, while in phase I – 39,8 times, III – a 41,7 V – 40,9 times. At the same time, significant differences obtained in phase II against the I (t=2,43; p<0,05) and V (t=2,16; p<0,05) and in phase IV phase with respect to the I (t=2,61; p<0,05) and V (t=2,35; p<0,05) phases.

Results flexion and extension arms in emphasis lying more significantly differ between phases OMC (tab. 4). The highest female athletes showed in stage IV (42,4 times), which was significantly better than I (t=3,52; p<0,01), III (t=3,14; p<0,01) and V (t=4,01; p<0,01) phases. In phase II medium group indicator results were 41,6 times, which was significantly higher than I (t=3,52; p<0,01) and III (t=2,81; p<0,05) phases.

As for the indicators of flexibility (tilt forward from a seated position), the significant (p<0,05) differences between the phases of the OMC is not detected.

Conclusions

The results indicate that the physical performance of skilled female athletes engaged in in bodybuilding is not the same in the phases of ovarian-menstrual cycle. It was revealed that the best conditions to perform considerable physical activities in postovulatory and postmenstrual phases of the OMC, so it is advisable to plan for them in the skilled female athletes engaged in in bodybuilding.

Prospects for further research include determining the effect of bodybuilding activities on functional state and psychophysical performance of female athletes in different phases of the ovarian-menstrual cycle.

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An influence of the training process on the functional state and physical quality indicators of sportsmen-veterans at stages of going off from the high performance sport

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Purpose: *to accomplish the analysis of influence of the training loadings on the indices of the functional state and physical qualities in different age periods of sportsmen-veterans.*

Material & Methods: *researches were conducted with the sportsmen-veterans (football players) of the different age groups (35–40; 41–45; 46–55) who continued to employ and participate in competitions after finishing of active performances in professional commands. The methods of determination of level of motive qualities and indices of the functional state of footballers-veterans were used. Results were calculated by the methods of mathematical statistics.*
Results: *the results of long-term researches of determination of dynamics of changes of motive qualities level and functional state indices during age period 35–55-years of football players are presented.*

Conclusions: *it is determined that during the research period the most changes of level of physical qualities and indices of functional state are received in the period of 35–40 years, that is caused by plummet of the training and competitive loadings after active employments in professional soccer commands.*

Keywords: *sportsmen-veterans, footballers, physical qualities, functional state*.

Introduction

The development of the veterans' movement contributes to the solution of the issue of sports qualification, the awarding of sports ranks for performances of European and world level.

Significantly promote the development of sports veterans movement that in order to get the title of Merited Master of Sports of Ukraine, sportsmen-veterans should at least participate in the competition for over 10 years and to be the world champion in three different age groups.

Currently, the number of kinds of sports veterans, active development in Ukraine has reached 25.

In developed countries (USA, Great Britain, Japan, France, Italy and others) the organization of spectacular rivalry of athletes participating in veterans' competitions is not the main goal. This part of the competition is only a small part of the overall system, which main purpose is to develop the habit of healthy forms of recreation of the general population [10].

However, sportsmen-veterans do not have an official status and therefore are forced to engage in sports without state support, at the expense of sponsors.

The problem of human physical activity throughout life in recent years, paid a lot of attention as it is one of the main issues of human life.

In the process of aging reduces the adaptive capacity of the body, different disease-causing factors are becoming more diverse and dangerous. However, scientists have established that along with the extinction of vital functions, new active adaptive mechanisms are included, which can for a long time preserve at a sufficient level the basic capabilities of the organism. Most notably these mechanisms develop in the body physically active people, so the biological needs of an aging organism in action must constantly meet. However, we must not forget that with age, the optimal value of the load varies, the boundaries between the training and non-training loads narrow [1; 2].
In the body of people who have reached physiological old age, naturally, atrophic changes are observed; gradually and evenly develop in all organs and systems. These changes ultimately lead to a decrease in the functionality of the aging organism.

The development of physical capacity occurs throughout a person's life. In this process, there are three major stage [2].

First – stage of intensive development of motor function and physical characteristics and motor abilities, which are formed on its basis.

Second – stage concerning a slow decline in physical capacity – beginning of regression of physical and motor skills.
Third – phase of involution of motor function of the gradual or rapid reduction of physical capabilities of an old man.
In recent years, the participation of veterans is activated in a variety of sports, but in scientific publications are not presented specific recommendations on features of construction of training process.

According to observations [14], athlete body who has reached

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his highest functionality under 25 can stably maintain this level up to 35 years. Then begins the slow decline of body functions, but are determined by the event of victory in the Olympics, World and European Championships and at an older age. This applies primarily to sports with display of endurance (skiing, athletics marathon running, rowing, etc.).

The main condition of physical activity may be a former athlete maintain a moderate level of physical activity (brisk walking, climbing stairs, swimming, skiing trips, dances and games, aerobics and so on up to 30 minutes a day at least 4 times a week depending on the state of the weak parts of the musculoskeletal system [13].

We [9] determined that the main causes of diseases in athletes is the use of inadequate physical activity – 40 cases, the consequences of injuries – 26 cases, unsatisfactory material and living conditions – 5 cases. All of the above indicates that the diseases and injuries of athletes are mainly due to the reasons for the insufficient implementation of the methodological guidelines and regulations established in each sport.

An important factor in the prevention of disease in athletes is their gradual exit from large training and competitive pressures and save further optimal, taking into account age and gender, motor activity. This, in turn, determines the logical solution to the constant monitoring of the physical condition of the sportsmen-veterans of in urban medical and sports clinic. The solution to this institutional problem does not require any financial costs [15].

It is established [3], that the morphological changes in the heart of sportsmen-veterans depend not only on the degree of their preliminary adaptation to physical loads, but also on the orientation of the training process.

Individuals retain the locomotor activity and preparedness in middle and old age tend to live longer than their sedentary counterparts. Older people who choose an active lifestyle, less prone to various chronic diseases, including hypertension, insulin dependent diabetes mellitus, heart disease [13; 15].

Conducted A. Polyakov, R. Korobeynikov [11] survey showed that physical activity of sportsmen-veterans is not only a means of physical and psychological rehabilitation of older people, but also an important factor in slowing down the aging process of involution in the human body.

From the standpoint of the experience gained it seems to assert that important area of modification of exercise in the veterans age can only be a shift towards less complex exercise, and lightweight exercise for the entire set of parameters, primarily on the intensity (sharpness, tempo, effort value) and secondarily, by volume, duration, number of repetitions of movements, the number of sessions per week, and so on. [8]. According to other targets, the change in the nature of physical exercise is inevitable: from a fairly rigidly regulated systematic exercise to “feeling well” with little physical exertion [7].

In addition, the disclosure of matters of major influence, including competitive pressures on the body of the elderly, there is no question about the development of the training process, although various sports, people who have reached 40 years and more, this is not uncommon. Number of participants in the last World Games «Masters Games» veterans, where they took the start over 10 000 athletes over the age of 30 years, which suggests that it is not far off the day when the most popular (mass), the veterans of the game will be at the Olympic Games. Dynamics of growth of the number of participants in the last world championships in swimming and Europe strongly supports this assumption [4; 14].

Despite significant differences in the level of physical potential of people of all ages, it is, however, characterized by a general, inherent in all periods of life, properties of human motor function. This property is the ability of the motor function to adapt to the develop. The latter is not always unidirectional, and not equally intense for all periods of the individual evolution of man, but always provides a more or less necessary balance of the balance between the requirements of the environment, the internal state of the organism and its capabilities.

Communication of the research with scientific programs, plans, subjects

The theme of the article developed under the consolidated plan of research work in the field of physical culture and sports in 2014–2019 years. Ministry of Ukraine for Family, Youth and Sports 2.4.12 1п by theme “Optimization of educational and training activities and competitive sports games”, state registration number 0114U002659.

The purpose of the research

to accomplish the analysis of influence of the training loadings on the indices of the functional state and physical qualities in different age periods of sportsmen-veterans.

Material and Methods of the research

The studies were conducted with sportmen-veterans (players) of different age groups (35–40; 41–45; 46–55 years), continued employment and participation in the competition at the end of active performances in professional teams. Used methods for determining the level of motor skills and the functional condition of veteran football players, the results of which are calculated by methods of mathematical statistics.

Results of the research and their discussion

Physical activity of man, ultimately aimed at changing the state of his body, for the purchase of a new level of physical qualities and abilitiesThe latter can not be achieved any other way, except for training. The basis of the training effect, its mechanism determines the fundamental property of all living things – the ability to adapt, to development based on adaptation to external influences. Knowledge of the laws of adaptation to physical stress becomes one of the most important conditions for the successful organization of human physical activity.

A study of ontogeny motility in athletes and persons who are not involved in sports, conducted in recent years, reveals the following basic patterns of its human evolution:

1. Heterochromic character of the development of links and systems of morphology and functions of the organism that provide for the realization of motor activity.
2. In phase periods of intense growth movements systems

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elements and their mismatch with periods of accelerated development of structures.
3. Multilevel rhythmic motor development systems, their elements and structures.
4. The high degree of individuality motor manifestations [7].

Thus, physical activity of the person throughout life, although it has a tendency to fading, however can be quite high and depends on the living conditions and rationally carried out by motor mode.

It was revealed that in 30–40 years, begins the fall in muscle strength, especially sharply expressed it after 60 years, with the greatest efficiency retain muscle most often involved in natural living conditions [6]. It was also established by N. E. Motylianska that physical exercises help maintain muscle strength even at a relatively later age [6].

Mechanisms of adaptation to physical load of persons of mature and old age suggest that individually tailored exercise regimen based on the results of the physiological, biochemical, biomechanical research to developing an impact on the entire system of oxygen transport in the bodyAlong with this, for each athlete there are individual values of the dose volume and intensity of training loads.

Correctly selected training mode leads to an increase in cardiac output both at rest and during exercise, contributing to a more complete filling of the heart with blood during diastole. All this for many years ensures the stability of maximum aerobic performance, only after 30 years it comes down [15]. In addition, studies have shown that as a result of a rationally constructed exercise, there is a significant increase in the density of mitochondria, the amount of mitochondrial enzymes in those muscles that are amenable to training [12].

It can be assumed that with fatigue and further recovery, conditions are simulated and mechanisms for combating aging are formed through mobilization and development of functional reserves, increases the adaptive capacity of the organism and can significantly slow the approach of old age.

Therefore it is advisable to raise the issue of selection for former athletes, as well as for others in physical education, such exercises, fatigue which has specific features of similarity to aging in a given person. This will allow to approach the individualization of physical activity, provides effective control for longevity.

Thus, the analysis of the effect of exercise on the body of people to determine the general thrust loads of character changes according to age: the gradual decline in employment in competitive sports and martial arts because of the growing threat of injury; increase the time allocated for individual sessions; gradual reduction of exercise first speed, and later power orientation; increasing the share of endurance exercise.

In addition, in the second period, the people of mature age is necessary to form a permanent motivation and systematic physical activity, preventive and improving character through the use of different types of exercise and physical labor, various sports, tempering, rehabilitation and psycho-regulatory measures.

Therefore, the construction of the training process of sportsmen-veterans should be aimed at preserving the longevity of sports activities, taking into account:

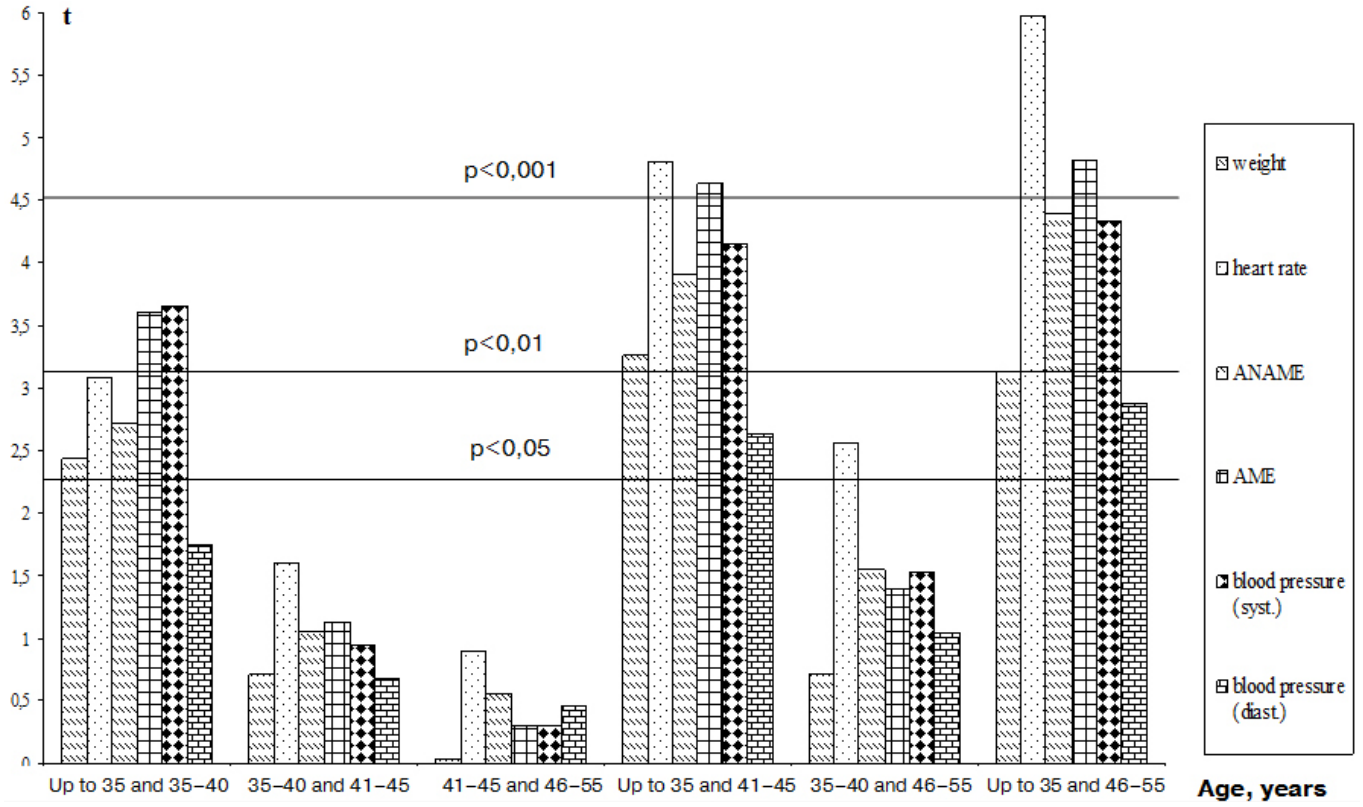

Fig. 1. Numerical values t-test and significant level (p) of the changes of functional state veteran football players at the stages of quitting the sport of higher achievements (n=10)

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– sequence of rational combination of the main parties of training;
– age-related changes in functional systems of organism;
– fatigue processes, recovery and adaptation of the organism to functional loads, which are necessary for the construction of the training process of sportsmen-veterans ;
– prolonged exposure to large training and competitive pressures on the body of athletes;
– athletic longevity.

The main feature, which is necessary for the construction of the training process of sportsmen-veterans, is the functional state of body systems. At the same time in the course of life is changing a state of vital organs that determine human performance [3; 5; 11].

In turn, these changes occur gradually (evolution) and discontinuously, resulting in severe disorders of organs and systems due to a variety of stresses, the main of which athletes relates overpotential, resulting in incorrect training process planning.

The change in the functional state of the body systems is also dependent on the nature of work activity and physical activity of a person. Therefore, a very important issue in the training of sportsmen-veterans is to determine the dynamics of changes in the main indicators of the functional state of their body for further consideration of planning the training process.

We conducted the dossier with veterans-football players to show the dynamism of the functional group of the old groups (35–40 rock, 41–45, 46–55) (fig. 1).

According to the results, significant changes mainly obtained in the first period of sports veterans in terms of body weight ($t=2,44$; $p<0,05$), which is further stabilized.

Heart rate also increased in the first age period ($t=2,99$; $p<0,05$), the second (41–45 years – $t=4,55$; $p<0,01$) and third (46–55 years $t=5,15$; $p<0,01$) relative to baseline data.

In addition, the increased blood pressure (from each age period), but statistically significant only measure systolic blood pressure during the first time interval ($t=2,77$; $p<0,05$).

During the first years of training sportsmen-veterans decreased metabolic rates in cardiac ANAME ($t=2,90$; $p<0,05$) and AME ($t=3,44$; $p<0,01$), which later stabilized at the initial data.

Thus, the performance of the functional state of the cardiovascular system of sportsmen-veterans lowered after active performances in competitions ranging from 35–40 years, and further stabilized.

Comparative analysis of indicators of physical qualities of sportsmen-veterans also shows the gradual decrease (fig. 2).

The results of the test show a sharp reduction Cooper's length distance that is overcome in 12 minutes transition athletes in the veterans status ($t=3,13$; $p<0,01$), while further changes are not significant ($p>0,05$) in relation to the age of 35–40 years. The above demonstrates the same type of training activity (2–3 times a week, starting with 40), which helped stabilize their physical fitness. Similar trends are the results of running on 200 and 30 meters ($t=4,33$; 2,55; $p<0,01$–$0,05$). Speed-strength qualities of sportsmen-veterans, which

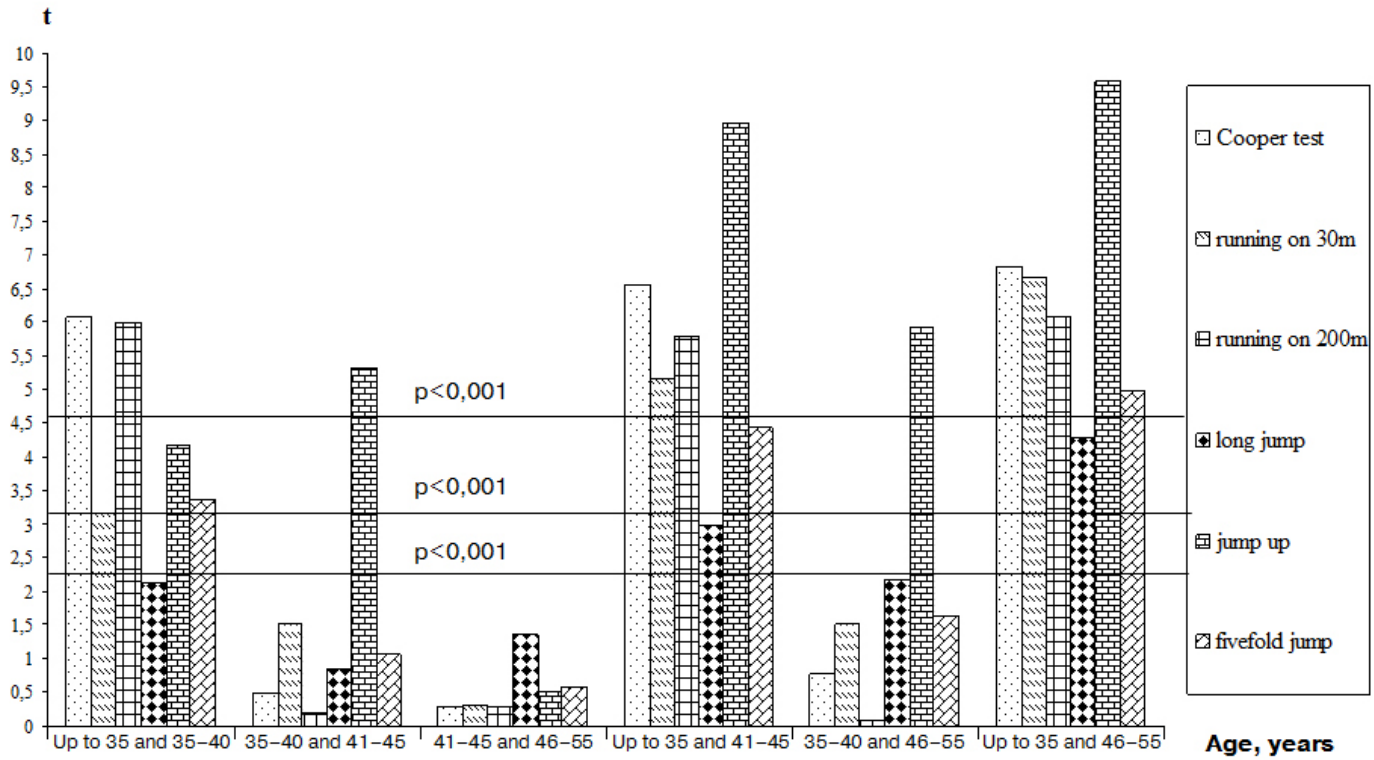

Fig. 2. Numerical value of t-test and significant level (p) of the change in the level of manifestation of physical qualitiesof veteran football players during active sessions at the stages of getting out of the sport of higher achievements (n=10)

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manifest themselves in the jump tests, have more significant changes in the indicators in the jump up from the place, which significantly worsened in the first (t=2,82, p<0,05), and also the second (t=3,50, p<0,01) the age periods.

A significant decrease in the results is due to an increase in body weight and a slight use of jumping exercises in training. The results of the long jump from the place are essentially (p>0,05) unchanged during individual age periods, only comparisons of the second and third with respect to the first periods have significant shifts (t=3,18, 4,11, p<0,01). Group average result fivefold jump significantly (t=2,65; p<0,05) immediately after closure deteriorates active sessions results in further stabilized with a tendency to reduce them.
The received results testify to gradual extinction of motor potential of sportsmen-veterans.

Conclusions

1. The functional state of the organism of veteran players is reduced after active performances in the sport unevenly. The greatest changes in the cardiovascular system of players in relation to the data obtained during the active sessions, marked in the heart rate (35–40 years – t_1=2,29, p<0,05; 41–45 years – t_2=4,55, p<0,01; 46–55 years – t_3=5,15, p<0,001), blood pressure syst. (t_1=2,77, p<0,05; t_2=3,94, p<0,01; t_3=4,19, p<0,01) and AME (t_1=3,44, p<0,05; t_2=4,40, p<0,01; t_3=4,57, p<0,01).

2. It is determined that the indicators of testing the level of physical fitness of veteran football players are different in certain age periods. In the first age period (35-40 years) the results related to the manifestation of speed-strength qualities (running at 30 m; jump up from the place, a fivefold jump – p<0,05), as well as special and high-speed endurance (Cooper test – p<0,05; running at 200 m – p<0,01). In the second age period (41–45 years), there was a significant decrease in all the physical fitness indicators compared with the baseline (p<0,05), while the preliminary results (35–40 years) of significant differences, except for the upward jump places not found (p<0,05). The results of testing the older age group (46–55 years) did not change significantly with respect to the age of 41–45 years (p<0,05), which indicates the stabilization of the level of manifestation of physical qualities.

