

OPTIMIZING THE LEVEL OF THE PHYSICAL HEALTH OF THE STUDENTS WITH A GLANCE OF THE TYPE OF AUTONOMIC NERVOUS SYSTEM

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Annotation. It is analyzed the changes in the level of physical health of students of the Faculty of Physical Education under the influence of physical training with a glance of the type of autonomic nervous system. The study involved 87 students of first and second courses. Is used methods for determining the level of physical health of students: Apanasenko G.L., teacher observations, statistics. Hold a special physical training with the prevalence of the type of the autonomic nervous system. The basis of influence was the principle of individualization of physical activity, the systematic and gradual. A significant high level of physical fitness at the end of the study, the main group of students. In this group, overall assessment of the level of physical health is above the average level by improving the life, power and index Robinson.

Key words: students, autonomic, nervous system, improving, physical health.

Introduction

The state of youth's health is a necessary condition and determining factor of society welfare and progressive development. Physical preparedness of rising generation is now understood as an important component of health, physical development, the base of high workability, preparation to socially significant work and active service in Armed Forces of independent Ukraine [2, 4, 6]. Studying at higher educational establishments is a hard and tensed mental work, which is fulfilled in conditions of time deficit, against the background of sharp reduction of motion activity. Adapting of organism to new environment is ensured not by separate systems of organism, but by functional systems, which are coordinated in time and space. Objective indicators of any system's functioning is the result of action, which ensures maximally useful for organism's function. Increasing of students' motion activity with the help of physical exercises in the process of physical classes and sports trainings is efficient tool for rising of students' workability and health protection [1, 5, 7-10].

The urgency of research of organism's morpho-functional changes under physical loads, depending on initial state of autonomous nervous system; absence of scientific works, devoted to studying of this problem in detail; with it, not revealed possible peculiarities of organism response to physical loads of different type and intensity condition the necessity of further, more profound studying of this problem.

The work has been fulfilled as per plan of scientific & research works of Kremenetskiy regional humanitarian pedagogical institute, named after Taras Shevchenko.

Purpose, tasks of the work, material and methods

The purpose of the work is to analyze the changes of physical health level of students, studying at faculty of physical education and having different types of autonomous nervous system.

The tasks:

1. To determine the level of humanitarian higher educational establishment students', with different types of autonomous nervous system, physical health level.
2. To study the changes of physical health by components and in general, with students being under special physical loads, considering prevailing of type of autonomous nervous system.
3. To evaluate the efficiency of the offered general physical motion regimes, depending on the prevailing type of autonomous nervous system.

87 of first and second year students of physical education faculty of Kremenetskiy humanitarian-pedagogical institute, named after Taras Shevchenko, took part in the research.

The methods of the research: analysis of scientific & methodological literature, determination of autonomous nervous system's type, the level of physical health by G.L. Apanasenko's method, pedagogical observation, methods of mathematical statistics.

Results of the research

If at the beginning of the researches the control group students, who had domination of normotonic type nervous system, showed mass index $22, 49 \pm 0, 53 \text{ kg/m}^2$ (0 points), at the end it nearly did not change and was equal to $22, 54 \pm 0, 48 \text{ kg/m}^2$ (0 points); with increment only by 0.05. Life index was $62, 33 \pm 1, 41 \text{ ml/kg}$ (2 points) at the beginning of the research, and $62, 36 \pm 1, 17 \text{ ml/kg}$ (2 points) at the end, with increment by 0.03. Power index was $66, 53 \pm 2, 25\%$ (1 point) at the beginning of the research, and $68, 11 \pm 1, 84\%$ (1 point) at the end, with increment only by 1, 58 ($p < 0, 05$). If Robinson's index was $95, 37 \pm 2, 65 \text{ conv. units}$ (-1 point) at the beginning of the research, at the end it became $94, 23 \pm 2, 20 \text{ conv. units}$ (1 point), i.e. improvement by 1.14 conv. units. The time of heart beat frequency (HBF) restoration after 20 squatting during 30 seconds was $116, 32 \pm 8, 40 \text{ sec.}$ (3 points) at the beginning of the researches and at the end it did not improve— $116, 58 \pm 7, 82 \text{ sec.}$ (3 points). At the beginning of the research total evaluation of physical health level (the sum of points) of students, who had domination of normotonic type nervous system, was 4,

63±0, 98 points, that corresponded to the level below middle; at the end of the researches it was 4, 79±0, 92 points, that also corresponded to the level below middle, with improvement only by 0.16 points, see table 1.

Table 1

The changes of physical health level of students, who had domination of normotonic type autonomous nervous system, in the process of the researches

№ / №	Indicators	Stage of research	Normotonic type			
			Main group		Control group	
			data	points	data	points
1	Body mass index, kg/m ²	beginning	23, 30±0, 55	0	22, 49±0, 53	0
		end	23, 38±0, 38	0	22, 54±0, 48	0
2	Life index ml/kg	beginning	64, 01±1, 98	2	62, 33±1, 41	2
		end	67, 64±0, 76	3	62, 36±1, 17	2
3	Power index, %	beginning	59, 84±2, 80	-1	66, 53±2, 25	1
		end	92, 24±1, 39	3	68, 11±1, 84	1
4	Robinson's index, conv. units.	beginning	92, 31±3, 41	0	95, 37±2, 65	-1
		end	84, 35±2, 04	3	94, 23±2, 20	0
5	HBF restoration time	beginning	131, 41±9, 61	1	116, 32±8, 40	3
		end	82, 47±3, 94	5	116, 58±7, 82	3
6	Total evaluation	beginning	3, 35±0, 86		4, 63±0, 98	
		end	12, 12±0, 51		4, 79±0, 92	
	Level	beginning	Low		Below middle	
		end	Higher than middle		Below middle	

The main group students, who had domination of normotonic type autonomous nervous system, had body mass index 23, 30±0, 55 kg/m² (0 points) at the beginning of the research and at the end it nearly did not change and was equal to 23, 38±0, 38 kg/