Prospects for further research

Prospects for further research include the identification of features of changes in physical qualities and functional status of sportsmen-veterans engaged in cyclical sports.

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Communicative competence of sport volunteers

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Purpose: *to investigate the level of communicative competence of sport volunteers.*

Material & Methods: *students of Kharkov state academy of physical culture (2–4 courses) who are engaged in sports volunteering. The theoretic-methodological analysis of problem is carried out; the technique "Need for communication and achievements", "Self-checking assessment in communication", "Machiavellianism level" is used for studying of indicators of self-assessment.*

Results: *the high level of communicative competence on three indicators is revealed at sport volunteers: need for communication (60,71%), communicative control (57%), Machiavellianism (91%) that gives them the chance to come into contacts with people around quickly, to correlate the reactions to behavior of surrounding people and to operate the emotions, at the same time they are inclined to manipulations and demonstration of the strengths at communication with people.*

Conclusions: *the purposeful psychology and pedagogical preparation, which program has to include the communicative block and the block of personal development, is necessary for sport volunteers.*

Keywords: *communicative competence, sport volunteer, need for communication, communicative control, Machiavellianism.*

Introduction

Volunteer activity, which under the law of Ukraine "About volunteer activity" (2011), is the voluntary, disinterested, socially directed, non-profitable activity, which is carried out by volunteers and the volunteer organizations by providing the volunteer help [7]. Such activity provides communication (that is development of communicative competence), that is establishment and development of contacts between people, exchange of information, perception and understanding of other person [2]. The psychological mechanism of empathy is the cornerstone of productive communication [9]. It is clear, that the volunteer, who seeks to help other people, has to be able to communicate, and it needs available of high communicative potential at him. The sport volunteer, who helps with holding recreational actions and sports competitions, often in the activity interacts in about tens, and even in hundreds of people, fulfilling different functional duties [3], he has to be able to formulate and convey accurately information, to establish, to adjust, to support communication with the management, participants and the audience of competitions, to find communication channels, to build strategy and tactics of contacts. Not in view of the relevance and the practical importance of problem of communicative culture of sport volunteers, it was not the subject of special scientific research, for this reason communicative competence of sport volunteers which is manifestation of their communicative culture, is considered in the article.

Communication of the research with scientific programs, plans, subjects

The research is executed within the implementation of the fundamental scientific project for 2015–2017. "Theoretic-methodical bases of development of Non-Olympic sport" (number of the state registration is 0115U002372, number of the sub-theme "Organizationally-administrative, economic and humanitarian bases of development of Non-Olympic sport in Ukraine" 0115U006861C).

The purpose of the research

To investigate the level of communicative competence of sport volunteers.

Research tasks:

1. To learn the need for communication at sport volunteers.
2. To determine the level of communicative control of sport volunteers.
3. To learn Machiavellianism level at sport volunteers.

Material and Methods of the research

Students of Kharkiv state academy of physical culture (2–4 courses), who are engaged in sports volunteer, were investigated. The theoretic-methodological analysis of the problem is carried out for the foundation of relevance of the subject. The technique "Need for communication and achievements", the technique "Self-checking assessment in communication", the technique "Machiavellianism level" are used for studying of indicators of self-assessment [10].

Results of the research and their discussion

The criteria for evaluation of communicative competence, ac-

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cording to B. Ananyev [1], is the formation of system of communicative knowledge (conceptual and intrinsic level), experience of productive communicative activity (practical-world outlook level), personally-valuable relation to self-improvement of communicative competence – (conceptual level), systems of communicative abilities (practical-active level) which includes the need for communication, communicative control and Machiavellianism.

Need for communication. The level of communicative abilities of sport volunteers was defined during the research. Need of sport volunteers for communication was studied at the first stage of our research, for which studying the technique "Need for communication and achievements" was used [10]. Results of the research of level of need for communication of sport volunteers are presented in tab. 1.

Table 1

Distribution of sport volunteers, according to levels of need for communication of %

Level of communication	Points	Investigated		
		Boys (n=44)	Girls (n=40)	The whole group (n=84)
Low	3–21	4,55	7,50	5,95
Below the average	22–23	9,09	15	11,90
Average	24–25	27,27	15	21,43
Above the average	26–28	31,82	27,50	29,76
High	31–33	27,27	35	30,95

These results demonstrate that 5,95% students-volunteers have the low level of need for communication. According to researches of I. Kohn [8], students with the low level of need for communication are not interested in establishing contact and result of communication, they do not like about that, their words and adequately clear essence of the statement will be how correctly apprehended; characteristic features of their communication is: the low level of culture of communication, scanty lexicon, fast rate of language, haughty position, concerning the interlocutor, the partner in communication is not perceived by them as the personality with own opinion; the fear of rejection dominates in communication. Being based on the above-mentioned characteristics, it is fair to assume that such students can summon mistrust, they have poorly developed communicative skills, and they will show uncertainty, inconvenience and constraint in communication.

Results of researches have also shown that the average level and below the average level of need for communication is found at 33,33% of students-volunteers. The following features characteristic for such students: lack of initiative and desire to show own activity, they are not inclined to broaden the sphere of communication and to participate in the general actions which purpose is creation of cordial emotionally-significant relations with other people who certify results of the previous researches [5]. According to scientists [6], students with such level of need for communication for the follow-up volunteer activity need to increase the level of communicative abilities and to have psychology and pedagogical training by visit of special trainings.

By our researches, the level of need for communication is high and above the average at 60,71% of students-volunteers. Modern researches [9] have shown that people with such level of need for communication are inclined to maintenance or renewal of good relations with people, inherent strong experiences at rupture of these relations to them, ability to forgive offense for the sake of renewal of good relations, aspirations to help others, ability to refuse own conveniences for the sake of others, tendency to show participation, aspiration to establish good relations with many people, to broaden the sphere of the communication; it is possible to share experiences with them and it will become easier from it. Students-volunteers, in our opinion, are capable to come with such level of need for communication quickly into contacts with people around and to improve business and personal relations, their style of communication will be characterized by confidence, ease, openness, and social courage.

Communicative control. Studying of the level of formation at them communicative control became the following investigation phase of components of communicative competence of students, who are engaged in sports volunteer, for this purpose the technique "Self-checking assessment in communication" was used [10]. Results of the research are presented in tab. 2.

Table 2

Distribution of sport volunteers behind the level of communicative control of %

Level of emotional efficiency	Points	Investigated		
		Юнаки (n=44)	Girls (n=40)	The whole group (n=84)
Low	0–3	9	–	5
Average	4–6	36	40	38
High	7–10	55	60	57

They demonstrate that the high level of communicative control takes place in 57% of students-volunteers. B. Ananyev [1] notes that such people get into any role easily, react to change of situation flexibly, provide impression which is made on people around. For 38% of students who by results of the research have the average level of communicative control, peculiar, according to modern scientists [4], sincerity and certain fieriness in emotional manifestations. Communicative control is characterized by low level only in 5% of the examined students. Scientists note [4] that behavior of such people is rather resistant, and they do not consider that it is necessary to change depending on situation.

Machiavellianism. The following investigation phase of features of communicative competence at students-volunteers had studying of their level of Machiavellianism [10]. The technique "Machiavellianism level" was used for this purpose; results of the research are presented in tab. 3

Apparently from the submitted data, 91% of students, who are engaged in sports volunteer, have the high level of Machiavellianism. Modern scientists [4] consider Machiavellianism as the psychological syndrome, which is based on the combination of interconnected cognitive, motivational and behavioral characteristics, its main psychological components as lines of the personality, is: the belief is in what at communication with others is possible and necessary to manipulate, manipulation – not only natural, but also most effective way of

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Table 3

Distribution of students who are engaged in sports volunteer, according to % Machiavellianism levels

Machiavellianism level	Points	Investigated		
		Boys (n=44)	Girls (n=40)	The whole group (n=84)
Low	up to 50	9	10	9
High	from 50	91	90	91

interaction. Researchers note that people with the high level of Machiavellianism, at the introduction in contact with other persons from whom nothing is necessary inclined to keep is emotionally aloof, separated, feel mistrust to people around, socially detached, focused not so on the interpersonal relations, and on problem, more purposeful, directed to achievement of goals, they also more convincing in communication: estimate others more honestly concerning themselves more precisely. According to B. Ananyev [1], people with the high level of Machiavellianism have more frequent, but less deep contacts with people around, at them high suspiciousness, hostility takes place, they display disbelief in the fact what most of people can be trusted that they are altruistic. Also machiavellist usually lose because refuse manipulation use. In this case, manipulation consists in demonstration of imaginary incompetence or weakness.

It should be noted that 9% of students, who are engaged in sports volunteer, have the low level of Machiavellianism by results of the research. Such people, according to modern scientists [4], are indecisive, honest, reliable, sentimental, come under influence, for them characteristic flexibility (one of the most important conditions of mutual understanding in interpersonal communication, ability to use different behavior depending on requirements of context). Therefore, the manipulative orientation of behavior of students-volunteers in communication and high degree of Machiavellianism of the personality reduces probability of achievement by them mutual understanding in personal and professional contacts.

Conclusions

1. It is revealed that most of sport volunteers (60,71%) have the high level and level above the average of need for communication in the course of the empirical research.

2. It is established that 57% students-volunteers have the high level of communicative control, 38% – average and only 5% of the examined students have the low level of communicative control.

3. The high level of Machiavellianism is found at 91% of sport volunteers that testifies to their ability to manipulations for the achievement of the purposes and demonstration of the strengths during communication with people.

4. It is established that most of students, who take part in sports volunteer activity, are not conflict persons, openness and high level of empathy inherent to them, it gives them the chance to come quickly into contacts with people around, to correlate the reactions to behavior of other people and to direct the emotions.

5. The conducted researches have shown that communicative abilities (need for communication, communicative control, Machiavellianism) play the important role in the course of volunteer activity at sport volunteers. It is established that the formation of communicative competence at sport volunteers undergo by two directions. On the one hand – acquisition of new knowledge, skills, and from another – correction of already created.

Therefore, the development of communicative competence at students-volunteers provides use of all set of the means, which are oriented as on the development of subject-subjective (productive, personal parties of communication), and subject-objective (reproductive) components that needs purposeful psychology and pedagogical preparation which program has to turn on at itself the communicative block and the block of personal development.

Prospects of the subsequent researches in this direction consist in studying of individual and personal characteristics which influence organizational behavior of sport volunteers.

Conflict of interests. The authors declare that there is no conflict of interests.
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Modeling of morpho-functional profile of sportsmen of high qualification who specialize in swimming in way butterfly stroke at distances of various lengths

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Purpose: *the development of modern morpho-functional models of sportsmen of high qualification who specialize in swimming in way butterfly stroke at distances of various lengths.*

Material & Methods: *the analysis of scientifically-methodical literature, timekeeping, measurement of morpho-functional indicators with application of private techniques, methods of mathematical statistics. The contingent of the investigated was made by sportsmen who specialized in distances of 50, 100 and 200 meters in way butterfly stroke and had the level of sports qualification: MSU, MSIC.*

Results: *it is established that the morpho-functional profile of the sportsmen specializing in swimming in way butterfly stroke at distances of various length has the features; model morpho-functional characteristics of sportsmen, who act in swimming in way butterfly stroke at distances of 50, 100 and 200 meters, are developed.*

Conclusions: *the definition of compliance of individual characteristics of the sportsman to the morpho-functional status will allow choosing correctly remote specialization of the swimmer, to open his potential opportunities most fully.*

Keywords: butterfly stroke, sportsmen, distances, morpho-functional characteristics, model.

Introduction

The modern level of development of swimming dictates need of search of the talented sportsmen, who are capable to achieve world-class results [1; 10; 12].

Such opportunity takes place only on condition of compliance of system of selection and orientation to the main components of structure of the competitive activity and special preparedness of swimmers that allows carrying out the choice of way and length of distance which as much as possible answer specific features of the specifically taken sportsman [5; 8; 11].

The significant role in the system of sports orientation belongs to morpho-functional indicators [2; 3; 4].

It is proved by experts that compliance of sportsmen by their genetically determined morpho-functional parameters of certain specialization considerably increases efficiency of the training process and, as a result, improves sports result [2; 8; 9].

Rather fully developed models of sportsmen, who act in different ways of swimming, occurred during the numerous researches in scientifically-methodical literature [1; 6; 7; 8].

However practice of elite sport in the conditions of intensification of training and competitive processes experienced the number of essential changes in recent years that could not to leave a mark on morpho-functional characteristics of sportsmen. Therefore, there was need of carrying out the scientific research for this branch for the purpose of the subsequent correction.

Communication of the research with scientific programs, plans, subjects

The researches were conducted according to the subject of the Built plan of RW in the branch of physical culture and sport for 2011–2015. "Modeling of technical-tactical actions of the qualified sportsmen in swimming and high-speed and power disciplines of track and field athletics".

The purpose of the research

To develop modern morpho-functional models of sportsmen of high qualification who specialize in swimming in way butterfly stroke at distances of different length.

Research tasks:

1. To characterize features of morpho-functional profile of sportsmen of high qualification who specialize in distances of different length in way of swimming butterfly stroke.

2. To investigate the nature of changes of morpho-functional indicators depending on length of competitive distance in way of swimming butterfly stroke.

3. To develop model morpho-functional characteristics of sportsmen who specialize in swimming in way butterfly stroke at distances of 50, 100 and 200 meters.

Material and Methods of the research

The following methods were used for the solution of the put tasks: analysis of scientifically-methodical literature, timekeeping; measurement of morpho-functional indicators with

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use of private techniques; methods of mathematical statistics.

Researches were conducted during the period from 2014 to 2016 during the championships and national cups of Ukraine on swimming.

The contingent of the investigated was made by sportsmen who specialized in distances of 50, 100 and 200 meters in way butterfly stroke and had the level of sports qualification: MSU, MSIC. Total of investigated – 24 swimmers.

Results of the research and their discussion

For definition of features morpho-functional to profile of swimmers of high qualification who specialize in swimming in way butterfly stroke at distances different lengths we have considered 34 parameters.

The received experimental material allowed constructing the average profile of sportsmen who successfully act in swimming in way butterfly stroke, irrespective of distance specialization (fig. 1).

Apparently from the figure 1, sportsmen who swim in the way butterfly stroke have the average height, long trunk and short legs, well exercised muscle of shoulder girdle, trunk and extremities, have the big weight, considerable sizes of the clasping sizes that are coordinated with data of references [1; 8].

Having made the assumption that depending on length of competitive distance morpho-functional indicators of sportsmen will differ, we have distributed all swimmers on three groups, depending on the progress of overcoming distances of different slowness by them.

The carried-out analysis of the experimental data allowed to define value of morpho-functional indicators what inherent in sportsmen-delphinists who specialize in distances of 50, 100 and 200 meters (tab. 1).

Respectively models for distances of 50, 100 and 200 meters in way of swimming butterfly stroke were constructed (fig. 2, 3, 4).

Apparently from the provided charts, sportsmen who specialize in swimming in way butterfly stroke at different distances in general have the similar anthropometrical profile. However there are some divergences in values of the studied parameters depending on the competitive length.

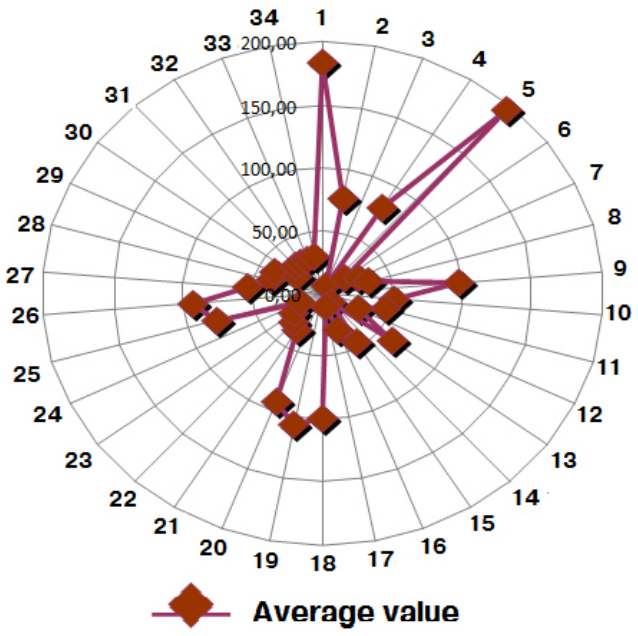

Fig. 1. Morpho-functional profile of the sportsman who specializes in swimming in way butterfly stroke: *1. Body length; 2. Body weight; 3. VCL; 4. Length of arm; 5. Scope of arms; 6. Length hand; 7. Length of forearm; 8. Length of shoulder; 9. Length of leg; 10. Length of hip; 11. Length of shin; 12. Length of foot; 13. Length of trunk; 14. Width of foot; 15. Width of shoulders; 16. Width of pelvis; 17. Width of hand; 18. Girth of thorax - at rest; 19. -on inhalation; 20. -on exhalation; 21. Girth of shoulder (external); 22. Girth of shoulder (relaxed); 23. Girth of forearm; 24. Girth of wrist; 25. Girth of waist; 26. Girth of buttocks; 27. Girth of shin; 28. Girth of knee; 29. Girth of hip; 30. Girth of ankle-bone; 31. HR after dream; 32. HR at rest; 33. HR after load; 34. Bending down.*

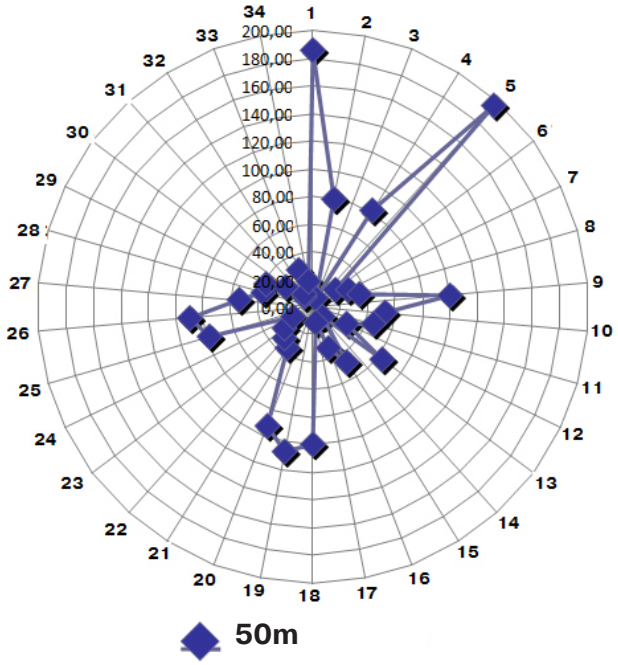

Fig. 2. Model morpho-functional profile of swimmers who specialize in way butterfly stroke at distance of 50 meters: *1. Body length; 2. Body weight; 3. VCL; 4. Length of arm; 5. Scope of arms; 6. Length hand; 7. Length of forearm; 8. Length of shoulder; 9. Length of leg; 10. Length of hip; 11. Length of shin; 12. Length of foot; 13. Length of trunk; 14. Width of foot; 15. Width of shoulders; 16. Width of pelvis; 17. Width of hand; 18. Girth of thorax - at rest; 19. -on inhalation; 20. -on exhalation; 21. Girth of shoulder (external); 22. Girth of shoulder (relaxed); 23. Girth of forearm; 24. Girth of wrist; 25. Girth of waist; 26. Girth of buttocks; 27. Girth of shin; 28. Girth of knee; 29. Girth of hip; 30. Girth of ankle-bone; 31. HR after dream; 32. HR at rest; 33. HR after load; 34. Bending down.*

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Table 1

Morpho-functional indicators of sportsmen who specialize in swimming in way butterfly stroke at distances of different length, $\bar{X}\pm m$

№	Indicators	Distance		
		50 m	100 m	200 m
1	Body length , sm	185,58±7,34	185,56±8,22	183,29±4,82
2	Body weight, kg	78,96±9,12	80,67±9,31	78,00±9,00
3	VCL, l	6,24±1,23	6,51±1,13	6,85±1,32
4	Length hand, sm	81,65±5,32	82,67±6,46	79,29±8,04
5	Scope of arms, sm	196,23±17,10	198,33±22,45	193,86±16,26
6	Length hand, sm	20,65±3,06	20,78±3,73	19,43±1,62
7	Length of forearm, sm	28,69±3,86	29,89±4,17	28,64±2,31
8	Length of shoulder, sm	34,38±3,10	35,11±3,41	36,07±2,62
9	Length of leg, sm	99,00±6,88	100,33±7,42	96,07±4,09
10	Length of hip, sm	52,31±4,31	53,44±4,56	51,00±7,64
11	Length of shin, sm	46,27±4,61	46,06±4,68	46,71±3,61
12	Length of foot, sm	28,19±2,12	27,89±2,43	28,00±1,04
13	Length of trunk, sm	62,77±7,11	64,11±6,53	58,57±5,16
14	Length of foot, sm	10,27±1,70	10,39±1,11	9,86±1,84
15	Width of shoulders, sm	47,42±4,86	47,33±5,72	47,71±3,82
16	Width of pelvis, sm	31,46±5,48	30,94±2,88	31,00±2,88
17	Girth of hip, sm	52,88±9,11	52,33±4,38	50,36±7,59
18	Girth of knee, sm	36,96±4,45	35,71±3,25	36,50±2,07
19	Girth of shin, sm	37,62±2,88	38,17±3,67	37,57±3,56
20	Girth of ankle-bone, sm	24,25±3,56	24,29±4,71	22,10±2,30
21	HR after dream, bpm^{-1}	9,57±1,40	10,29±2,14	9,25±3,30
22	HR at rest, bpm^{-1}	11,40±1,84	11,50±2,27	13,60±2,07
23	HR after load, bpm^{-1}	28,50±6,26	27,89±6,39	30,40±1,67
24	Bending down, sm	18,42±8,11	21,22±7,53	21,33±8,64
25	Width of hand, sm	11,31±1,20	11,33±1,44	11,29±2,20
26	Girth of thorax – at rest, sm	99,88±5,92	101,22±6,51	100,71±7,25
27	Girth of thorax – on inhalation, sm	106,62±5,80	108,72±5,84	108,29±7,31
28	Girth of thorax – on exhalation, sm	92,08±15,76	98,11±6,09	97,50±7,99
29	Girth of shoulder (external), sm	34,54±2,20	35,07±2,52	33,75±2,79
30	Girth of shoulder (relaxed), sm	30,96±3,23	32,33±3,12	30,71±2,45
31	Girth of forearm, sm	26,08±1,88	26,89±1,95	26,86±2,29
32	Girth of wrist, sm	16,67±1,71	16,57±1,90	16,70±1,79
33	Girth of waist, sm	78,29±6,77	78,21±7,38	78,17±7,03
34	Girth of buttocks, sm	88,75±17,64	87,86±22,11	95,93±7,16

The analysis of the data provided in table 1 allows distributing indicators of morpho-functional development of sportsmen-swimmers on several groups:

• The first group of parameters is characterized by the growth of numerical values together with the increase in length of distance. It is possible to distinguish from them: VCL, shoulder length, girth of thorax, HR at rest and after load, bending down.
• Among indicators which values decrease with the increase in length of distance are: growth, girth sizes of waist and hip.
• Parameters which reach the greatest values only at separate distances.

So, the largest sizes of length of foot, width of pelvis, girth of waist, hip, knee, are observed at swimmers who successfully overcome distance of 50 meters.

Sportsmen who specialize in swimming at distance of 100 meters butterfly stroke have the largest weight, length and scope of arms, the linear sizes of hand, forearm, leg, hip and trunk, value of width of foot and hand clasping, the sizes of thorax, shoulder, forearm, shin, and anklebone, and also HR value after dream.

The greatest values are reached by shin length, width of shoulders, girth of buttocks, HR values at rest and after loading at swimmers for whom the main distance are 200 meters.

Thus, we can claim that depending on length of competitive

Table 2

Model morpho-functional indicators of athletes who specialize in way of swimming butterfly stroke at distance of 50 meters

№	Indicators	Model values
1.	Body weight, kg	78,96
2.	VCL, l	6,24
3.	Width of shoulders, sm	47,42
4.	Girth of ankle-bone, sm	24,25
5.	HR(at rest), bpm^{-1}	11,4

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distance, the anthropometrical profile of swimmers-delphinists changes.

The carried-out correlation analysis allowed to determine the number of parameters which considerably influence sports result (0,5 among the studied morpho-functional indicators($0,5 \leq r \leq 0,85$), and to develop model characteristics of sportsmen which successfully swim distances of 50, 100 and 200 meters in the way butterfly stroke (tab. 2, 3, 4).

Apparently from the provided tables, model values of body weight at swimmers who specialize in distance of 50 meters in the way butterfly stroke have to make 78,96 kg, at the same time at distance of 200 meters this indicator has to equal 78,00 kg. This divergence is predetermined by specifics of work on each of distances. So, the result considerably depends on power indicators on 50-meter piece which increase goes in parallel with hypertrophy of miofibrils which promotes the increase in absolute body weight. In turn distances of 200 meters result are mainly influenced by power endurance which depends on stock in muscles of substrata of power supply, speed of their renewal, inter-muscular coordination and innervations of muscles, but not on muscular weight.

Comparison of model values of VCL at sportsmen who specialize in swimming at distances of 50, 100 and 200 meters in the way butterfly stroke allows seeing the growth of this indicator along with the increase in length of competitive distance. This results from the fact that performance of physical activity longer time imposes more severe requirements to the level of functional development of the sportsman.

Model indicators of width of shoulders at sportsmen who swim distance of 100 meters have smaller values, than other representatives of way have butterfly stroke. In turn anklebone girth at them is bigger, than at sportsmen who specialize in distance of 50 meters.

If to compare sportsmen who swim distance of 200 meters, with sportsmen who specialize in distance of 100 meters in the way butterfly stroke, then in the first model values of length of shoulder and width of pelvis are big, and shin girth are smaller.

Thus, the developed model characteristics can serve as reference points during definition of distance specialization of the sportsman who will give opportunity to open its potential opportunities most fully.

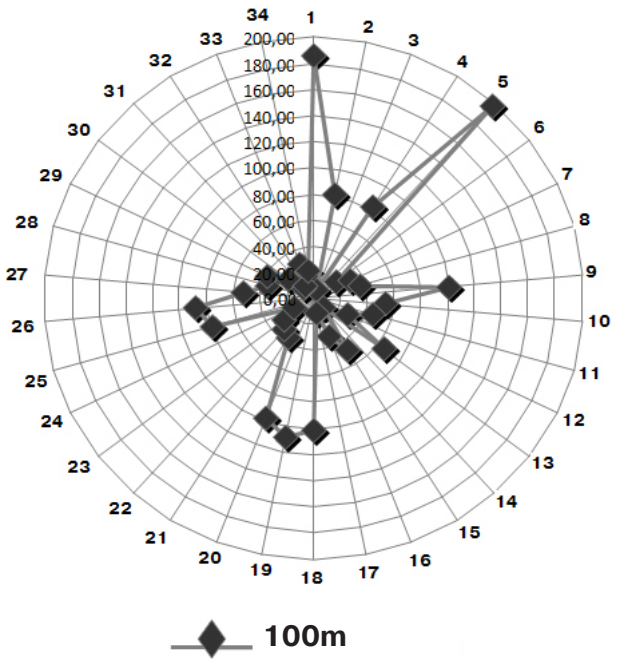

Fig. 3. Model morpho-functional profile of swimmers who specialize in way butterfly stroke at distance of 100 meters

1. Body length; 2. Body weight; 3. VCL; 4. Length of arm; 5. Scope of arms; 6. Length hand; 7. Length of forearm; 8. Length of shoulder; 9. Length of leg; 10. Length of hip; 11. Length of shin; 12. Length of foot; 13. Length of trunk; 14. Width of foot; 15. Width of shoulders; 16. Width of pelvis; 17. Width of hand; 18. Girth of thorax - at rest; 19. -on inhalation; 20. -on exhalation; 21. Girth of shoulder (external); 22. Girth of shoulder (relaxed); 23. Girth of forearm; 24. Girth of wrist; 25. Girth of waist; 26. Girth of buttocks; 27. Girth of shin; 28. Girth of knee; 29. Girth of hip; 30. Girth of ankle-bone; 31. HR after dream; 32. HR at rest; 33. HR after load; 34. Bending down.

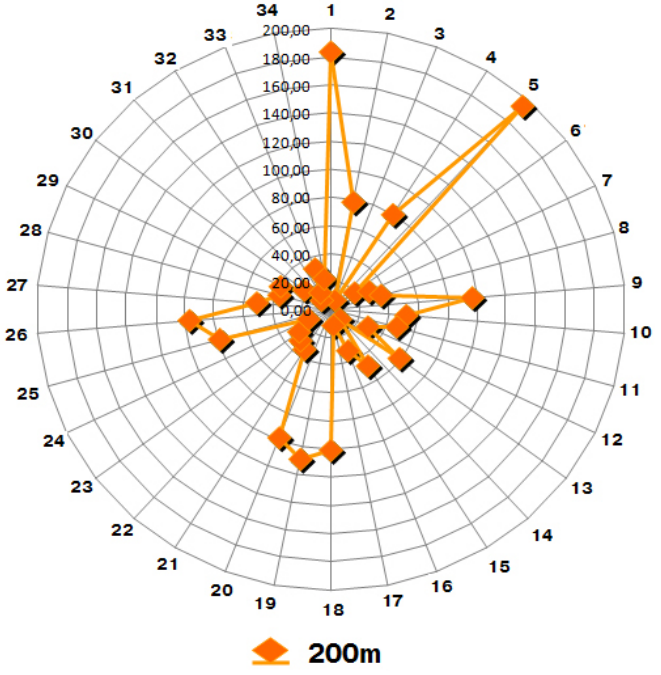

Fig. 4. Model morpho-functional profile of swimmers who specialize in way butterfly stroke at distance of 200 meters

1. Body length; 2. Body weight; 3. VCL; 4. Length of arm; 5. Scope of arms; 6. Length hand; 7. Length of forearm; 8. Length of shoulder; 9. Length of leg; 10. Length of hip; 11. Length of shin; 12. Length of foot; 13. Length of trunk; 14. Width of foot; 15. Width of shoulders; 16. Width of pelvis; 17. Width of hand; 18. Girth of thorax - at rest; 19. -on inhalation; 20. -on exhalation; 21. Girth of shoulder (external); 22. Girth of shoulder (relaxed); 23. Girth of forearm; 24. Girth of wrist; 25. Girth of waist; 26. Girth of buttocks; 27. Girth of shin; 28. Girth of knee; 29. Girth of hip; 30. Girth of ankle-bone; 31. HR after dream; 32. HR at rest; 33. HR after load; 34. Bending down.

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Table 3

Model morpho-functional indicators of athletes who specialize in way of swimming butterfly stroke at distance of 100 meters

№	Indicators	Model values
1.	VCL, l	6,51
2.	Length of shoulder, sm	35,11
3.	Width of shoulders, sm	47,33
4.	Width of pelvis, sm	30,94
5.	Girth of shin, sm	38,17
6.	Girth of ankle-bone, sm	24,29
7.	HR (after load), bpm^{-1}	28,50

Table 4

Model morpho-functional indicators of sportsmen who specialize in way of swimming butterfly stroke at distance of 200 meters

№	Indicators	Model values
1.	Body length, sm	183,29
2.	Body weight, kg	78,00
3.	VCL, l	6,85
4.	Scope of arms, sm	193,86
5.	Length of shoulder, sm	36,07
6.	Length of foot, sm	28,00
7.	Width of shoulders, sm	47,71
8.	Width of pelvis, sm	31,00
9.	Girth of thorax at rest, sm	100,71
10.	Girth of waist, sm	78,17
11.	Girth of buttocks, sm	95,93
12.	Girth of shin, sm	37,57

Conclusions

1. The result in swimming is closely connected with indicators of anthropometrical development and functional condition of the sportsman.

2. Sportsmen who specialize in swimming in way butterfly stroke at distances of 50, 100 and 200 meters in general have the similar anthropometrical profile. However there are some divergences in values of morpho-functional parameters depending on distance length.

3. Indicators of morpho-functional development of swimmers-delphinists change depending on length of the competitive distance.

4. The definition of distance specialization of the sportsman in way of swimming butterfly stroke has to be based on comparison of its individual characteristics with model most of which fully answer anthropometrical profile of swimmers who successfully perform at distances of 50, 100 and 200 meters.

Prospects of the subsequent researches consist in the definition of degree of correlation interrelation between morpho-functional indicators of the swimmers of high qualification and sports result at distances of 50, 100 and 200 meters in way butterfly stroke.

Conflict of interests. The authors declare that there is no conflict of interests.
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Dynamics of physical and psychoemotional condition of women under the influence of swimming occupations

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Purpose: *to reveal influence of occupations in recreational swimming on the psychoemotional sphere and the general indicators of women's health.*

Material & Methods: *52 women at the age of 25–40 years have participated in research. Data collection was carried out in recreational groups of author's swimming school of Y. Bliznuk and the pool "Pioneer". Methods applied: poll, testing, instrumental methods of cardiovascular system and anthropometry research; indicators of physical, mental and social health were determined by S. Stepanov's technique; assessment of health, activities and moods was carried out by means of questionnaire "HAM". The obtained quantitative data were processed by methods of mathematical statistics.*

Results: *conducted research demonstrates that recreational swimming occupations cause positive changes in physical development, physical fitness and psychoemotional condition of women; improvement of indicators of physical and psychoemotional state is most explicitly revealed after 2 years of occupations.*

Conclusions: *it is established that occupations in recreational swimming for 2 years have positively affected on the psychoemotional sphere and the general indicators of women's health.*

Keywords: *swimming, physical development, psychoemotional sphere, women, health, indicators.*

Introduction

Scientific and technical and social progress promotes to change not only the environment, but also way of life. The mass physical culture gains great value in the current social life of our country due to increase in labor productivity and strengthening of defense capability, as well as to the change of living conditions of people which are characterized by deterioration in social and economic level. More than ever the problem of strengthening of health of the population by physical culture is particularly acute. The physical culture and mass sport gain paramount role in defining the optimal level of vital activity of human body [1; 8].

Decrease in resilience of organism, loss of stamina, degradation of systems which provide those functions – all these are the effects of hypokinesia and hypodynamia. And consequences of it are very negative: excessive body weight, increased fatigue, apathy and rapid growth of sickness rate of various systems of human body. So, according to the researches conducted in the 2005–15 in Ukraine deterioration in health of able-bodied population was observed. Chronic diseases prevailed among other diseases. Prevalence of cardiovascular pathology has increased by 1,9 times; oncological – for 21 %; bronchial asthma – for 39,3 %; diabetes mellitus – for 11,4 %; every fifth has arterial hypertension [2; 3; 5; 8].

A possible counterbalance to the negative factors above can be introduction of various recreational systems designed to increase muscular activity. One of such systems is recreational swimming. According to a number of authors the value of swimming is that while being a perfect means of general fitness it also makes a complex impact on the human organism. Swimming strengthens all groups of muscles, develops mobility in joints, promotes increase in elasticity of sheaves and sinews; strengthens cardiovascular and respiratory systems, increases the vital capacity of lungs and mobility of thorax, strengthens respiratory muscles, increases the level of development of aerobic opportunities; develops force, flexibility coordination of movements; trains the general and power endurance; promotes increase in metabolism, the best adaptation of organism to change of temperature of the external environment to increase in level of physical fitness; positively influence nervous system [3; 4; 6; 10].

The recreational effect of swimming is in prevention of cardiovascular diseases, posture correction, prevention of diseases of musculoskeletal system, positive influence on the psychoemotional state of the engaged [1; 2; 4].

Most of the researches are focusing on swimming as the recreational factor, and much less attention is paid to studying of dynamics of the changes occurring under the influence of recreational swimming, whereas they appear as one of the main conditions not only physical, but also mental health of the person [6; 7; 10].

It is the fragmentariness of data about positive changes of physical and mental health of women under the influence of recreational swimming that has encouraged us to carrying out this research. Relevance of the chosen subject is backed by practice inquiries, and the offered data will help teachers, instructors, methodologists of physical culture, doctors, and also independently engaged more effectively use the recreational swimming in order to strengthen health and to improve fitness.

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The purpose of the research

To reveal influence of occupations in recreational swimming on the psychoemotional sphere and the general indicators of women's health.

Main objectives of research:

1. To analyze literatures data concerning influence of recreational training in swimming on the psychoemotional sphere and the general health indicators of women.

2. To track change dynamics of physical development indicators and physical fitness of the women which are swimming in physical improving groups.

3. To reveal influence of occupations swimming on physical, mental and social health of this contingent.

Material and Methods of the research

Data acquisition was carried out in recreational groups of Y. Bliznuk's author's school of swimming and the pool "Pioneer". During data acquisition poll, testing and tool methods of cardiovascular system and anthropometry research were applied. Indicators of physical, mental and social health were determined by S. Stepanov's technique; assessment of health, activity and mood level was carried out by HAM test. The quantitative data obtained during research was processed by methods of mathematical statistics [7; 9].

Results of the research and their discussion

One of the most common forms of work on adult population's physical culture level is the organization of occupations in recreational groups. In our country such groups were widely adopted and generally recognized. This form of work with persons of middle and mature age is directed to solve such problems as strengthening of health, improvement of physical development, hardening, increase in resistance of organism to adverse environmental conditions; maximum increase and maintenance of rather high level of working capacity, extension of active creative life; acquisition by participants of certain knowledge about bases of physical training and technique of independent use of physical exercises [2; 5; 8; 10].

52 women at the age of 25–40 years, which attend recreational groups of Y. Bliznuk's author's school of swimming and the pool "Pioneer" have participated in our research. During the period from October, 2014 to June, 2016 dynamics of physical development and physical fitness indicators of the women doing swimming were investigated and also attempt to reveal the influence of occupations in swimming on physical, mental and social health of this contingent has been made (in October, 2014 – initial indicators were recorded (0 experience in swimming occupations); in June, 2015 – indicators after 1 year of swimming occupations were recorded; in June, 2016 – after 2 years of occupations).

By means of anthropometrical and functional measurements at women aged 25–40 years taking part in research during 2 years, indicators of physical development and physical fitness under the influence of swimming occupations were defined and analyzed (table 1).

Apparently from table 1 under the influence of occupations in swimming there were considerable changes in many indicators. Thus, reliability of distinctions on indicator of body weight is revealed both after the first year of occupations ($p<0,001$) and after the second year ($p<0,05$). During researches body weight of women has decreased from 69,6±0,5 to 64,8±0,72 kg. There were considerable changes of indicators of chest volume ($p<0,01$; $p<0,05$) and respiratory excursion ($p<0,001$).

The analysis of functional indicators of the women doing swimming has also shown that vital capacity values had significantly changed. After the first year of occupations indicators of vital capacity have changed from 3013±25,1 to 3215±35,6 ml ($p<0,001$), and after the second year of occupations – to 3375 ± 33,9 ml ($p<0,001$).

Distinctions in the indicators of systolic ($p<0,01$) and diastolic blood pressure are also noticeable ($p<0,001$ – after the first year of occupations; and especially noticeable distinctions of these indicators were revealed between the first and second

Table 1

Dynamics of physical development and physical fitness indicators of women under the influence of occupations in swimming, $\bar{X}$±m (n=52)

Indicators	Initial (no experience in occupations) (n=52)	After 1 year (n=52)	Reliability level		After 2 years (n=52)	Reliability level	
			t	p		t	p
Body weight, kg	69,6±0,5	67,0±0,46	3,8	<0,001	64,8±0,72	2,6	<0,05
Body length, cm	159,9±0,37	160,2±0,37	0,56	>0,05	160,9±0,37	1,3	>0,05
Chest volume, cm	91,36±0,41	89,9±0,36	2,7	<0,01	88,5±0,47	2,4	<0,05
Respiratory excursion, cm	5,6±0,07	6,65±0,14	7	<0,001	7,6±0,08	5,8	<0,001
Vital capacity, ml	3013±25,1	3215±35,6	4,6	<0,001	3375±33,9	3,2	<0,001
Right hand dynamometry, kg	31,4±0,28	32,7±0,41	1,3	>0,05	33,5±0,34	1,5	>0,05
Left hand dynamometry, kg	29,5±0,24	30,1±0,24	1,7	>0,05	30,97±0,44	1,7	>0,05
Heart rate, BPM	74,8±0,62	71,17±0,68	3,9	<0,001	69,8±0,83	1,3	>0,05
Systolic blood pressure, mmHg	125,7±0,98	120,8±0,64	2,9	<0,01	118,15±0,68	2,9	<0,01
Diastolic blood pressure, mmHg	78,8±0,43	75,35±0,91	3,4	<0,001	72,8±0,57	2,4	<0,05

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year of occupations – p<0,05).

After the first year of occupations heart rate has decreased by 3,1 BPM (p<0,001), and during the second year of occupations decrease in heart rate slowed down (by 1,37 BPM) until finally stabilized at 69,8±0,83 BPM (p<0,05).

Indicators of dynamometry of the right and left hand did not change significantly, but gradually increased (p<0,05).

Analyzing data from table 1, it is possible to note that the most considerable positive changes of physical development and physical fitness indicators have happened after 2 years of occupations in recreational swimming.

Along with research of physical development and physical fitness indicators dynamics, we conducted researches of changes in psychoemotional condition of women aged 25–40 years under the influence of occupations in recreational swimming.

Indicators of physical, mental and social health of women were defined by S. Stepanov's method in the beginning of the swimming classes, and then again after the first and second year of classes (table 2) [7].

The data from table 2 confirms positive dynamics of all types of health indicators, which were defined at women for 2 years of occupations. Most indicators of physical health have considerably improved: after first year of occupations by 4,14 points (p<0,05), and after 2nd year – by 3,42 points (p<0,05). Considerably increased indicators of mental health: by 2,96 points (p<0,05) after the first year and by 4,42 points (p<0,05) after the second year of occupations. Growth of social health indicators is equal to 1,88 points (p<0,01) on the first year and 2 points (p<0,05) after the second year of occupations. It means that occupations in recreational swimming improve all types of women's health.

To find out how women's state changes due to occupations in recreational swimming, the HAM (health, activity, mood) test was held. Obtained data is presented in the table (table 3) [9].

Results of diagnostics demonstrate positive dynamics of these indicators and higher rates after year and, especially, after biennial experience of occupations in recreational swimming, in comparison with initial level. So, after the first year of occupations, indicators of health have improved by 1,63 points (p<0,01), and after 2nd year of occupations by 1,35 points (p<0,01). The indicator "activity" after year of occupations has increased by 1,22 points (p<0,001), and after the second year by 1,44 points (p<0,001). In comparison with initial level the indicator "mood" during first year has improved by 0,5 point (p<0,001), and after the 2nd year of occupations in recreational swimming – by 0,42 points (p<0,001). Thus, summing up the results of influence of recreational swimming occupations on psychoemotional condition of women, it is noticeable that this kind of activity causes positive changes in emotional sphere and provides high self-esteem.

The observed improvements were confirmed by the results of poll, conducted among women.. Data of poll on existence and number of complaints prior to the occupations in recreational swimming (October, 2014), in comparison with their quantity after the first (June, 2015) and the second years (June, 2016) of occupations are presented in the table (table 4).

Analyzing initial data on presence of complaints at women (October, 2014) it has been revealed that the most frequent were complaints about catarrhal diseases, headaches, dizziness, sleep disorders, irritability, heartaches, etc.. Similar surveys have been conducted after the first (June, 2015) and the second (June, 2016) years of occupations. Analysis of these repeated polls of women (June, 2015; June, 2016), engaged in groups of recreational swimming has shown that occupations have considerably reduced number of cases of catarrhal

Table 2

Dynamics of physical, mental and social health indicators of women under the influence of occupations in swimming (in points, $\bar{X}$±m (n=52)

Factors revealed	Initial (no experience in occupations) (n=52)	After 1 year (n=52)	Reliability level		After 2 years (n=52)	Reliability level	
			t	p		t	p
Physical health	8,95±1,14	13,09±1,23	2,5	<0,05	16,51±1,16	2,0	<0,05
Mental health	14,97±0,78	17,93±0,87	2,5	<0,05	20,35±0,72	2,1	<0,05
Social health	23,17±0,43	25,05±0,51	2,8	<0,01	27,05±0,61	2,5	<0,05

Table 3

Dynamics of women's of health, activity, mood indicators under the influence of occupations in swimming (in points, $\bar{X}$±m (n=52)

The states surveyed	Initial (no experience in occupations) (n=52)	After 1 year (n=52)	Reliability level		After 2 years (n=52)	Reliability level	
			t	p		t	p
Health	2,53±0,39	4,16±0,43	2,8	<0,01	5.51±0,29	2,7	<0,01
Activity	3,49±0,29	4,71±0,23	3,4	<0,001	6,15±0,28	4,0	<0,001
Mood	3,15±0,11	3,65±0,12	3,6	<0,001	4,07±0,19	2,1	<0,05

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Table 4

Dynamics of number of complaints at women under the influence of occupations in swimming (quantity of cases, %, n=52)

Common complaints		Initial (no experience in occupations) (n=52)		After 1 year (n=52)		After 2 years (n=52)	
		Incidence	%	Incidence	%	Incidence	%
Nervous disorders		48	92,3	34	65,4	17	32,6
Asthenic syndrome		48	93,3	31	59,6	10	19,2
Headaches		45	86,5	28	53,8	12	23,1
Joint pains, calcifications, joint deformation		46	88,5	35	67,3	17	32,7
Sleep disorders, insomnia		37	71,2	22	42,3	6	11,5
Respiratory problems		23	44,2	18	34,6	12	23,1
Heartache, heartbeat, shortness of breath while physical activity		27	51,9	19	36,5	9	17,3
Backache	Cervical	43	82,7	21	40,3	12	23,1
	Chest	37	71,2	24	46,1	15	28,8
	Cumbar	31	59,6	18	34,6	15	28,8
	Coccyx	22	42,3	17	32,7	12	23,1
Occasional pain in stomach, liver, etc.		21	40,3	18	34,6	10	19,2
Catarrhal diseases		38	73,1	23	44,2	6	11,5
Other		23	44,2	15	28,8	5	9,6

diseases: from 73,1 % (38 cases) – prior to the occupations swimming, to 44,2 % (23 cases) – after the first year of occupations and to 11,5 % (6 cases) – after the second year.

Under the influence of occupations in swimming, the quantity of headache cases (initial indicator – 86,5 % (45 cases of 52 respondents) has significantly decreased to 53,8 % (28 cases) – after the first year and 23,1 % (12 cases) – after the second year. Sleep disorders and sleeplessness: initial – 71,2 % (37 cases), to 42,3 % (22 cases) and 11,5 % (6 cases) after 1st and 2nd years of occupations accordingly. In comparison with basic data (48 cases – 92,3 %), the number of neurotic frustration has considerably decreased: after year of occupations – to 34 cases (65,4 %), after 2 years of occupations – to 17 cases (32,6 %). The asthenia syndrome shown prior to occupations in swimming in 48 cases (93,3 %) after one year of occupations has decreased to 31 cases (59,6 %), and after the second year to 10 cases (19,2 %).

The positive tendency is seen also in dynamics of complaints about heart. Thus, at the beginning of the research, 27 of 52 women complained of heartaches that made 51,9 %. In year after the beginning of occupations in swimming the number of the women complaining about heartache, heartbeat and shortness of breath has decreased to 19 cases (36,5 %), and after the second year of occupations has made 9 cases (17,3 %). The number of complaints about respiratory problems (from 23 cases (44,2 %) has decreased to 18 (34,6 %) and then and to 12 cases (23,1 %); complaints about chronic stomachache and liver pain (from 21 cases (40,3 %) to 18 (34,6 %) and to 10 cases (19,2 %) after 1st and 2nd years of occupations accordingly.

The number of complaints to joint pains has decreased from 46 cases (88,5 %) to 35 cases (67,3 %) after year of occupations and to 17 cases (32,7 %) after the second year. In two years of occupations in recreational swimming the number of complaints to pains in various regions of backbone has decreased on average by 25 %.

Conclusions

As a result of the conducted research it is noticeable that biennial occupations in recreational swimming have positively affected the psychoemotional sphere and the general indicators of women's health. It is established that there were considerable changes in indicators of physical development and physical fitness of the women doing swimming. It is revealed that recreational swimming positively influences indicators of physical, mental and social health of women aged 25–40 years, and indicators of health, activity and mood are higher in comparison with basic data. The most noticeable improvements of physical and psychoemotional state indicators are revealed after 2 years of occupations in recreational swimming.

Prospects of further researches can be determined by indicators of the dominating condition of women who do swimming, in different phases of menstrual cycle.

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Efficiency of actions of the setter in competitions of students' women's volleyball teams of the Kharkiv region

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Purpose: *to define efficiency of performance of the second serves at the organization of the attacking actions of team in SVL of Kharkiv.*

Material & Methods: *the analysis of references showed that researches are practically not conducted in student's sport of Ukraine. The competitive process with participation of 9 players of role – setter qualifications of the I adult category was investigated in the pedagogical observation, by mathematical processing of the obtained data efficiency of actions of the setters at the organization of the attacks of women's teams of Kharkiv Student's volleyball league was defined.*

Results: *defining indicators of efficiency of technical-tactical actions of the setter in the organization of attacks of women's teams of Student's league of Kharkiv, the analysis of references on condition of problem of training of the setter was carried out, tactical models of game in attack, in which the setter and efficiency of game actions of the setter, takes part in the organization of the attacking actions of women's teams of Kharkiv Student's volleyball league are defined.*

Conclusions: *the offered methodical approach based on the quantitative assessment of competitive activity will allow rationalizing structure and distribution of means of trainings and to increase efficiency of the whole educational-training process of training of the setters, will improve the game in attack of the teams of SVL of Kharkiv.*

Keywords: *student's volleyball, setter, tactical systems of game.*

Introduction

Ukrainian volleyball celebrated the ninetieth anniversary in 2015. Playing volleyball deserved interest and respect from fans and sportsmen for times of the existence [5].

World volleyball hasn't recognized leaders many years. If the fight for the superiority was conducted between two, sometimes three favorites in the past, then it is not possible to provide winners actually at the moment.

Certainly, fierce competition, impossibility to predict winners increases the popularity of volleyball worldwide.

It is necessary to define that teams of the European countries have the greatest influence on state and development of the popular game. All these teams have bright players who perform functions of the setter. Personality, talent, individual skill, style of the game of these players, as a rule, characterize the "face" of the whole team. Students' teams are not represented by the exception in this case. Competitions of the World Student Games, Student Games of Ukraine and Student's Volleyball League of Ukraine and SVL of Kharkiv testify to it [1; 9].

Not in view of the fact that the considerable attention is paid to training of sportsmen for the competitive activity, not enough attention is paid to problem of increase in efficiency of actions of the setters in the organization of attack in scientifically-methodical literature, as defines the relevance of materials of the given research.

Communication of the research with scientific programs, plans, subjects

The research was conducted according to the subject of the plan of the RW of Kharkiv state academy of physical culture 2.8. "Improvement of the educational-training process in sports" (number of the state registration is 0111U003126).

The purpose of the research

To define indicators of efficiency of technical-tactical actions of the setter in the organization of offensive actions of women's teams of Student's volleyball league of Kharkiv.

It is necessary to solve the following tasks for the achievement of this purpose:

– to carry out the analysis of references on condition of problem of training of the setter.

– to define tactical actions in attack in which the setter takes part.

– to define efficiency of game actions of the setter in attacks of women's teams of Student's volleyball league of Kharkiv.

Material and Methods of the research

We investigated indicators of the competitive activity with the assistance of the setter in the offensive actions of women's teams of Student's volleyball league of Kharkiv, such methods

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of the research were used in the research: analysis of scientific literature, pedagogical observations, mathematical processing of the obtained data. 9 players with the role – the setter of qualification of the I adult category were investigated.

Results of the research and their discussion

Technique is made by the methods and means, which are necessary for conducting the game in volleyball. Technique of volleyball consists of the following methods: stance, movements, passes, serves, attack hits and blocking. It is established by us that teams have executed 14278 technical actions at the 24th game (81 sets). It comes up from this indicator that 176 technical elements were performed on average for the set by the team [8]. The main part of elements is occupied by passes and attack hits – 42%. Receiving of serve, defense and secure, borrows – 39%. Serve occupies 12%. Least of all technical actions were performed on blocking – 7% (fig. 1).

Indicators of performance of game elements on average for the set are displayed in fig. 1. The place and role of separate techniques are different in the game. Beginners have the number of techniques which is used in the game; it often comes down to two: to serves and passes, and the specific weight of passes at them reaches 75–80%. It occurs due to the reduction of specific weight of attack hits and blocking. It must be kept in mind that receiving and pass are not two techniques of the game that essentially differ one from another as, for example, attack hit and blocking. At the heart this is only action of the player which essence, – by means of hands to change the initial direction of flight of the ball on such, which is demanded by the game situation for achievement of the desirable result. The overhead pass of the ball allows to transfer the ball most precisely to the partner, therefore, this way is more often applied as the second pass, this is pass for the attack hit, and is used at the offensive actions. Efficiency of the game in attack depends not only on the technique of performance of the overhead second pass, but also on its tactics. The main tactical task in this case – to create the best conditions for the attack by the attack hits to the partner, using passes of different speed, being on duty them by the direction, length, height, performing the distracting operations, trying to obtain reserve of passes, considering situation and technical abilities of forwards of the team, estimating the blocking possibilities of the team of the opponent. Therefore, teaching the technique of

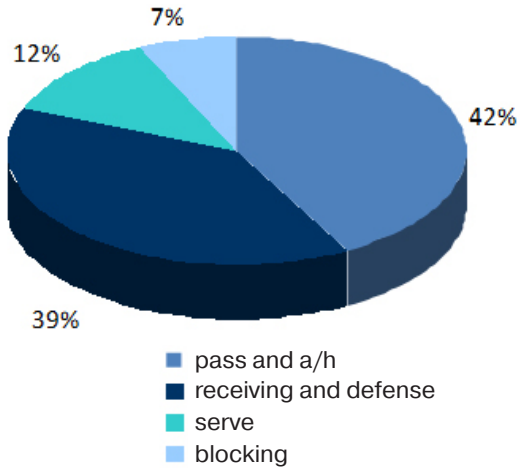

Fig. 1. The partial number of performance of basic elements during the game (%)

performance of the overhead pass, it is necessary to open its tactical component. The overhead pass is applied most often in basic situation; the overhead pass in jump or with falling is applied much less often at beginners. The overhead passes are divided on pass forward, over themselves, back in the direction to the setter. By length they can be: long are the passes, which are directed through the zone (for example, from the zone 2 in the zone 4), short – are oriented to the next zone, for example, from the zone 3 in the zone 4, and shortened – are oriented to the zone (from the zone 2 in the zone 2). High, average and low passes are distinguished by height. Low pass has the smallest height of trajectory over the net (to one meter), average – to two meters, high –is higher than two meters. Passes can be slow by speed of flight of the ball (to 10 $m \cdot s^{-1}$), accelerated (to 16 $m \cdot s^{-1}$), shoot (more than 16 $m \cdot s^{-1}$). Besides, there are passes close to the net (to half a meter) and distant from it (more than a half-meter). It is possible to tell about value of pass in modern volleyball that the skill level of players and teams in many respects is defined by the level of mastering technique of pass.

Refereeing presents high requirements to technically correct performance of passes. Unlike other game sports, where it is not ideal from the point of view of technique, the performed receiving can bring success to the team (hit of the ball in the rim in basketball, goal in hockey), the technique of performance of receiving, irrespective of its efficiency, is estimated by referees in volleyball. Insignificant errors in the technique are fixed by referees at once, and the ball is passed to the opponent that finally affects result of meeting. Considering the high specific weight of the overhead pass in total of techniques of playing volleyball, the high requirements to the method of performance, which is offered by refereeing, big tactical load, the considerable part of time in the educational and training process on volleyball is taken away for study and improvement of the overhead passes. Exercises on technique of the overhead passes join in each educational-training class, irrespective of other tasks, which are solved in it. In literature all authors unanimously admit the fact that study to techniques of playing volleyball has to begin with studying of the overhead pass [2; 5].

Considering the technique with its tactical contents, it is lawful to call the first pass as receiving of the ball and to refer it to the technique of defense, and the second pass – to the technique of attack. Besides, receiving of the ball even from the most difficult situation is tried to be executed directly with task to leave the ball in the game of optimum amount of time. Unfortunately, there is no unity in the plan of terminology in special literature, and it is possible to meet such combinations as receiving and pass of the ball, the first pass and the second pass, receiving-pass. Each technique includes means which

Table 1

Types of pass from above by the main signs in volleyball

№	Types of pass from above at organization of attack in volleyball		
1	shortened	short	long
2	low	average	high
3	shoot	accelerated	slow
4	close to the net	distant from the net	on the backline
5	forward	over	for the head

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differ one from another in performance details (two hands from above, two hands from below, and one hand from below, one hand from above). Options of technique are defined by specifics of performance of technique by signs of speed, the direction and trajectory of flight of the ball. All this demonstrates that kinds of performance of this technical game element depending on problems, which are solved by this or that player at present in this game situation, are hidden under the name receiving-pass of the ball.

Big variety of versions and options of passes is defined by their tactical content (appointment), and also conditions of their performance. There is close and difficult interrelation between details, versions, options, conditions of performance and purpose of receiving. Efficiency of actions of the setter is defined by his technical arsenal. It is preferred as technique of possession of the ball, tactical thinking, and peripheral sight, not without reason at his study. Strong mastering of all subtleties of the second pass of the ball, finishing it to perfection – such task faces the setter. All coaches demand good pass from the dispatchers, but forget that quality of pass first of all depends on correct position of legs, trunk and hands, and also on distance of point where the ball has to be directed. The setter has to know well manner of the game of forwards of players from different passes, their physical standards and mental state, has to be guided well in any game situations, has to be able to analyze that arise during the situation game, to know all nuances of tactics of the game.

Definition of quantitative indices of performance of the second passes by different signs was one of problems of our research. As it was stated above, the systematized classification of the second passes in volleyball by the following signs: by length (long, shortened, short); by height (high, average, low); by speed (slow, accelerated, shoot); by distance from the net (on the backline, distant from the net, close to the net); by the direction of performance (forward, back, over).

We have investigated all performed passes by requirements of the existing classification. Results of processing of protocols of code record of games concerning performance of the overhead pass by the setters; it is displayed in figures 2–6 in the form of charts. These charts display quantitative indices of performance of different types of the second passes at the organization of the offensive actions of women's teams.

The long pass, which was performed by the setter, has the greatest quantitative index in 74% of cases in the game. This pass is used for the organization of the offensive actions by forwards of the 4 zone. Shortened (14%) and short (12%) passes have approximately identical percent of use in the game. In our opinion, it is connected with the fact that setters use these game elements uncertainly in connection with low quality of receiving and bad accuracy of finishing in defense.

Indicators of passes by speed are attached indicators by height in proportion (fig. 4).

So, we could see that height indicators by sign "low" – 8% answer "shoot" passes – 6%, "average" height – 37% close on indicators to "accelerated" passes, and "high" passes – 55% close on indicators to "slow" – 64%.
There is indicator by sign "distance from the net" in classification of passes in volleyball, which is displayed in fig. 5.

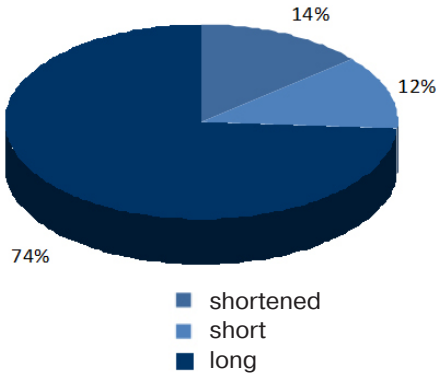

Fig. 2. The partial number of the second passes during the game (by length)

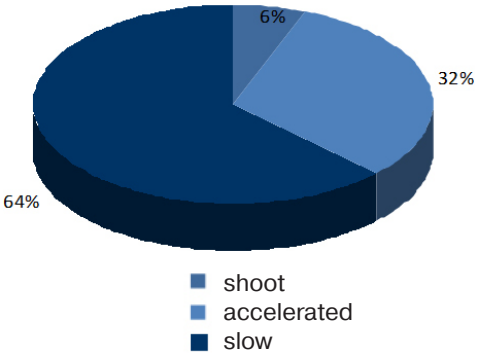

Fig. 4. The partial number of the second passes during the game (by speed)

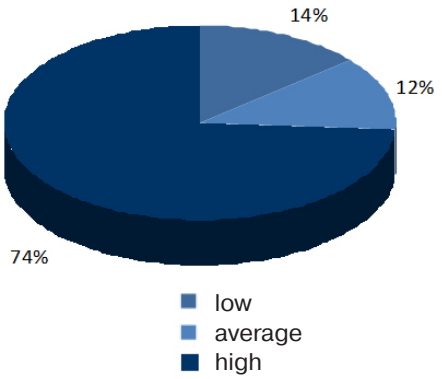

Fig. 3. The partial number of the second passes during the game (by height)

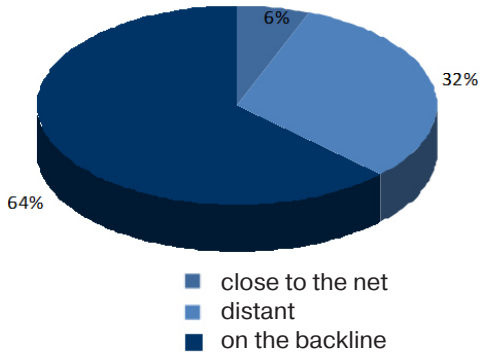

Fig. 5. The partial number of the second passes during the game (by distance from the net)

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This is very important indicator in modern volleyball as growth of the blocking players of the opponent and the right "to transfer" during blocking of hand to the party of the opponent grants privileges to defenders of the first line of the opponent. Apparently therefore, the quantity of «net» passes is more and more reduced, which are performed on short distance from the net, especially in volleyball of the highest sports skill.

The higher qualification of the setter is, the more exact and more effective second pass is offered to the forward.

Indicators of passes by distance from the net have no interrelation with one sign as also high and slow; different types of passes can be both close to the net, and distant.

One more important indicator in classification of passes is the direction, in which it is executed. Pass performance back for the head is possible only at full mastering of the technique of passes as it is connected with the difficult coordination movements and development of time-spatial feelings in the player. Apparently therefore, use of the different directions of the second passes for the organization of the offensive actions gives big versatility of attack and possibility of achievement of victorious result for the account of offensive actions to the team [2]. The setter, who has passes, different by signs, in the arsenal by means of them, can decide difficult tasks that the coach of the team puts for the achievement of victory. The effective technique, differing high coordinate, firmness and profitability, allows the setter to achieve the highest results at the organization offensive actions of the team during the games at competitions. Results of our research of the direction of performance of the second passes are displayed in fig. 6.

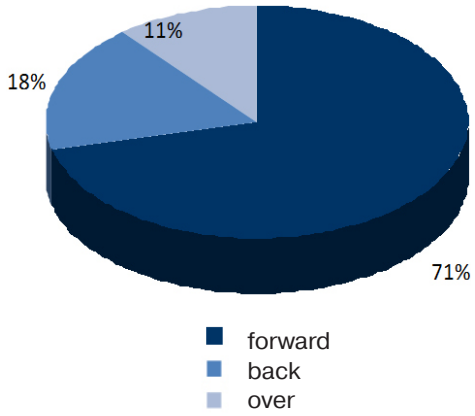

Fig. 6. The partial number of the second passes during the game (by the direction)

Materials of the research testify to big advantage in indicators of performance of pass by the direction forward – 71%. In our opinion, it is connected with the fact that the setter feels big confidence in the reformed passes in this direction as studying of the overhead pass begins by different signs of speed, length, height and distances, from the net by the direction – forward.

The setter performs second passes in different game situations at the organization of the offensive actions of the team during the game. So, the game situation in the organization of the offensive actions has the name "game on set" at receiving of serve of the rival. It is caused by the fact that there are recognized parameters of performance of serves which influence performance of receiving and more static position of players, which are located on receiving in volleyball. In our opinion, it influences also efficiency of performance of the second passes at the organization of the offensive actions of the team at the game "on taking down" (fig. 7).

Analyzing the obtained data, it is visible that the setter have very high percent of efficiency of performance of the second passes on indicators "good" (54%) and "excellent" (28%) in game situation "on taking down". It demonstrates that in standard situations on receiving of serves of the rival which are, as a rule, formed on trainings, the setters feel confidence in performance of technical element – the second pass on hit.

Game situations change constantly and very quickly in volleyball during the game as feature of game provides need to give the ball to the opponent by serve for possibility of the organization of the counterattacking actions in response to the attack of the opponent from "taking down". Therefore, there is the concept - "playing to the end" in volleyball. It is the game situation in which the setter together with the team will organize the attack after the defensive play. Situations in "playing to the end" are most dramatic as the number of transitions of the ball on the one hand of the platform on the friend can be very big. In these game situations as for the rule, the team, which has big game endurance, wins. Efficiency of the sec-

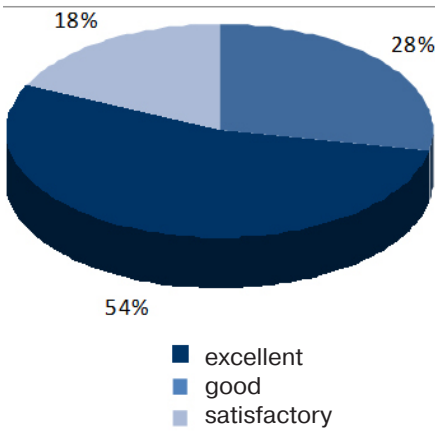

Fig. 7. Efficiency of performance of the second passes on "taking down" at serves of the opponent

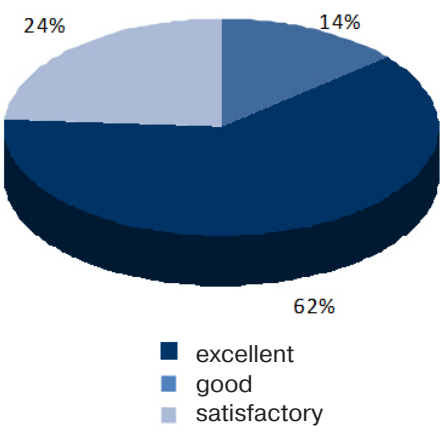

Fig. 8. Efficiency of performance of the second passes in playing to the end

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ond passes, performed by the setter, is influenced dynamic game situations and by possibility of their repeated repetition at draw of one point (fig. 8).

We can see that the percent of efficiency of performance of the second passes by the indicator "satisfactory" has increased (24%) in compared to the indicator of efficiency of performance of the second passes "on taking down" (18%), the indicator of efficiency of performance "good" in the situation of playing to the end has increased (63%) in compared to the situation "on taking down" (54%) at the organization of the offensive actions in playing to the end. It, in our opinion, demonstrates that female players of SVL of Kharkiv have seized the stable technique of performance of the second passes.

Conclusions

The offered methodical approach, which is based on the quantitative assessment of competitive activity, will give opportunity to rationalize the structure and distribution of means of trainings and to increase efficiency of the whole educational-training process of training of the setters to the organization of the game in attack.

Results of researches can be used for the analysis and assessment by coaches of actions of the setters at the organization of the attacks at "taking down" and in "playing to the end". On the basis of the made research we think that it is necessary to pay more attention to improvement of technical training in the tactical tasks in connection to realization in training of the setters. And also it is necessary to reconsider priorities of the choice of different types of passes at the organization of the attacks depending on quality of receiving and defensive play. It will give the chance to the coach to work in the training process on use of various combinations in the game of forwards.

Prospects of the subsequent researches

In the future the necessity occurs to analyze interrelation between types of preparation on the basis of the obtained data of the analysis of competitive activity of the setters of the women's volleyball teams of SVL of Kharkiv in our research. It will give opportunity to coaches of the teams to optimize the training process of preparation for competitions and to define the main directions of improvement in types of preparation.

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Features of influence of sports activities on the identity of students

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Purpose: *the definition of features of influence of sports activities on the identity of athletes.*

Material & Methods: *the special surveys of students and teachers of KhSAPC, and also students, who train in sports club "Politekhnik", and the students who are engaged in sports sections NLU were conducted for the solution of purposes.*

Results: *the most important qualities of the personality which sports activities influence are: formation of "confidence", "emotional stability", and "orientation to achievement" at athlete. According to most of the interviewed athlete and experts, the authority of the coach is not significant factor which influences the identity of athlete.*

Conclusions: *it is established as a result of the conducted researches that sports activities most of all influence the formation of confidence, emotional stability and orientation to achievement of athlete. Results of the research demonstrate also that the identity of the athlete is most influenced by the competitive relationship which develops in the course of competitive activity. Results of the research also indicate disturbing tendency which is shown that most of sportsmen connect the end of their sports career with injuries.*

Keywords: *personality, student's sport, sports activity, requirements, sports specialization.*

Introduction

The integration processes that are taking place around the world, including all aspects of human existence and deal with the scope of the mass student sport as a system of organization and holding of sports events (competitions, entertainment, games, etc.) for mass kinds of physical activity [3]. Currently, there are two different strategic directions in the development of mass sports student. One, based on the territory of the Soviet Union and still being implemented in modern Ukraine, provides for students mandatory physical exercises in the framework of the educational discipline "Physical Education", as well as sports of their choice at leisure [2; 4]. This direction, reflecting the state policy in the field of physical education of student youth, inherently assumes a relatively centralized management of the processes that unfold in this area. Thus, the practical organization of physical education and mass sport is governed by the Regulations in higher education [3]. This regulations provides the universities with ample opportunities for organizing the physical education of student youth. However, practice shows that the most common is a sports-oriented form of organization of student's classes in physical education [5; 6]. This is the first and most massive level of attracting students to sports activities, and accordingly this is the first organizational form of mass impact on the student's personality.

The second trend in the historical development of university sports, which is a consequence of the evolution of the Euro-American civilization, provides for the establishment for students' conditions and opportunities for free choice of types of physical activity, as a form of leisure activity (sports or physical exercise at your leisure). This approach involves the formation of the students 'respective needs, achieved by two interrelated components: the development of an appropriate social thought, and through her influence on the formation of students' respective needs, that is, a certain level of personal physical training (to use the terminology adopted in the national scientific community), and the creation of conditions for the practical implementation of such requirements. For example, in the United States, the formation of an appropriate social environment, in which a healthy physically active lifestyle is a priority, began in the sixties of the last century, when President D. Eisenhower established the Council for Sports and physical fitness, which is coordinated at the national the level of activity in this field. This has influenced the formation of the universities need to establish specialized sports and recreation centers. An analysis of the information posted in the report on the top 25 such centers shows that, for example, the University of Texas has seven basketball and handball courts, a full-size Olympic pool, archery areas, dance classes and much more, and the University of Cincinnati Has three swimming pools, several gyms, a climbing wall, a football and basketball stadiums [9]. Despite the seemingly effective functioning in foreign universities students bringing the system to the physical exercise, as well as the availability of appropriate

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sports base for the realization of their needs in motor activity, however, as evidenced by the results of special studies, about 50% of today's young Americans still do not receive the necessary the volume of physical activity [10]. Some foreign experts have concluded that one of the most common barriers to physical activity and active recreation students is the lack of free time Some foreign experts have concluded that one of the most common barriers to physical activity and active recreation students is the lack of free time. In their opinion, the system of education in higher educational institutions should be changed in the direction of creating conditions conducive to a rational and healthy way of life for students in their spare time [7; 8].

The analysis indicates significant differences between the effect of the process on the student sports personality takes place in the domestic and foreign sports practice [1]. In domestic practice, such influence is realized mainly through sports training in the educational process and, to a lesser extent, in sports sections. In foreign practice, it is implemented through sports clubs, which represent a special form of self-organization of students' activities in the implementation of common interests in the field of sports. This contradiction actualizes the need to study the problem of the influence of sports on the individual student.

The relationship of research with scientific programs, plans, themes

The research was carried out within the framework of the implementation of the scientific project of the Ministry of Education and Science of Ukraine "Theoretical and methodological foundations for the formation of a culture of physical health in student youth" (state registration number: 0115U006767).

Purpose of the research

The definition of features of influence of sports activities on the identity of athletes.

Objectives of the study:

1. Identify the qualities of personality, which are most influenced by the employment of various sports.

2. Find out the main factors that influence the personality of students involved in sports.

Material and Methods of the research

To solve these tasks, special surveys of students (n=137) and teachers (n=48) of the Kharkov State Academy of Physical Culture (KhSAPC) were conducted, as well as students who train in sports club "Politekhnik" (NTU) (n=67) and students engaged in sports sections of the Yaroslav Mudryi National Law University (NLU) (n=58). In the course of the study, a closed type questionnaire was used.

Results of the research and their discussion

The results of studying the problem of the influence of sports on the personality of students studying in KhSAPC, NTU, NLU, presented in tables 1 and 2. They show that the most important quality of personality, which is affected by exercise, according to most respondents is the formation of the "confidence" of athletes, which gave preference to 57,0% of the athletes students KhSAPC (table 1, question 1), whereas among NTU students, 50,0%, and in NLU – 49,8% (table 2, uestion 1). As shown by the results of research conducted among students of KhSAPC, among sports specialties this quality is most significant for wrestling wrestlers (75%), and it is least important for gymnasts (40%). Essentially less expressive quality of the athlete's personality, which is formed under the influence of training and competitive activity, is "emotional stability", which 20,5% of KhSAPC students drew attention to. Significantly higher these grades for student athletes NTU and NLU, respectively, 45,0% and 30,6%. 19,3% of KhSAPC students noted the importance of such personality quality as "orientation towards achievement" (among NTU students, 10,0%, and among students of NLU – 16,4%). As shown by the results of the study, physical culture and sports activities, which are realized in universities of Ukraine, practically do not affect such qualities of the athletes' personality as "aggressiveness" and "independence".

The results of the research also indicate that the competitor's personality is influenced to the greatest degree by the competitive relationships that develop in the course of competitive activity (table 1, question 2). About this factor there is a fairly consolidated position of almost all athletes who took part in the study. Of all the sample of the students-athletes of KhSAPC this factor was noticed by 93,0% of respondents. Among the students of NTU athletes such 90,0%, and among students of NLU – 98,3% (table 2, question 2). The analysis of materials reflecting the students' point of view about the influence of sports on the qualities of the individual showed that 39.0% of the surveyed athletes were most influenced by sports achievements (table 1, question 3), which is confirmed by the data obtained at NTU (30,0%) and NLU (33,0%) (table 2, question 3). The results of the study, conducted on the basis of KhSAPC (table 1), indicate that among the representatives of various sports in this matter there are certain disagreements. Thus, only 16.6% of athletes involved in football singled out this factor as significant, while among boxers 66,6% of respondents preferred it. In a similar survey conducted among trainers and teachers of specialized departments of KhSAPC, 44,0% of respondents also preferred the factor of "sports successes" as the most rating one.

The second group of factors influencing the athletes' personality is, in the opinion of KhSAPC students, "correctly organized training process" – 16.5% of respondents preferred it on average (among trainers and teachers of KhSAPC, this factor was also preferred by 16,0% of respondents). The students of NTU (30,0%) and NLU (27,5%) gave a much higher rating to this factor. 15,6% of the students of the KhSAPC singled out, as an important factor, also the "feeling of their significance" factor. Among NTU students, there are 15,0%, and among NLU students – 7,2%. The factor is most significant for football players, respectively 20,8%, as well as for volleyball players, respectively 33,3% and 20,0%.

Attention is drawn to the fact that in the overall ranking of factors that athletes noted, "the credibility of the coach" occupies only the fourth position, it was preferred by 10.6% of the respondents by KhSAPC, 10,0% – NTU and 14,8% – NLU. This assessment almost coincided with the assessment made by the trainers and teachers of the specialized chairs of the KhSAPC (12,0%). In the opinion of athletes, the factor "au-

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Table 1

Features of the influence of the employment of various sports on the personality of athletes (judgments of students of KhSAPC, n=137), %

№	Variants of answers	Kinds of sport: Athletics	Football	Wrestling	Weightlifting	Boxing	Gymnastics	Volleyball	Summary results
	What an athlete personality the greatest impact exercise?								
1	Confidence	66,6	45,8	75,0	56,2	55,5	40,0	60,0	**57,0**
	Emotional stability	–	12,4	–	25,0	33,3	40,0	33,3	**20,5**
	Orientation to achievement	33,3	33,3	25,0	12,5	11,1	13,3	6,6	**19,3**
	Aggressiveness	–	4,1	–	6,2	–	6,6	–	**2,4**
	Independence	–	4,1	–	–	–	–	–	**0,6**
2	**Influence the formation of the individual athlete's competitive relationships that are formed in the course of competitive activity?**								
	Yes	100	95,9	75,0	93,7	100	100	86,6	**93,0**
	In your opinion, the personality of the athlete is most affected:								
3	Sporting successes	50,0	16,6	37,5	62,5	66,6	20,0	20,0	**39,0**
	Optimal training process	24,9	33,3	–	6,2	–	18,3	33,3	**16,5**
	Feeling of importance	8,3	20,8	12,5	–	33,3	14,3	20,0	**15,6**
	Authority of the coach	16,6	12,4	12,5	12,5	–	20,3	–	**10,6**
	Relationship between athletes	–	12,5	37,5	6,2	–	–	13,1	**9,9**
	Participation in competitions	–	4,1	–	12,5	–	26,8	13,3	**8,1**
	What can affect your decision to finish your sports career?								
4	Injuries	66,6	75,0	37,5	68,7	54,4	33,3	73,3	**58,4**
	Awareness of the impossibility of the growth of sports results	10,0	8,3	12,5	12,2	22,2	26,6	6,6	**14,0**
	Disappointment in sport	6,6	–	12,5	6,2	12,1	20,0	6,6	**9,1**
	Take a lot of time	16,6	–	–	–	11,1	13,3	6,6	**6,8**
	Your option	–	16,6	37,5	12,5	–	6,6	6,6	**11,4**

thority of the coach" in its significance is equated to "relations between athletes" (9,9%) and "participation in competitions" (8,1%). Attention is drawn to the fact that for 37,5% of the athletes of the KhSAPC, who are engaged in various types of struggle, the most important factor is the "relationship between athletes", and for 26,8% of the gymnasts of this institution – «participation in competitions».

The results of the study indicate an alarming trend, which manifests itself in the fact that the majority of athletes from KhSAPC (58,7%) associate with the end of their sports career with injuries (table 1, question 4). A similar trend can be traced in the answers of student athletes NTU (65,0%) and NLU (43,2%) (table 2, question 4). Also noteworthy is the fact that in a similar survey conducted among trainers and teachers of specialized departments of the KhSAPC, 44,0% of respondents noted the "sports injuries" factor. This factor is most significant for the sportsmen of KhSAPC who are engaged in game sports (football – 75,0%; volleyball, basketball – 73,3%). In the rating of the factors that make athlete leave active sports, the second place is occupied by the "awareness of the impossibility of the growth of sports results" (14,0%), NTU – 15,0% and NLU – 16,4%. The analysis of the survey results KhSAPC athletes of various specializations shows that this factor is most important for boxers (22,2%) and gymnasts (26,6%). An important factor for gymnasts is also "disappointment in sports", which was preferred by 20,0% of athletes. The considerable time spent on training and competitive activities practically does not influence the decision of the athletes to complete their sports career.

Conclusions

The analysis of the influence of various sports on the personality of the athletes showed the following.

1. The highest marks were received by such qualities of the personality of students, which are formed as a result of sports activity:
a) "Confidence" (KhSAPC – 57,0%, NTU – 50,0%, NLU – 49,8%);
b) "Emotional stability" (KhSAPC – 20,5%, NTU – 45,0%, NLU – 30,6%);
c) "Orientation to achievement" (KhSAPC – 19,3%, NTU – 15,0%, NLU – 16,4%).

2. The study results also suggest that the athlete identity in the most affected by the degree of competitive relationships that are formed in the course of competitive activity.
3. The analysis showed that the quality of the individual, ac-

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Table 2

Judgments of students who train in the sports club "Polytechnic", and students involved in sports sections of NLU, the impact of sports on the athlete's personality, %

№	Variants of answers	Universities	
		NTU (n=67)	NLU (n=58)
	What an athlete personality the greatest impact exercise?		
1	Confidence	50,0	49,8
	Emotional stability	45,0	30,6
	Orientation to achievement	15,0	16,4
	Aggressiveness	–	–
	Independence	–	3,1
2	**Influence the formation of the individual athlete's competitive relationships that are formed in the course of competitive activity?**		
	Yes	90,0	98,3
	In your opinion, the personality of the athlete is most affected:		
3	Sporting successes	30,0	33,0
	Optimal training process	30,0	27,0
	Feeling of importance	15,0	7,2
	Authority of the coach	10,0	14,8
	Relationship between athletes	–	11,8
	Participation in competitions	15,0	6,2
	What can affect your decision to finish your sports career?		
4	Injuries	65,0	43,2
	Awareness of the impossibility of the growth of sports results	15,0	16,4
	Disappointment in sport	5,0	10,6
	Take a lot of time	–	17,5
	Your option	15,0	12,3

cording to 39,0% of the surveyed athletes most affected by sporting success, which was confirmed by 44,0% of coaches and teachers of specialized departments KhSAPC.

4. The results of the research showed that 16,5% of the respondents (16,5% of the respondents preferred the factor among the trainers and teachers of KhSAPC), as a significant factor, "the training process is correctly organized". A much higher appreciation of this factor was given by students NTU (30,0%) and NLU (27,5%).

5. In the overall ranking factors that mentioned athletes, "the authority of the coach," is only the fourth position, he expressed a preference for 10,6% of respondents and 10,0% KhSAPC NTU and 14,8% of NLU. With this assessment, the assessment almost coincided with the trainers and teachers of the specialized chairs of the KhSAPC.

6. The results of the study also point to an alarming trend, which is manifested in the fact that the majority of athletes from KhSAPC (58,7%) are associated with trauma after completing their sports career. A similar trend can be seen in the responses of athletes NTU (65,0%) and NLU (43,2%), as well as 44,0% of trainers and teachers of specialized departments of KhSAPC.

Prospects for further research

In the future, it is planned to develop a pedagogical technology for the formation of personal physical culture in students' youth by means of mass sports.

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Condition of esthetic component of motive activity in aerobic gymnastics

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Purpose: *to prove condition of esthetic component of motive activity of sportsmen in aerobic gymnastics at various stages of sports preparation.*

Material & Methods*: analysis of video records, method of expert assessment, methods of mathematical statistics.*

Results: *the level of criteria of esthetic component ("musicality", "dancing", "illustrative expressiveness", and "emotional expressiveness") with use of the offered rating scale is determined.*

Conclusions: *indicators of motive activities of sportsmen for aerobic gymnastics are defined at various stages of sports preparation.*

Keywords: *aerobic gymnastics, esthetic component, assessment, criteria, preparation stages, motive activity.*

Introduction

The formation of an esthetic component in aerobic gymnastics is associated with the purposeful development of a complex of motor-coordination, intellectual, moral-willed qualities, contributes to the versatile harmonious development of athletes. In the works of P. N. Kizim [3], T. S. Lisitska [5], A.Y. Mullagildinova [6], T. T. Roters [9] the improvement of the creative activity of athletes through the organization of various types of musical rhythmic activity. In the studies of O. S. Beketov [2], O. A. Omelyanchik-Zyurkalova [7], V. Y. Sosin [11] t is noted that the emotional expressiveness of motor actions, the unity of music and composition, "artistic performance" that are brought up in process of training exercises, positively affect the performing skills of gymnasts. The authors assume that the esthetic component of the motor activity is subjected to pedagogical influence and can change at different stages of the development of sportsmanship. Specialists in aerobics B. V. Kokarev [4], O. O. Pozdeev and G. M. Pshenichnikova [8], O. A. Somkinim [10] described in some detail the content and structure of training sessions. However, at the present time the rapid development of this type of gymnastics is characterized by the appearance of new, more complex programs that require greater emotionality, artistry, grace, which makes the control of the development of the esthetic component of athletes' [12; 14]. Development of an estimation of an esthetic component of motor activity of gymnasts to promote motivation to formation of individual style and skills of esthetic performance of impellent actions.

Communication of the research with scientific programs, plans, subjects

The work was perfomed in accordance with the theme of the research work "Theoretical and methodological bases of managing the training process and competitive activities in the Olympic, professional and adaptive sport" in accordance with the LSUPC plan for 2016–2020. (Number of state registration: 0116U003167).

The purpose of the research

to prove condition of esthetic component of motive activity of sportsmen in aerobic gymnastics at various stages of sports preparation.

Objectives of the study:

1. Create a quantitative and qualitative scale for assessing the esthetic component of the motor activity of athletes in aerobic gymnastics.

2. Determine the indicators that have a significant impact on the state of the esthetic component of the motor activity of athletes in aerobic gymnastics at different stages of sports training.

Material and Methods of the research

181 gymnasts from different age groups of the city Odessa and Odessa region were examined, of which – 59 girls at the age of 6–10 years; were in the initial training stage – 61 girls aged 11–14 years; were in the preliminary basic training stage – 61 gymnasts at the age 15–17 years. Examination was carried out on the basis of the Federation of Aerobic Gymnastics, School № 81, School № 111, Sports Schools № 10, № 1, № 3 (city Odessa).

For qualitative and quantitative analysis of the esthetic component, video recordings of competitive programs of athletes-aerobists of different age groups. To determine the level of the esthetic component of the motor activity of athletes, the method of expert evaluations. During the statistical processing of the results of the study, statistical characteristics were calculated: arithmetic mean (M) standard deviation (±SD) concordance coefficient. Also, the individual formation ratio (k) was determined, which indicated the ratio of the sum of the estimates of the indicators relative to their number for a single criterion and was calculated from the formula:

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$$k = \frac{\Sigma O}{N},$$

where k – individual coefficient of formation; Σ – sum; O – rating; N – number of indicators.

The optimal level of the formation of individual criteria was determined for values of k in the range 2,5–1,8 points, sufficient – 1,7–1,3 points, low 1–1,2 points.

To characterize the group level of formation of individual criteria, the group coefficient of formation (k_{gr}), was calculated, which was defined as the average arithmetic value *k*.

Results of the research and their discussion

According to the literature, the esthetic component of the motor activity of athletes reflects the "artistic performance" of exercises that characterize the ability of athletes to convey feelings and moods, through expressiveness, musicality, create artistic imagery [8; 11; 13]. In the composition of the esthetic component we included criteria with the following orientation: "musicality", "dancing", "illustrative expressiveness", "emotional expressiveness", does not contradict the research of specialists in sports with high esthetic requirements [5; 7; 8; 9 etc.].

"Musicality" – estimated by the degree of coordination of movements with tempo, rhythm, accents of music and the general nature (genre) of music.

"Dancing" – defined as the correspondence of the movements of a certain genre of the nature of music.

"Expressiveness" – n this work, we divided expressiveness into an illustrative and emotional:

"Illustrative" (or motive) – harmonious coordination of the movements of the hands, head, trunk, legs in postures, movements that most appropriately emphasize the direction and nature of the posture, gesture, fragment of the composition;

"Emotional expressiveness" – estimated by the ability to convey the nature of the musical accompaniment, the way, expressive facial expressions.

We proposed a two-point rating scale, which greatly simplified the testing procedure for the experts (tabl. 1).

In our opinion, such a scale is more concretized in assessing any degree of formation. Objective assessment in sports with a visual way to assess decreased significantly due to the primary confusion judges too complex rating scale and the need to integrate three or more levels of formation resulted in a non-specific evaluation. Taking into account the human factor, as much as possible, we have simplified the assessment scale.

For a more creative assessment, a score of 0,5 was allowed, which made it possible to get an estimate of "0,5" to "2,5". These criteria and indicators served as the basis for distinguishing the levels of the esthetic component of the motor activity of athletes in aerobic gymnastics.

Low level (<1–1,2 points) was characterized by the lack of: consistency of movements with the tempo and rhythm of music; according to predetermined dance motions dance genre and musical accompaniment; coordination of movements of hands, head, torso, legs that highlight the direction and nature of the posture; gesture in the presence of manifestations of emotions and feelings (facial expression), dictated by the nature of the music.

At a sufficient level (1,3–1,7) of the formation of the esthetic component: the movements are not always consistent with the tempo and rhythm of the music; not always correspond to a given genre of dance and music; movements of the arms, head, torso, legs that highlight the direction and nature of the poses are not always consistent; gestures are performed in the absence of manifestations of emotions and feelings (facial expression), dictated by the nature of the musical accompaniment.

The optimal level (1,8<2) was noted with: the consistency of movements with the tempo and rhythm of the music; according to predetermined dance motions dance genre and the musical accompaniment; coordination of movements of hands, head, torso, legs that highlight the direction and nature of the posture; there is a gesture at the manifestation of emotions and feelings (facial expression), dictated by the nature of the musical accompaniment.

For the purpose of determining the level of the esthetic component of motor activity, the average score for each athlete was calculated according to all criteria (*k*) according to the sum of the evaluations of the five experts. Table 2 shows the data of individual levels of the formation of criteria for choreographic preparedness.

Table 1

Criteria for the esthetic component of motor activity in aerobic gymnastics

Criteria	Indicators	Quantitative and qualitative assessment	
		2,5 points	1 point
Musicality	Coordination of movements with tempo, rhythm of music	Coherence presence	Lack of coherence
Dancing	Compliance with dance movements given dance genres and musical accompaniment	Coherence	Disparity
«Illustrative expressiveness»	Consistency of movements of the hands, head, trunk, legs, which emphasize the direction and nature of the posture, gesture	Coherence presence	Lack of coherence
«Emotional expressiveness»	A vivid manifestation of emotions and feelings (facial expressions), dictated by the nature of the musical accompaniment	Presence of the emotions that manifest	Lack of appropriate emotions, which manifest

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Table 2

The level of the formation of criteria for the esthetic component at various stages of long-term sports training (%)

Criteria	Initial training stage			Previous base preparation stage			Specialized base preparation stage		
	I	II	III	I	II	III	I	II	III
Musicality	15	25	60	33	32	35	13	28	58
Dancing	3	22	75	0	38	62	3	28	68
«Illustrative expressiveness»	2	50	48	0	10	90	0	27	73
«Emotional expressiveness»	18	72	10	0	10	90	0	25	75

Note. *I – optimal level, II – sufficient level; III – low level.*

At the stage of initial preparation, the best indicators were defined in the criterion of "emotional expressiveness". Among the athletes who were studied, the optimal level of "emotional expressiveness" was registered in 11 people, which is 18%). Athletes in the stages of preliminary basic training and specialized basic training are much inferior to younger athletes. In these stages the optimal level absent. A sufficient level of emotional expressiveness was identified in 72% of cases (43 people) during the stage. This is the best indicator for this stage, but by the next stage the amount of low level can reach 90% (fig. 1).

Comparative analysis of musicality indicators showed (fig. 2), at the stages of initial and specialized basic training, athletes significantly reduced the level of correspondence of dance movements with a given dance genre and musical accompaniment (60% and 58% respectively).

It is interesting that at the stage of preliminary basic training athletes on the criterion of "musicality" were distributed according to certain levels almost evenly (33% – optimal level, 32% – sufficient level, 35% – low level).

The data shown in figure 3 indicate a discrepancy between dance movements given dance genre and musical accompaniment at all stages of sportsmanship. A low level of dance is 75% (45 people) in the initial training stage, 62% (37 people) – in the preliminary basic training, 68% (41 people) in the specialized basic training.

A low percentage of the optimal level or complete absence of it characterizes "illustrative expressiveness" at all stages of sports training (fig. 4).

The lack of coordination of movements of the hands, head, trunk, legs, which emphasize the direction and nature of the posture, gesture, is defined in 90% (54 people) in the preliminary basic training stage. This is the worst indicator for this stage. Only slightly improved the results at the stage of specialized basic training (44 people have a low level, corresponding to 73%). It should be noted that at the stage of initial training in 50% of cases (31 people) a sufficient level of indicators was determined by the above criteria.

Conclusions

A quantitative and qualitative scale for assessing the esthetic component is created, which takes into account the criteria of «musicality», «dancing», «illustrative expressiveness», «emotional expressiveness».

These data define the parameters that have a significant impact on reducing the esthetic component in uneven contingent gymnasts. At the stage of initial training, the worst indicators were in the manifestation of "musicality" and "dance". At the stage of preliminary basic training, as well as at the stage of specialized basic training, "illustrative and emotional expressiveness" suffers significantly.

The prospect of further research is to determine ways to improve the esthetic component at all stages of long-term training of athletes.

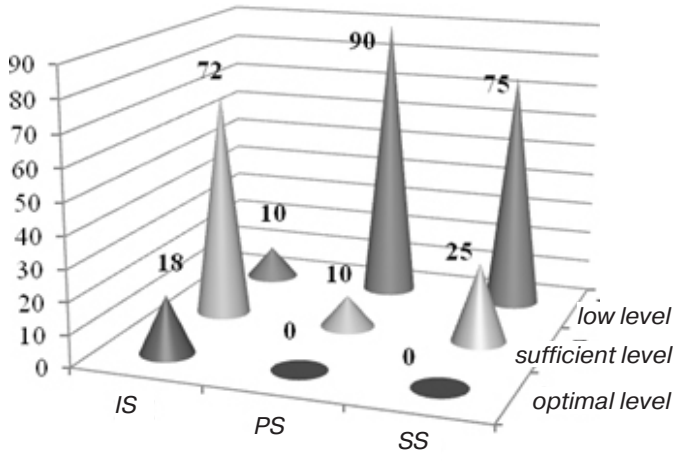

Fig. 1. Formation of the criterion "emotional expressiveness" of athletes at various stages of sports training (%): *IS – Initial training stage; PS – Previous base preparation stage; SS – Specialized base preparation stage.*

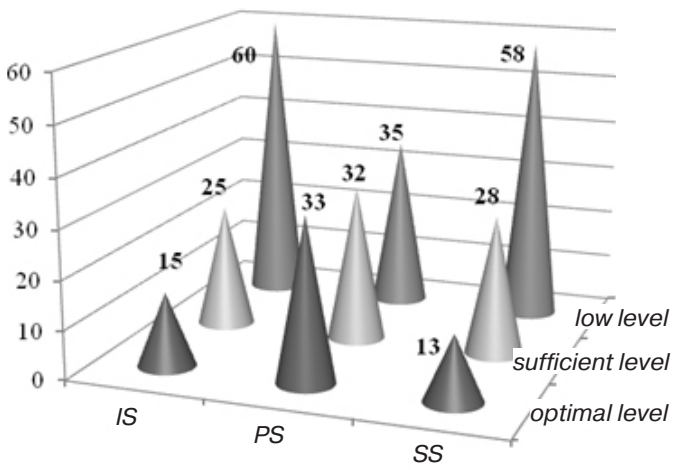

Fig. 2. Formation of the criterion "musicality" of athletes at various stages of sports training (%): *IS – Initial training stage; PS – Previous base preparation stage; SS – Specialized base preparation stage.*

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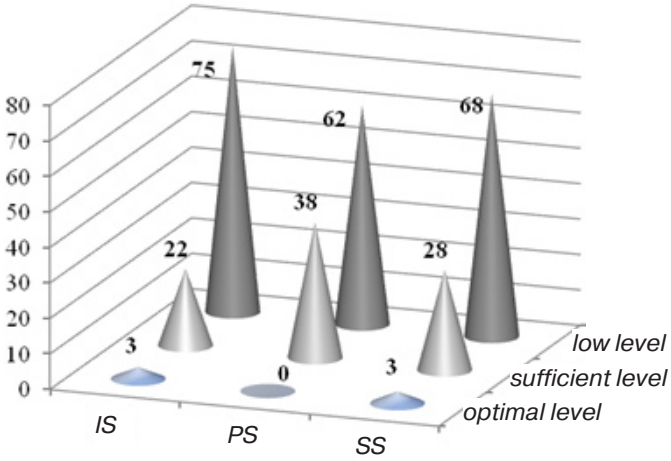

Fig. 3. Formation of the criterion "dancing " of athletes at various stages of sports training (%): *IS – Initial training stage; PS – Previous base preparation stage; SS – Specialized base preparation stage.*

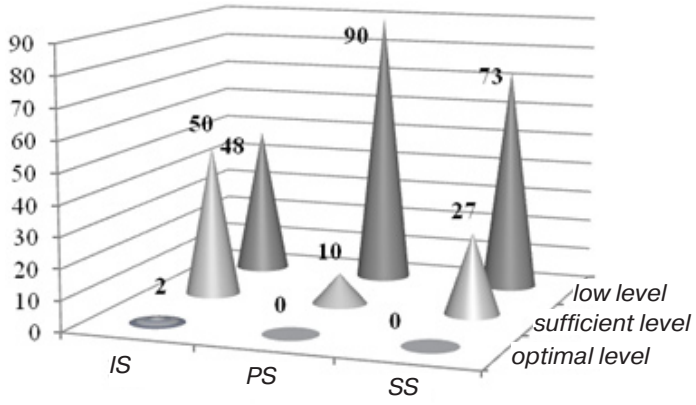

Fig. 4. Formation of the criterion "illustrative expressiveness" of athletes at various stages of sports training (%): *IS – Initial training stage; PS – Previous base preparation stage; SS – Specialized base preparation stage.*

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Interrelation of level of physical fitness with indicators of competitive activity at young wrestlers of the Greek-Roman style

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Purpose: *to define interrelation of level of physical fitness with indicators of competitive activity at young wrestlers of the Greek-Roman style.*

Material & Methods: *twenty young wrestlers, age of 12–13 years participated in the researches. The pedagogical testing of level of physical fitness was held, the analysis of competitive activity was carried out, and methods of mathematical statistics were applied.*

Results: *the strong statistical interrelation between interval of the successful attack in competitive fights and 10 by backward rolls (r=0,718) is established; between active maintaining duel meet and speed of performance of 15 throws of the partner by tuck (r=0,703).*

Conclusions: *it is defined that indicators of the general and special high-speed and power endurance are influenced on activity of maintaining duel meets at wrestlers of 12–13 years old; indicators of effectiveness and efficiency of competitive activity are influenced on the level of development of high-speed and power preparedness and dexterity.*

Keywords: *young wrestlers, correlation, physical fitness, competitive activity.*

Introduction

Wrestling is one of the most difficult sports of rather technical-tactical preparedness. Number of experts [1; 3; 7; 16; 20] considers that physical, mental and theoretical training of wrestlers is shown in their technical actions from which extent of improvement both ultimate result of wrestle and success of performance of sportsmen at competitions depends.

The continuous increase of competition on “the international carpet” forces to look for more effective remedies and methods of the training process [6; 9; 12; 13; 15].

All complex problems of improvement of motive skill of sportsmen are naturally displayed in modern technique of technical training of wrestlers. However here, as well as in other sports, there are the characteristic specifics which define finally skill level of sportsmen, therefore already it is important to lay the foundation for technical-tactical arsenal at the stage of the previous basic preparation [5; 8; 11].

Defining the structure and the maintenance of means and methods of training of young wrestlers at stage of the previous basic preparation, it must be kept in mind that the progress of development of technical actions during this period significantly depends on the level of development of different types of endurance, high-speed and power qualities and dexterity [4; 10; 17].

Communication of the research with scientific programs, plans, subjects

The research is executed according to the plan of RW of Kharkiv State Academy of Physical Culture.

The purpose o the research

To define interrelation of level of physical fitness with indicators of competitive activity at young wrestlers of the Greek-Roman style.

Research tasks:

1. To establish the level of physical fitness and indicators of competitive activity at young wrestlers of the Greek-Roman style.

2. To define the extent of correlation communication between the level of physical fitness and indicators of competitive activity at young wrestlers of the Greek-Roman style.

Material and Methods of the research

20 young sportsmen who are engaged in section on Greco-Roman wrestling of CCYSS No. 9 of Kharkiv participated in the research. The age of the investigated made 12–13 years old, experience of classes by wrestling 3–4 years.
The research was carried out in three steps.

The analysis of references was carried out and experience of specialists in questions of physical training of young wrestlers and features of competitive activity in wrestling at the initial stages of sports specialization was generalized at the first stage.

The level of development of physical fitness in tests was de-

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fined at the second stage (October in 2016): run on 30 m (s); standing long-jump (sm); the maximum number of pull-ups on cross-piece (number of times); the maximum number of bendings-extensions of hands in emphasis, lying (number of times); raising of trunk, lying on back for 30 s (number of times); hung on the bent hands on cross-piece (s); shuttle run of 3x10 m (s); run on 1000 m (s); 10 forward somersaults (s); 4, 10, 15 throws of the partner by tuck (s). Testing was held on the educational-training classes after careful warm-up.

Testing of technical-tactical preparedness of young wrestlers was held in November and December, 2016, during the competitions (2 competitions). Competitive wrestles of the investigated were fixed on the video camera then the careful analysis of each wrestle was carried out.

The standard methods in practice of wrestling were used for the research of competitive activity of young wrestlers. The following indicators were registered: activity (s); attack interval (s); interval of the successful attack (s); efficiency (%); effectiveness (points) [2; 14; 18; 19].

The data of tests of physical fitness and indicators of competitive activity of young wrestlers were processed with application of methods of mathematical statistics at the third stage.

Research methods: analysis of scientifically-methodical literature, pedagogical observation and testing, analysis of protocols and video records of competitive activity of young wrestlers; methods of mathematical statistics.

Results of the research and their discussion

Results of our research are presented in the table. The correlation analysis of interrelation of the level of development of motor abilities with indicators of competitive activity showed that such indicators of preparedness as muscular strength of hands and back (test of pull-up on cross-piece, respectively – r=0,549 and r=0,523) and high-speed and power abilities significantly influence on effectiveness and on interval of the successful attack in wrestles (test run 30 m, respectively – r=0,549 and r=0,553).

Such component of power preparedness as power endurance (test of bending and extension of hands in emphasis, lying) has average statistical interrelation with indicators of activity of conducting fight (r=0,524) and interval of attack (r=0,647).

Results of the research showed that efficiency of technique and effectiveness have average statistical interrelation from times of performance of 10 forward somersaults, respectively – (r=0,648) and (r=0,672) and shuttle run of 3x10 m, respectively – (r=0,527) and (r=0,505). Thus, the development of coordination abilities of sportsmen significantly influence on efficiency and effectiveness of competitive activity of young wrestlers of 12–13 years old.

The research of interrelation of the level of development of motor abilities with indicators of competitive activity showed that influence of the level of development of endurance on efficiency of competitive activity of young wrestlers is not really big at this age. Results of the research showed strong statistical interrelation of activity of actions in wrestles with special high-speed and power endurance (performance of 15 throws of the partner by tuck on speed – r=0,703, average statistical interrelation with static power endurance (hung on the bent hands on cross-piece) – r=0,675 and with dynamic power endurance (bending and extension of hands in emphasis, lying) – r=0,524). The powerful statistical interrelation between interval of the successful attack with coordination abilities is also recorded (test of 10 forward somersaults – r=0,647). Mainly weak statistical interrelation is found in other tests.

Conclusions

1. Results of testing of physical fitness of young wrestlers indicate that young sportsmen try to use strengths of preparedness in competitive activity first of all. So, young men who have advantage in power component of preparedness try to be more active in wrestles, imposing to rivals rigid manner of fight. They often applied such tactical actions as stiff, stamping, shaking of the rival to his removal from balance and ex-

Table

Interrelation of physical fitness and indicators of competitive activity of young wrestlers (n=20)

№	Indicators	Activity	Interval of attack	Interval of the successful attack	Efficiency	Effectiveness
1	Run on 30 m	0,248	0,193	**0,553**	0,472	**0,514**
2	Standing long-jump	0,231	0,257	0,306	0,401	0,222
3	Pull-ups on cross-piece	0,234	0,307	**0,523**	0,418	**0,549**
4	Bendings-extensions of hands in emphasis lying	**0,524**	**0,647**	0,217	0,162	0,202
5	raising of trunk, Lying on back for 30 s	0,181	0,233	0,345	0,273	0,343
6	Hung on the bent hands on cross-piece	**0,675**	0,424	0,277	0,312	0,307
7	Shuttle run of 3x10 m	0,129	0,215	0,489	**0,527**	**0,505**
8	Run on 1000 m	0,343	0,322	0,186	0,143	0,137
9	10 forward somersaults, s	0,176	0,233	**0,718**	**0,648**	**0,672**
10	4 throws by tuck	0,305	0,327	0,287	0,323	0,315
11	10 throws by tuck	0,489	0,408	0,305	0,314	0,289
12	15 throws by tuck	**0,703**	0,476	0,290	0,356	0,311

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haustion of energy resources in their duel meets.

Young wrestlers, in who coordination abilities are well developed, carry out competitive wrestles in the game style, applying such tactical actions as expectation, advancing, and repeated attack. Activity in duel meets at them is not really high, but if they do attempt to perform the technique, then this operation will be instant and unexpected for the rival.

Sportsmen who have advantage in endurance in wrestles showed high intensity, often won with the minimum advantage, showed the greatest effectiveness at the end of fights.

2. It is established that the progress of competitive activity and the development of technical actions at the stage of the previous basic preparation significantly depends on the level of development of different types of endurance, high-speed and power qualities and dexterity.

3. It is certain that activity of maintaining duel meets at wrestlers of 12–13 years old is influenced by indicators of the general (bending and extension of hands in emphasis, lying – r=0,524; hung on the bent hands on cross-piece – r=0,675) and special (performance of 15 throws of the partner by tuck on speed – r=0,703) high-speed and power endurance. The level of development of coordination abilities influence on indicators of efficiency and effectiveness of competitive activity (time of performance of 10 forward somersaults, respectively – (r=0,648) and (r=0,672) shuttle run of 3x10 m, respectively – (r=0,527) and (r=0,505)).

The average statistical interrelation with dynamic power endurance has interval of attack (bending and extension of hands in emphasis, lying – r=0,647). Such indicators of preparedness as muscular strength of hands and back (test of pull-up on cross-piece – r=0,523), high-speed and power abilities (test run 30 m – r=0,553) and coordination abilities (time of performance of 10 forward somersaults – r=0,718) influence on interval of the successful attack.

Prospects of the subsequent researches consist in finding of correlation dependence between indicators of competitive activity and psychophysiological characteristics at young wrestlers of the Greek-Roman style.

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Physical and psycho-sensory abilities as the basis of motivation of students to systematic section classes in the system of physical education of HEI

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Purpose: *to develop practical recommendations for students of KhSAC, concerning the choice of sports section taking into account the level of their psychophysiological and motor abilities.*

Material & Methods: *theoretical analysis and generalization of scientific and methodical literature, pedagogical testing, methods of mathematical statistics.*

Results: *statistically significant interrelations of psychological indicators with indicators of motor abilities of students, who took part in the research, are revealed by results of the research. Differences of results of the pedagogical testing of students of different specialties are found, practical recommendations which allow students of KhSAC, taking into account their desires, psychological and motor abilities, to choose the sports section corresponding to them, are developed.*

Conclusions: *individual properties of students of KhSAC of different specialties are defined on the basis of results of assessment of psychophysiological and motor abilities. Practical recommendations for students of KhSAC are developed, concerning the choice of sports section taking into account the level of their psychophysiological and motor abilities.*

Keywords: *psychophysiological abilities, sensomotor reactions, specific impressions, pedagogical testing, motor abilities, sports section.*

Introduction

Motor activity remains at the present stage of improvement of the system of national education by the effective method of the solution of priority tasks of student's youth, in particular, of effective professional activity, prevention of diseases, active living position. The organization and the maintenance of motor activity are primordial in the achievement of all results that will provide the professional operability and the appropriate level of health [3; 5; 8].

The process of physical education in higher education institutions of unsporting profile is directed, first of all, not to the achievement of high sports results, and to awakening of interest in classes, by means of the chosen sports and complex development of motive qualities. It is necessary to consider potential adaptation opportunities of students, to use optimum their physical and intellectual potential by drawing up programs for physical education in these higher education institutions [3; 7].

Control of movements – the difficult process depending on many factors including – from speed of carrying out nervous impulse on structures of the central nervous system that traditionally belongs to characteristics of psycho-sensory opportunities [2; 4; 5].

Psycho-sensory indicators reflect one of aspects of functional condition of human body [4; 5; 7; 9] which account will allow the teachers, who are carrying out the process of physical education in higher education institution, to recommend to students this or that sports section that, eventually, will favorably affect both vocational training, and their functional and psychological state [3].

The purpose of the research

To develop practical recommendations for students of KhSAC at the choice of sports section taking into accounts the level of their psycho-sensory and motor abilities.

It is necessary to solve *the following problems* for realization of this purpose:

1. To carry out the analytic survey of available scientific-methodical literature concerning physical education of students in higher educational institutions of unsporting profile.

2. To determine the level of psycho-sensory and motor abilities of students of KhSAC.

3. To make the comparative analysis of the results, which were received during the research, and on its basis to develop prac-

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tical recommendations for students of KhSAC at the choice of sports section taking into account the level of their psycho-sensory and motor abilities.

Material and Methods of the research

Psycho-sensory methods: definition of simple visual reaction, definition of reaction to the moving object, definition of reaction of the choice from the static objects, definition of feeling of speed, determination of accuracy and speed of reproduction of the set line, tapping-test. The complex of tests by the assessment of sensomotor reactions and specific perceptions, which are developed for tablet computers [1], was used in the research.

Frequency of lifting of hip to the set height (running in place 15 s), the test for definition of muscular strength of stomach, time of performance of complex relay were registered from indicators of physical fitness [6].

Girls of Kharkiv state academy of culture (n=40) have participated in the research, the main group for health reasons, the following specialties: "Modern choreography" – 14 persons, "Information, library and archiving" – 13, "Management" – 13, not having sports categories. The age of girls, who participated in the research, has made 18,3±0,2 (years old), height 167±1,55 (sm), weight 58,5±1,72 (kg).

Results of the research and their discussion

Results of students on psychophysiological tests and tests for assessment of motor abilities were distributed on three groups on the level of performance of test tasks during the research – "High level", "Average level" and "Low level" (tab. 1, 2).

It is noted that results of the pedagogical testing of girls, who go in for modern choreography, are better, than results of girls of specializations "Information, library both archiving" and "Management".

So, the greatest differences in results of assessment of psycho-sensory abilities are noted:
– results of choreographers are better on 17,6%, than results of students of the specialization «Management», and they are better on 17,4%, than results of students of the specialization «Information, library and archiving» at the execution of the test «Simple visual reaction»;
– results of choreographers are better on 14%, than results of students of the specialization «Management», and they are better on 9,9%, than results of students of the specialization «Information, library and archiving» at the assessment of feeling of speed.
Results of choreographers, which are shown in complex relay, are on better 20,6%, than results of students of the specialization «Information, library and archiving», and they are better on 14,7%, than results of students of the specialization «Management» at the assessment of motor abilities (fig. 1).
The aforesaid demonstrates that motive activity of choreographers assumes the sufficient motor activity, which is connected both with manifestation of precision movements, and with manifestation of certain motor abilities, such as: dexterity, speed, force.
Results of the pedagogical testing of girls of specializations «Information, library and archiving» and «Management» concede to results of choreographers, and it is connected with the fact that professional activity of librarians and managers does not assume special motive skills.

The correlation analysis is carried out for the determination of interrelations between indicators of psycho-sensory and motive abilities. Statistically significant correlation communications at the assessment of simple motility and force (r=0,37), simple motility and dexterity (r=0,4), simple visual reaction and frequency of lifting of a hip to the set height in running on the place for 15 s (r=0,33), simple visual reaction and dexterity (r=0,3), reaction to a moving object and power abilities (r=0,4), reaction to a moving object and frequencies of lifting of a hip to the set height in running on the place for 15 s (r=0,36), reactions to a moving object and dexterity (r=0,34), result in the tapping-test (30 s) and power abilities (r=0,33) are revealed.

The correlation analysis confirms the interrelation of psycho-sensory indicators with indicators of motive abilities of the students who participated in the research.

Practical recommendations, which will allow the students of KhSAC, taking into account their desire, psycho-sensory and motive abilities, to choose the sports section corresponding to them are developed on the basis of the comparative analy-

Table 1

Indicators of psycho-sensory abilities of students of KhSAC (n=40)

№	Psycho-sensory tests	High level	Average level	Low level
1	Simple motility (quantity of times)	>28,3	28,3–25,0	<25,0
2	Resistance to the forcing-down signals (%)	>88,1	88,1–77,6	<77,6
3	Simple visual reaction (ms)	<203,6	203,6–238,5	>238,5
4	Reaction of the choice (ms)	<548,0	548,0–665,9	>665,9
5	Reaction to a moving object (ms)	<13,9	13,9-29,4	>29,4
6	Accuracy of reproduction of the set line (mm)	<324,4	324,4–541,9	>541,9
7	Speed of reproduction of the set line ($mm \cdot s^{-1}$)	>94,4	94,4–56,5	<56,5
8	Feeling of speed (ms)	<35,0	35,0–76,0	>76,0
9	Tapping-test (10 s)	>81,0	81,0–62,6	<62,6
10	Tapping-test (30 s)	>231,0	231,0–177,4	<177,4

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sis of the received results. In particular, classes by sports and rhythmic gymnastics with a primary orientation are recommended to students who have the low level of psycho-sensory and motive abilities for the development of motive abilities. The students, who have the sufficient level of development of motive abilities, but the low level of development of psycho-sensory abilities, can be recommend among sections which are cultivated in KhSAC, classes by table tennis and volleyball. The students, having the high level of development of psycho-sensory abilities, but the insufficient level of development of motive abilities, can be recommend classes in gym. The students, who have rather high level of development of both psycho-sensory and motive abilities, can be offered classes in such sections: chess, checkers.

Conclusions

1. Despite of numerous researches in the system of physical education of students, the data, which would recommend indicators of abilities to certain sports for students of unsporting educational institutions, are not observed in literature.

2. The given results of the research revealed the considerable advantage of physical and psycho-sensory abilities of students of the specialization modern choreography.

3. Practical recommendations for students of KhSAC for definition of types of sports sections are developed on the basis of the analysis of literature, practical experience and materials of the research: sports (not contact), rhythmic gymnastics, shaping.

Prospects of further researches are connected with more detailed analysis of the process of physical education in KhSAC and search of ways of increase in interest of students in classes in sports sections of higher education institution.

Table 2

Indicators of motor abilities of students of KhSAC (n=40)

№	Assessment of motor abilities	High level	Average level	Low level
1	The test for assessment of muscular strength of press (quantity of times)	>27,6	27,6–21,3	<21,3
2	Run with high lifting of a hip (quantity of times)	>45,1	45,1–36,8	<36,8
3	Complex relay (s)	<8,3	8,3–9,6	>9,6

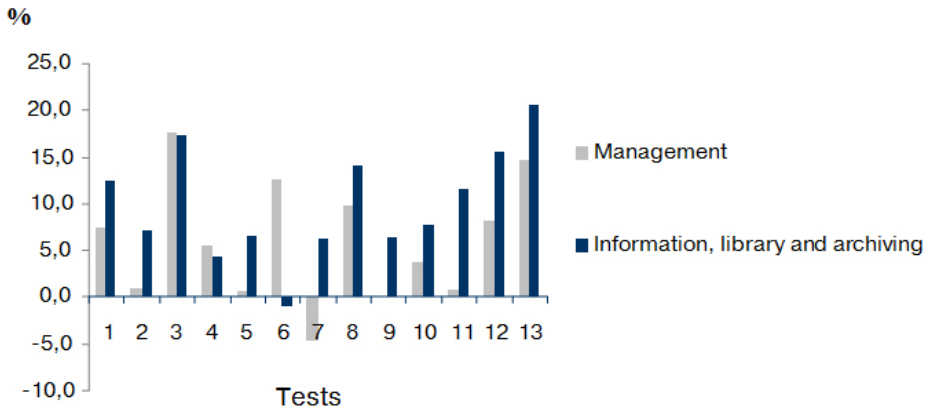

Fig. 1. Differences of results of pedagogical testing of students of the specialty "Modern Choreography" from results of testing of students of specialties "Management" and "Information, Library and Archiving": *1. Simple motility. 2. Resistance to the forcing-down signals. 3. Simple visual reaction. 4. Choice reaction. 5. Reaction to a moving object. 6. Accuracy of reproduction of the set line. 7. Speed of reproduction of the set line. 8. Feeling of speed. 9. Tapping-test (10 s). 10. Tapping-test (30 s). 11. The test for assessment of force of muscles of press. 12. Run with high lifting of a hip. 13. Complex relay.*

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The organization and conducting of paratriathlon competitions

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Purpose: *to analyze the system of the organization and conducting of competitions among paratriathletes concerning compliance with specifics of this sport – the consecutive overcoming of the combined distance by means of different types of physical activity.*

Material & Methods: *the analysis of conditions of the organization and conducting of competitions of paratriathletes in six competitive categories was made on the basis of studying of articles of the UNO Convention on the Rights of physically disabled people, the regulatory base of the international federations of triathlon and Federation of triathlon of Ukraine.*

Results: *the compliance of the organization and conducting of paratriathlon competitions concerning specifics of continuous triathlon with certain modifications of passing of stages of the combined distance by sportsmen with limited physical capacities is revealed.*

Conclusions: *competition rules on paratriathlon, which allow conducting the fair competitive competition in the spirit of fair, competitive and safe rivalry to athletes with different physical deviations, are developed for more active attraction to sports activities, and also for the purpose of removal of discrimination barriers from physically disabled people.*

Keywords: *assistant, classification, leader, continuous triathlon, paratriathlete, paratriathlon, competitive categories*

Introduction

According to experts, till 650 million of physically disabled people lives on our planet, including about 3 million today – in Ukraine [8].
December 13, 2006 the General Assembly of the United Nations adopted the first new UNO Convention on Human Rights in the XXI century – the UNO Convention on the Rights of physically disabled people [11].

Physically disabled people have to have on an equal basis with others opportunity to participate in sporting events according to the paragraph 5 of the article 30 of the UNO Convention [8; 11]. The rapid development of the Paralympic movement on different types of sport involving in the sphere of people of various status and age began in this regard in the world. The increasing popularity on an equal basis with traditional competitions on continuous triathlon is gained by paratriathlon which is carried out under the auspices of the International Federation of Triathlon (ITU) and the International Paralympic Committee (IPC) [15].

Sportsmen with limited physical capacities (without their status) on an equal basis with everybody took part in overcoming of the combined distances, various on extent, and showed high sports results during the formation of paratriathlon [1; 4; 5]. So, the triathlete with the amputated leg to the knee competed (on sports artificial limb), and he has shown the best time in overall classification at the final running stage from 250 participants, having overcome marathon running for 2 hours 49 minutes that can unambiguously be regarded as commission of sports feat in the open championship of Hungary "Extreme Mam Hungary, 2005" (Nadyatadt), carried out under patronage of the World corporation of triathlon (WTC) at the classical distance of 226 km 257 m (3,862 km of swimming + 180,2 km of cycle driving + 42,195 km of run) [4; 5; 6].

To create equal conditions for sportsmen with different physical deviations in consecutive overcoming of the combined distance by means of different types of physical activity, ITU developed the corresponding rules of the organization and competitions on paratriathlon in ITU P.2 taking into account the status of participants [15; 16].

Considering that preparation and participation in competitions on paratriathlon – one of the perspective directions of the development of Paralympic sport in the world, and the Federation of Triathlon of Ukraine (FTU) began to propagandize this innovative direction in invasport in our country, only in one type of the program so far – triathlon and at one sprint distance (0,75 km of swimming + 20,0 km of cycle driving + 5,0 km of run) [6; 13; 14].

However, the questions concerning features of the organization and competitions in paratriathlon taking into account physical defeats of sportsmen according to the rules of ITU P.2 and also the degree of compliance to their main requirement of thriathlon – continuous and consecutive overcoming of the combined distance by means of swimming, cycle driving and run, are far not completely studied [2; 3; 7; 10; 15; 17; 18].

The purpose of the research: to analyze the system of the organization and competitions among paratriathletes by the rules of ITU P.2 on compliance to their specifics of this sport – consecutive overcoming of the combined distance by means of different types of physical activity.

Research problems:

1. To open conditions of the organization and competitions on

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paratriathlon on the basis of the international rules.

2. To define the degree of compliance of competitions in the rules of ITU P.2 to specifics of continuous triathlon among paratriathletes.

3. To prove need of involvement of physically disabled people to paratriathlon classes in Ukraine.

Material and Methods of the research

1) studying and synthesis of data literary and Internet sources, normative documents of the UNO Convention on the Rights of physically disabled people, IPC, ITU, ITU P.2, WTC, FTU and other international federations for assessment of degree of study of problem and definition of compliance of rules to the main requirement which is the cornerstone of competitive process in paratriathlon;

2) analysis of conditions of the organization and competitions in paratriathlon among sportsmen with different physical defeats by the rules of ITU P.2 for the purpose of identification in them the essential distinctions influencing the sports results, which are shown by paratriathletes when passing of the combined distance.

Results of the research and their discussion

Competitions on paratriathlon within one sporting event have to be held in common, according to the Constitution of ITU during competitions in types of the program triathlon and duathlon under the auspices of ITU in which winners are also defined and on age groups (18–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60–64, 65–69, 70–74, 75–79 years old) [12; 13; 16].

The World Cups and the continental championships on paratriathlon among sportsmen with limited physical capacities in different types of the program are held separately [13; 15].

That paratriathletes could compete with different physical defeats together in overcoming of the combined distance and conduct the private fight in the spirit of fair, competitive and safe rivalry; they are divided by the rules of ITU P.2 into six competitive categories (TRI) depending on classification of condition of their health:

TRI-1	Paraplegia (defeat by paralysis of the lower extremities), quadriplegia (paralysis of the upper and lower extremities), amputation of two legs.
TRI-2	Serious damage of legs, including amputation of leg higher than knee.
TRI-3	Multiple sclerosis, muscular dystrophy, cerebral palsy, amputation of two lower extremities, paralysis of several extremities.
TRI-4	Paralysis of hands, amputation of higher and lower than elbow, defeat in both upper extremities.
TRI-5	Average damage of legs, including amputation below knee.
TRI-6	Vision disorder (ITU after consultation with IPC in 2013 subdivided this category into two subgroups: **6**a – for completely blind sportsmen and **6**b – for sportsmen with vision disorders) [12, 13, 15].

Note. *The sportsmen having physical defeats less than 15% on any extremity are not allowed for participation in competitions on paratriathlon in categories TRI-1, TRI-2, TRI-3, TRI-4, TRI-5, and in category TRI-6b – having maximum of sight 20/200 at the best adjustment. Also the sportsmen, who are incapable to competitions to transfer the heat or cold having artificial joints (endoprostheses), foreign bodies (spare-part surgery), kidney dialysis, hearing disorder, are not allowed. Besides, paratriathletes of categories TRI-1, TRI-6 are not allowed to competitions in the following types of the program of continuous triathlon: cross-country duathlon, cross-country triathlon and winter triathlon [15].*

Conditions of the organization and carrying out paratriathlon on the rules of ITU P.2 are identical both to men, and to women (often they are carried out in common and include number of consistently held events before start and observance of special modifications during the competitions) [12; 13; 15].

Classification. All participants of the competitions on paratriathlon, which are held under the auspices of ITU, have to have the international classification on compliance to the minimum criteria of physical defeat in the category [15].
Paratriathletes, who need to undergo the procedure of classification, have to visit the classification commission prior to the competitions and on the basis of the presented medical examination (the documents describing physical defeats of the sportsman), photo (3,5 cm x 4,5 cm), personal survey to be classified by the ITU qualifier **[**15].

Assistants and leaders. Assistants and leaders in the following categories are relied for rendering the specific help to sportsmen with limited physical capacities during competitions on paratriathlon:

TRI-1 – no more than two assistants;

TRI-2, TRI-3, TRI-4, TRI-5 – one assistant;

TRI-6 – one leader (can also combine and function of the assistant) [12; 13; 15].

Assistants help participants with artificial limbs and other devices, lift sportsmen on the bicycle and wheelchair and remove from them, take off diving suit and clothes, eliminate arisen malfunction of the bicycle and "racing wheelchair" on conducted - and running stages of competitions [12; 13; 15].

Leaders help to be guided to participants with vision disorder by distances of continuous triathlon, at the same time they have to be not younger than 18 years old and the same sex with them. If they earlier participated in the international competitions of ITU, then not less than one year after their last performance have to pass before they are able to become the leader for the sportsman in paratriathlon [12; 13; 15; 16].

Note. *All assistants and leaders have to follow competition rules of ITU P.2, and also requirements of referees. Any their actions, regarded by the referee as stimulation of the sportsman to move forward (to pull it or to push), are punished by penal time or disqualification of the participant.*

Briefing. Meetings are surely held by the technical delegate (TD) before the competitions on paratriathlon for participants (coaches can be also present).

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Sportsmen, assistants, leaders are registered before entrance on briefing. Participants, who are not present at meeting, but warned about this TD, will be displaced on 10 positions concerning their previous position on pre-starting construction back. Participants, who are not present at briefing and not warned TD about the absence, can be not allowed to competitions or are displaced on the last prestart position (at the discretion of TD).

On the end of briefing, depending on competitive category, the starting package is provided to competitors, in which are:

TRI-1 – red hat for swimming, 6 self-adhesive numbers-stickers (3 for helmet, 1 for the hand-operated bicycle, 1 for "racing wheelchair", 1 for daily wheelchair), 3 breast numbers (1 for the sportsman, 2 for assistants);

TRI-2, TRI-3, TRI-5 – yellow or green hat for swimming, 7 stickers (3 for a helmet, 1 for a bicycle, 3 for artificial limbs / auxiliary devices), 2 breast numbers (1 for a sportsman and 1 for an assistant);

TRI-4 – yellow hat for swimming, 7 stickers (3 for a helmet, 1 for a bicycle, 3 for artificial limbs), 2 breast numbers (1 for a sportsman and 1 for an assistant);

TRI-6 – 2 hats for swimming (green for a sportsman, white for a leader), 7 stickers (6 for two helmets and 1 for a cycle-tandem), 1 breast number for a sportsman and 1 breast number for a leader with the inscription "GUIDE".

Note. *The local organizing committee (LOC) after the briefing also gives out the t -shirt, corresponding to their status to the registered assistants and leaders.*

Just before start participants of race with the assistants and leaders undergo pre-starting registration. At the same time the sports equipment and artificial limbs of sportsmen have to be identified by the self-pasted numbers (compliance of LOC is checked) [12; 13; 15].

Transit (transitional) zone. All sports equipment, artificial limbs, crutches, canes of the sportsman have to be in the specially allotted place in the transit zone according to his competitive category and bib number (if there is no "disguise zone"). Only assistants and leaders can be in the transitional zone, except sportsmen.

Rules of conduct in swimming zone. The diving suit in swimming segment is allowed to be used at any temperature, it is obligatory to put on at actual water temperature 18^0C and below.

Note. *Actual water temperature is analyzed, in case, air temperature is lower than water temperature, by calculation 0,5 degrees on each degree of difference between air temperature and water (for example, actual (calculated) water temperature will make 17^0C at water temperature 18^0C and air temperature 16^0C).*

Considering the raised safety rules when carrying out swimming stage among sportsmen with limited physical capacities, they are in order of the competitive categories on the line of start (and in swimming hats of the color): **TRI-6, TRI-5, TRI-4, TRI-3, TRI-2, TRI-1**. At the same time assistants bring swimmers of category **TRI-1** in water after when all five categories of sportsmen are already in it.

The start in competition on paratriathlon is given when all swimmers are in water, i.e. from water.

Note. *Sportsmen with vision disorders of category TRI-6 during swimming have to be attached to the leader (around waist, leg or foot), and at athletes of category TRI-1 during this stage of leg have to be connected between shin and knee [12; 13; 15].*

It is allowed paratriathletes to use any way of swimming.

Use by sportsmen during swimming of additional objects (flippers, vests and other devices facilitating movement in water), and also swimming with artificial limbs and orthoses, that will lead to disqualification, is forbidden.

Passing of swimming stage by sportsmen is strictly regulated on time for all categories and should not exceed at sprint distance (750 m) – 45 minutes, at the Olympic distance (1500 m) – 1 hour 10 minutes, on double Olympic (3000 m) – 1 hour 40 minutes, on triple Olympic (4000 m) – 2 hours 15 minutes.

If the paratriathlete does not keep within the taken-away limit of time and more than 100 meters is until the end of heat, then he acts from competitions (if less than 100 meters – continue to participate) [9; 12; 13; 14; 15].

LOC has to provide in "exit zone from water" presence of at least 12 assistants, who will help swimmers to leave with limited physical capacities water and to reach transit zone, on end of the first stage of continuous triathlon.

Depending on color of swimming hat on the head of the participant of competitions, assistants give them the following help:

red – the sportsman needs to be lifted from water and to carry in transit zone;
yellow – the sportsman needs to be supported during exit from water to transit zone;
green, white – the sportsman does not need the help.

Sportsmen by means of assistants change clothes, put on the registered artificial limbs, take seat on "bicycles" and in the continuous sequence start passing of the second piece of the combined distance in transit zone [12; 13; 15].
Cycle stage. Depending on competitive category at this stage, sportsmen use specific bicycles for paratriathlon (according to the rules of ITU P.2 section 5.2), but all of them have to correspond to the basic principles of design of the International Bicycle Union (UCI) and be set in motion only by means of force of hands or legs (but not simultaneous efforts).

Tricycles with the manual drive in "the lying position" (dimensions: no more than L – 250 cm, W – 70 cm, the existence of rear-view mirror is obligatory) are used by paratriathletes in category **TRI-1**.

Tricycles in "sitting position" (dimensions: no more than L – 200 cm, W – 95 cm) are used by sportsmen in categories **TRI-2, TRI-3, TRI-4, TRI-5**.

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Note. *All tricycles have to be equipped behind (at the level of the plug) by protective horizontal bar for prevention of hit in inter-wheel space of forward wheel of the bicycle going behind, at the same time all bicycles have to be equipped with brakes.*

Cycle tandem (the double racing bicycle) is used by sportsmen in category **TRI-6**. The leader occupies forward sitting, paratriathlete – back. The cycle-tandem moves by means of at the same time ongoing efforts of two participants, at the same time the leader also steers the vehicle on the track of cycle stage.

Note. *Carrying out cycle stage on the track having bias more than 12% is not allowed.*

Considering the different speed of movement of sportsmen of different competitive categories, they should not interfere with other cyclists when overtaking.

Sportsmen get again to transit zone, where assistants help them to pass to other type of physical activity on end of cycle stage and to go to overcoming the final stage of the combined distance.

Note. *The helmet on participants of cycle race has to be put on the head both will clasp prior to the movement and is taken off only after end of distance (sportsmen of category TRI-1 remove it after end of running stage) [12; 13; 15].*

Rules of conduct at running stage. The run competition in paratriathlon is initiated in transit zone. Participants of categories **TRI-2, TRI-3, TRI-4, TRI-5** can use artificial limbs, crutches, canes at this stage. Sportsmen of category **TRI-6** have to put on "black glasses" corresponding to their status and to be in them during run, at the same time their leader has to run all the time at distance no more than half-meter nearby, and during crossing of finishing line – to be sideways or behind.

Note. *Leaders in category TRI-6 are forbidden to set speed to the sportsman at any stage of competitions.*

Sportsmen of category **TRI-1** overcome running distance on "racing wheelchair" which has two big wheels (diameter of 70 cm) with round manual contours and one small (diameter of 50 cm).

Bicycle helmet has to be put on the head on the participant of this category during "run" and no part of his lower extremities should touch the earth during the movement.

Violation of the above rules of competitions on paratriathlon by paratriathletes, assistants, leaders leads to charge of penal time or disqualification of the participant (to the discretion of the referee).

Note. *Finding of guide dogs both in transit zone, and at the combined distance of continuous triathlon is strictly forbidden by competition rules of ITU P.2 [12; 13; 15].*

Conclusions

It is possible to draw the following conclusions on the basis of the conducted research:

1. The rules ITU P.2, which are developed according to key provisions of the UNO Convention on the Rights of physically disabled people, the International Paralympic Committee and the Constitution of the International Federation of Triathlon lie at the heart of the organization and competitions on paratriathlon.

2. The competitions among paratriathletes, which are held by the rules of ITU P.2, in general, correspond to the basic rule of continuous triathlon with the specific changes in passing of stages of the combined distance caused by physical defeats of sportsmen.

3. Federation of Triathlon of Ukraine on the basis of the rules ITU P.2 developed normative documents on the organization and competitions on paratriathlon in our country, and also defined order, conditions and requirements, which are necessary for assignment of sports categories and ranks in this sport for the purpose of removal of the discrimination barriers, which are connected with questions of disability and more active involvement in sports activities of physically disabled people.

Prospects of further researches

The subsequent researches will be directed to the determination of temporary coefficient which application gives the chance to unite paratriathletes with various extent of physical defeat in one competitive category and to fight for medals in individual competition on the competitive basis.

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The factorial structure of professionally-applied physical fitness of students of railway specialties

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Purpose: *to define the factorial structure of professionally-applied physical fitness of students – future electrical engineers of railway transport.*

Material & Methods: *analysis and synthesis of references, questioning, anthropometry, testing, functional tests, and methods of mathematical statistics (the factorial analysis) with application of the computer program "SPSS 17.0". 50 students (young men) of Ukrainian state railway university participated in the research.*

Results: *the ratio of means of physical culture which are expedient to use for the optimization of professionally-applied physical training of future specialists of the railway branch is defined.*

Conclusions: *the factorial analysis allowed to distribute means of physical education as follows: physical exercises which are directed to the increase in physical working capacity and overall physical fitness – about 40%; exercises on the development of power qualities – 25%; exercises on the development of high-speed and power endurance – 15%; means which are allocated for the improvement of functions of attention and kinetic sensitivity – 10%; exercises which are directed to the increase in special working capacity – 10%.*

Keywords: *professionally-applied physical training, dynamics of indicators of physical fitness, electrical engineers of railway transport, factorial structure, physical education.*

Introduction

The scientifically-technical progress transforms working conditions of the modern expert by cardinal rank, submits to it more and more increased requirements, needs special preparation, ability to work in the conditions of psychological tension and deficiency of time. Therefore, processes of formation of professional level of competitive experts of different specialties of railway branch acquire the increasing relevance and the importance.

The important role in formation of the harmonious identity of a future expert, his professional skills and abilities is played by physical education, namely professionally-applied physical training which fully promotes the formation of necessary level of professionally important qualities, skills.

Professionally-applied physical training of students in higher educational institutions has to provide formation and development in the course of physical education classes of necessary physical and psychophysical qualities of future experts, applied knowledge, skills which will help them to take control in the shortest possible time of profession and to adapt to conditions of modern production. Therefore, classes on physical education have to be under construction taking into account specific features of certain professional activity, conditions, and to the nature of work, negative factors of production and occupational diseases.

Data of many researches demonstrate that today extremely important search of new forms and methods of the organization of professionally-applied physical training which, in complete system of physical training would promote the formation of professionally important skills and fully trained future experts for the chosen profession.

The rapid development of science and technique promotes the increase in the importance of a professional in the production process. Character and working conditions are harder and harder every year, even more often there is the replacement of strenuous physical efforts by precisely fulfilled and quick physical actions, and complexity of productions increases the nervously-emotional pressure. All this makes the increased requirements to physical and psychophysical fitness of the modern expert [4; 9].

Variety of modern professions needs the corresponding terms for training of future highly skilled professionals and various approaches to the foundation of structure and contents at implementation of vocational training. Besides, it is important to modern experts to own the certain physical and psychophysical qualities, personal abilities and properties corresponding to the chosen professional activity [1; 3; 5; 7; 8; 10]. All these features develop and improved during professionally-applied physical training and in the subsequent in the course of work performance.
In recent years many scientists pay attention to the definition of students making physical fitness. So, N. V. Yegorova [6] investigated the structure of physical fitness of students of agricultural higher educational institutions. The author has defined that power and high-speed and power preparedness, physical development and functional preparedness of students have the largest weight in the general factorial structure.

High-speed and power qualities, flexibility, endurance and

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coordination enter the structure of physical fitness of future dance teachers, according to T. V. Sabantseva [8],.

Investigating the factorial structure of physical condition of students who study on the educational direction of preparation "Ecology", I. G. Bondarenko [2] has defined that the most powerful contribution to its development is put by indicators of aerobic endurance, indicators of force and high-speed and power abilities are less important.

The factorial structure of professionally-applied physical fitness of students of technical specialties on the example of the transport branch was studied by N. V. Chukhlantseva, L. Ye. Shesterova [11]. It was established by us that it is expedient to distribute arsenal of the funds of physical education which are allocated for increase in professionally-applied physical fitness of students of transport specialties as follows: on the development of harmonious constitution and general physical qualities – 35%; on the development of power and coordination abilities – 25%; high-speed and power endurance – 20%; on the increase and support of optimum condition of cardiovascular and cardiorespiratory system – 10%; on the general and special working capacity – 10%.

However, it should be noticed that today researches of factorial structure of professionally-applied physical fitness of specialists of railway branch are almost absent.

The purpose of the research

To define factorial structure of professionally-applied physical training of students – future electrical engineers of railway transport.

Material and Methods of the research

The following methods were used during the research: analysis and synthesis of references, questioning, anthropometry, testing, functional tests, methods of mathematical statistics (the factorial analysis), with application of the computer program "SPSS 17.0".

50 students (boys) of Ukrainian state railway university took part in the research.

Results of the research and their discussion

The factorial analysis of indicators of physical development, physical and professionally-applied physical fitness and functional working capacity was carried out for the purpose of identification of the main components of structure of professionally-applied physical training of students – future electrical engineers of railway transport and definition of optimum ratio of means of physical education.

The substantial characteristic of the main allocated factors is presented in table 1.

The index of back strength (0,921), back strength (0,920), PWC170 (0,901), vital capacity of lungs (0,891), the maximum consumption of oxygen (0,856), vital index (0,801) entered the first factor, with the general contribution of 35,49% of the general total dispersion. According to indicators which entered the first factor it was called "physical working capacity". It should be noted the close connection of indicators of back strength and PWC170.

The second factor, with the general contribution of 13,88% of the general total dispersion, united indicators of high-speed index (0,908), high-speed and power index (0,815), index of endurance (0,715), index of body weight (0,650), and received the name "physical fitness".

Indicators of index of Robinson (0,739), HR at rest (0,724), in-

Table 1

The substantial characteristic of the main allocated factors

Name of factor	Variables	Factorial loads
I factor Physical working capacity	Index of back strength	0,921
	Back strength	0,920
	Pwc170	0,901
	Vital capacity of lungs	0,891
	Maximum consumption of oxygen	0,856
	Vital index	0,801
II factor Physical preparedness	High-speed index	0,908
	High-speed and power index	0,815
	Endurance index	0,715
	Body weight index	0,650
III factor Vital potential	Robinson's index	0,739
	HR at rest	0,724
	Index of adaptation potential	0,679
	Static endurance of muscles of back	–0,677
IV factor Ability of motor analyzer to differentiate effort	Kinaesthetic sensuality without visual control	0,939
	Kinaesthetic sensuality with visual control	0,936
V factor Muscular strength of hands	Hand dynamometry	0,715
	Power index of hand	0,732
	Test of Kopilov "Ten eights"	0,619
VI factor Concentration of attention	Firmness of the concentrated attention	0,735
	Volume, distribution and switching of attention	–0,727

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dex of adaptation potential (0,679), static endurance of muscles of back entered the third factor which made 12,22% of the general total dispersion (–0,677). He received the name "vital potential".

The fourth factor, with the general contribution of 7,92% of the general total dispersion, included indicators of kinaesthetic sensuality without visual control (0,939) and kinaesthetic sensuality with visual control (0,936). This factor received the name "kinaesthetic sensuality".

The following indicators entered the fifth factor which made 6,57% of the general total dispersion: hand dynamometry (0,715), power index of hand (0,732), test of Kopilov "Ten eights" (0,619). According to indicators which entered it, it received the name "muscular strength of hands".

With the general contribution of 5,31% of the general total dispersion, we interpret the sixth factor as "concentration of attention", it contained indicators of firmness of the concentrated attention (0,735) and volume, distributions and switchings of attention (–0,727).

Results of the factorial analysis showed that the chosen indicators of expanded complex testing break into six factors with the general contribution of 81,39% (pic. 1).

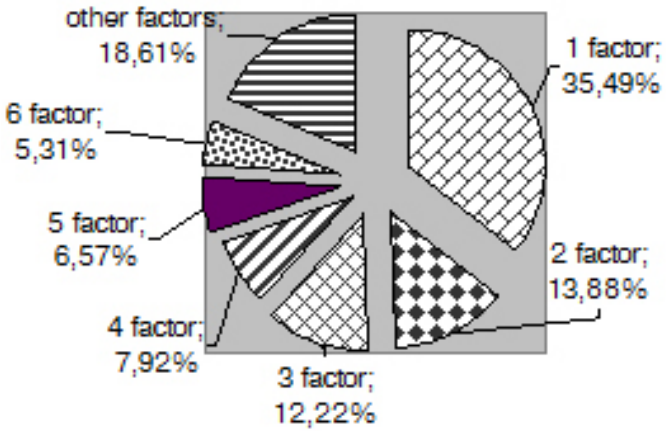

Fig. 1. Percent of contribution to the general dispersion of each factor

However, if to take into account that the dispersion of the received values on all indicators equals 100%, it is possible to find the calculated percentage contribution of each factor to the general structure of professionally-applied physical training (tab. 2).

Thus, results of the factorial analysis give the chance to define optimum structure of means of physical education in the experimental program with the strengthened course of professionally-applied physical training for students – future electrical engineers of railway transport for the purpose of optimization of its influence on professional preparedness of specialists railroad workers (tab. 3).

Therefore, the training material of the experimental program on physical education with the strengthened course of PAPT was distributed on the basis of the factorial analysis as follows: the exercises which are directed to the increase in physical working capacity and overall physical fitness – about 40%; on the development of power qualities – 25%; exercises on the development of high-speed and power endurance – 15%; the exercises which are directed to the improvement of functions of attention and kinaesthetic sensuality – 10%; exercises on the increase in special working capacity – 10%.

Conclusions

1. The analysis of domestic and foreign scientific literature confirms the existence of many thoughts concerning the structure of professionally-applied physical training of students of higher educational institutions, but researches on the definition of structure of PAPT of experts of railway transport practically aren't exist.

2. Results of the factorial analysis of complex testing of students of railway specialties gave the chance to define six factors with the general contribution 81,4% in the structure of professionally-applied physical fitness.

3. The determinate structural components of professionally-applied physical fitness of future electrical engineers of railway transport during the factorial analysis allow to distribute funds of physical education as follows: the physical exercises which are directed to the increase in physical working capacity and overall physical fitness – about 40%; exercises on the development of power qualities – 25%; exercises on the development of high-speed and power endurance – 15%; the funds which are allocated for the improvement of functions of attention and kinaesthetic sensuality – 10%; exercises on the increase in special working capacity – 10%.

The subsequent researches provide the development of the experimental program on physical education with the strengthened course of PAPT for future specialists of railway branch on the basis of the determinate factorial structure.

Table 2

Own values of factors (cumulative) and percentage percent of the explained dispersion

Factors	Own values	Contribution in dispersion of each factors, %	Cumulative own values of factors	Percentage percent, %
1	7,454	35,494	7,454	35,494
2	2,915	13,879	10,369	49,373
3	2,566	12,218	12,935	61,591
4	1,664	7,923	14,599	69,514
5	1,380	6,573	15,979	76,087
6	1,116	5,314	17,095	81,401

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Table 3

Percentage value of means of physical education in the experimental program with the strengthened course of PAPT

Name of factor	Orientation of means	Contribution of dispersion of, %	General contribution, %
Physical working capacity	Ability to maintain long, hard, hard work	35,494	43,60
High-speed and power endurance, physical preparedness	High-speed and power endurance	13,879	17,05
Vital potential	Aerobic opportunities of organism	12,218	15,01
Ability of motor analyzer to differentiate effort	Kinaesthetic sensuality	7,923	9,73
Muscular strength of hands	Power abilities	6,573	8,08
Concentration of attention	Concentration of attention	5,314	6,53
Other		81,401	100

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Technical-tactical preparedness of the team "Helios" of Kharkov in the 25th football championship of Ukraine in the first league

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Purpose: *to define model characteristics of technical-tactical preparedness of the team, that participated in the championship of Ukraine of the first league for the purpose of the further improvement and correction of the educational-training process.*

Material & Methods: *the researches were carried out by means of the method of expert estimates.*

Results: *average values of the registered sizes for 16 games are analyzed. Various technical-tactical actions and their differences for the first and second times, and also separate indicators of a game of players and the team "Helios" of Kharkov are analyzed.*

Conclusions: *quantitative and qualitative indicators (defect coefficient) as on team technical-tactical actions, and separately on each technical-tactical technique for every period of a game are received.*

Keywords: *technical-tactical actions, total of actions, defect coefficient, indicators for the first and second times attacking and defensive actions of the team.*

Introduction

The priority of native experts in creation of model characteristics of competitive activity in football does not raise doubts [5; 7; 10]. Technical-tactical preparedness from young football players [1; 4; 6] to veterans of football are analyzed by experts [9]. Some experts investigate separate indicators which, in their opinion, lead to the positive result of the game. Among them are: passes in one touch in different zones of the football pitch [11], transit of the ball to the penalty area of the rival [8] and another. There are single researches of the competitive activity of highly skilled football players (Premier league of the Ukrainian football) which were conducted with the same team [14] for a long time. However, longitudinal researches of technical-tactical preparedness of teams of the first league of the Ukrainian football are almost absent [2; 3; 13].

Presently during the development of quantitative indicators what characteristic of the set level of sports skill, it is possible to allocate different approaches [12]. We used approach, which is connected with studying of considerable set of sportsmen of different qualification, dependence establishment, between the level of sports skill and dynamics of changes of this or that indicator.

Communication of the research with scientific programs, plans, subjects

The research is executed according to the Built plan of the RW in the sphere of physical culture and sport for 2011–2015 MES of Ukraine on the subject 2.3 "Scientifically-methodical bases of improvement of the system of training of sportsmen in football taking into account features of the competitive activity", and also according to the Initiative subject of the RW of the chair of football and hockey of Kharkiv state academy of physical culture for 2016–2021. Psycho-sensory regulation of motive activity of sportsmen of situational sports".

The purpose of the research

The main objective was to define model characteristics and their changes in command technical-tactical preparedness of the team which participated in the 25th championship of Ukraine of the first league, for the subsequent improvement and correction of the educational-training process.

Material and Methods of the research

The researches were conducted by means of the method of expert estimation. 5 specialists were involved as football experts. Among them are: one – the master of sports of football, one – the candidate of the master of sports, others were players of professional teams of football. All experts in the past worked with professional and amateur football teams as coaches. Among experts are: two professors; one candidate of pedagogical sciences, associate professor; two candidates of science on physical education, associate professors of football and hockey of Kharkiv state academy of physical culture. If the debatable questions occur during registration of competitive activity of the team "Helios" of Kharkiv, they were solved by the majority of votes. The technique allowed mutual control of indicators of competitive activity during pedagogical observations that allowed obtaining more objective data. So, one of experts counted total of passes, and another, in the same time, recorded on Dictaphone what specifically players (number of the player) and which by the direction and distance pass was performed.

16 home matches were registered by the scientifically-methodical group at the team "Helios" of Kharkiv. Players of "He-

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lios" have scored 30 balls into gate of the rivals in matches of last championship of Ukraine in the first league; they have received three more goals for absence in Kharkiv of Ternopil "Nyva". 33 scored balls are the eighth indicator of effectiveness on the league.

Results of the research and their discussion

Indicators of technical-tactical activity of the team "Helios" of Kharkiv for 16 home matches for the 25th championship of Ukraine on football are provided in table 1. Indicators for the first and second times of the game and total of technical-tactical techniques were separately counted.

Analyzing indicators for the first and second half, some tendencies are shown. 1. The number of short passes forward in the second half increases, but the number of short passes across and back decreases. 2. The quantity of outplay of rivals in the second half increases. 3. The number of performance of corner increases in the second half. However all these changes are not reliable and indicate only tendencies which need to consider during correction of the educational-training process. It is necessary to specify among reliable changes that the number of rebounds of the team "Helios" of Kharkiv in

Table 1

Indicators of TTA of the team "Helios" of Kharkiv for the 25th championship of Ukraine on football (n=16)

№	Technical-tactical actions	1 half	2 half	t	p	1+2
		X̄±m				
1.	Shoot for goal	48,75±1,7	45,75±2,47	1,0	p>0,05	94,5±3,62
	Coef. of def., %	19,59±1,04	17,26±1,58	1,23	p>0,05	18,26±0,81
2.	Passes by foot forward (short)	98,75±3,51	106,62±4,93	1,3	p>0,05	205,37±7,33
	Coef. of def., %	35,46±2,91	33,25±1,67	0,65	p>0,05	34,22±2,07
3.	Passes by foot back and across (short)	69,5±6,18	63,0±5,39	0,79	p>0,05	132,81±10,67
	Coef. of def., %	12,1±1,47	10,56±1,92	0,63	p>0,05	11,28±1,24
4.	Passes by foot forward (long)	26,87±1,04	26,0±1,78	0,42	p>0,05	52,62±2,12
	Coef. of def., %	69,73±2,15	73,33±2,33	1,13	p>0,05	71,37±1,65
5.	Passes by foot back and across (long)	3,46±0,46	4,06±0,62	0,77	p>0,05	7,31±0,76
	Coef. of def., %	66,06±8,05	62,11±8,25	0,34	p>0,05	65,8±5,78
6.	Heading the ball (fight above)	25,18±1,65	24,06±1,39	0,52	p>0,05	48,68±2,24
	Coef. of def., %	43,51±2,6	47,05±2,81	0,92	p>0,05	45,61±1,7
7.	Outplay	11,62±1,15	14,5±1,32	1,65	p>0,05	26,25±1,88
	Coef. of def., %	45,89±3,37	44,76±2,43	0,27	p>0,05	45,68±2,02
8.	Rebounds	16,81±1,36	11,5±1,22	2,91	**p<0,01**	28,31±2,29
	Coef. of def., %	27,61±3,21	29,07±2,73	0,34	p>0,05	28,62±1,78
9.	Tackles	22,56±1,81	20,75±1,78	0,71	p>0,05	44,06±3,09
	Coef. of def., %	58,96±2,27	49,5±3,37	2,33	**p<0,05**	54,3±1,84
10.	Shoot for goal by foot	4,0±0,58	5,31±0,64	1,52	p>0,05	9,31±0,81
	Coef. of def., %	48,32±6,75	51,42±4,99	0,37	p>0,05	50,16±4,2
11.	Shoot for goal by head	1,6±0,26	1,69±0,34	0,22	p>0,05	2,53±0,35
	Coef. of def., %	64,99±13,25	46,91±12,15	1,0	p>0,05	61,65±8,36
12.	Penalty kicks	–	1	–	–	1
	Coef. of def., %	–	100	–	–	100
13.	Free kicks in the attacking zone	1,75±0,25	2,3±0,3	1,44	p>0,05	3,18±0,43
	Coef. of def., %	76,38±10,55	51,9±11,0	1,6	p>0,05	63,0±8,71
14.	Corner	3,68±0,48	4,66±1,23	0,74	p>0,05	6,93±0,82
	Coef. of def., %	65,55±7,98	74,14±8,57	0,73	p>0,05	67,72±6,01
15.	Ball throw in from the sideline	16,06±1,19	16,56±1,09	0,31	p>0,05	32,62±1,85
	Coef. of def., %	20,25±3,95	21,4±2,97	0,23	p>0,05	20,58±2,86
16.	Total TTA for the half (game)	349,37±9,18	345,62±12,09	0,24	p>0,05	695,0±19,07
17.	Efficiency factor, %	66,58±1,32	67,12±1,24	0,29	p>0,05	66,9±1,09
18.	Coefficient of defect, %	33,41±1,32	32,87±1,24	0,29	p>0,05	33,1±1,09

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the second half decreases (t=2,91; p<0,01). The defect coefficient at performance by players of tackle of the ball at rivals decreases (improves) (t=2,33; p<0,05) in the second half.

It is necessary to consider in more detail separate characteristics of passes by players of the team "Helios" of Kharkiv. The total of passes for two halves averaged for the game was – 398,37±17,44 (tab. 2).

The defect coefficient, when performing passes for two halves, has made 32,26±1,89%. The players of the team "Helios" performed on average 198,37±9,07 passes for first half, at the same time the coefficient of defect was 32,58±2,38%. Football players performed 200,0±9,9 passes in the second half, with the defect coefficient when performing 32,22±1,83%.

The defect coefficient when performing short and half-way passes forward – 34,22±2,07%, and when performing long balls forward, the defect made 71,15±1,68%. The number of passes (short, half-way and long) forward on average for game – 258,25±7,48, with the defect coefficient when performing 41,64±1,82%.

The number of passes (short, half-way and long) back and across – 140,75±11,13, with the defect coefficient – 14,63±1,29%.

The percentage ratio of number of passes in total of technical-tactical actions makes 56,91±1,11%.

The most active (who had the maximum number of technical-tactical actions) team players of the team "Helios" of Kharkiv were defined by the results of each game. The greatest individual indicators of average number of technical-tactical actions for the game by certain team players of the team "Helios" of Kharkiv – 90,0±4,14, at the same time the coefficient of defect made – 30,34±1,51%.

Indicators of attacking and defensive actions of the team "Helios" are displayed for the 25th championship of Ukraine on football in table 3.

The attacking actions were divided into fast and position attacks during registration of (tab. 4).

The indicators of the interrupted attacks of the team "Helios" (tab. 5) were also registered by experts.

Average values of efficiency of the attacking actions of the team "Helios" were defined (tab. 6).

Conclusions

1. The number of short passes forward, outplays of rivals and corner increases in the second half, but the number of short passes across and back decreases. The defect coefficient

Table 2

Indicator of total of passes for the first and second halves of team players the team "Helios"of Kharkiv (n=16)

№	Passes	1 half	2 half	t	p	1+2
				$\bar{X}$±m		
1.	Total of passes	198,37±9,07	200,0±9,9	0,12	p>0,05	398,37±17,44
	Coef. of defect, %	32,58±2,38	32,22±1,83	0,12	p>0,05	32,26±1,89

Table 3

Attacking and defensive technical-tactical actions of the team "Helios" of Kharkiv for the 25th championship of Ukraine on football in the first league on average for the game (n=16)

№	Indicators of technical-tactical activity		$\bar{X}$±m
1.	Number of attacks of the team	Successful	22,0±1,61
		Broken	131,62±4,55
		Total	153,62±5,04
2.	Efficiency of attacking actions, %		14,5±1,01
3.	Efficiency of defensive actions, %		90,31±0,69
4.	Number of attacks of the team of the rival	Successful	13,68±1,11
		Broken	125,68±3,68
		Total	139,37±4,08
5.	Efficiency of attacking actions, %		9,9±0,64
6.	Efficiency of defensive actions, %		85,91±1,06
7.	The number of the getting attacks of the whole team	Successful	22,0±1,61
		Broken	63,12±3,12
		Total	85,12±4,02
8.	Efficiency of attacking actions, %		25,83±1,42
9.	Efficiency of defensive actions, %		80,39±1,63
10.	The number of the getting attacks of team of the rival	Successful	13,68±1,11
		Broken	58,43±5,25
		Total	72,12±5,57
11.	Efficiency of attacking actions, %		19,81±1,56
12.	Efficiency of defensive actions, %		74,37±1,45

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Table 4

Indicator of the fast and position attacks of the team "Helios" and their efficiency for the 25th championship of Ukraine on football in the first league in 2015 (n=16), $\bar{X}$±m

Total	Fast attacks			Position attacks		
	Number	% among all attacks	Effectiveness, %	Number	% among all attacks	Effectiveness, %
153,62±5,04	115,56±5,73	75,22±2,86	13,15±1,04	33,68±3,51	21,61±2,17	20,57±3,21

Table 5

Indicators of the interrupted attacks of the team "Helios" in different zones of the football pitch of % (n=16)

Zones of football pitch	Defenses	Half-way $\bar{X}$±m	Attacks
The percentage breakdown of attacks	5,8±0,63	43,01±2,05	43,1±2,15

Table 6

Indicators of efficiency of the attacking actions of the football team "Helios" (n=16), $\bar{X}$±m

Quantity of attacking actions	Number of shoots for goal of the rival	The attitude of number of shoots for goal towards the number of the attacking actions, %	Number of scored balls	The attitude of quantity of the scored goals towards the number of the attacking actions, %
153,62±5,04	11,68±0,79	15,82±8,24	1,25±0,25	1,09±0,3

at rebounds decreases in the second half. However all these changes are not reliable and indicate only tendencies which need to consider during correction of the educational-training process.

2. The number of rebounds of the team "Helios" of Kharkiv decreases in the second half ($t=2,91$; $p<0,01$). The defect coefficient at performance by players of tackle of the ball at rivals decreases (improves) in the second half ($t=2,33$; $p<0,05$).

3. The greatest individual indicators of average number of technical-tactical actions for the game by certain team players of the team "Helios" of Kharkiv – 90,0±4,14, at the same time the coefficient of defect made – 30,34±1,51%.

4. The result of indicators on football for the 25th championship of Ukraine will allow receiving more reliable conclusions for the correction of the educational-training process of the team of the first league of the Ukrainian football.

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The reliability of the presented results correspond to authors

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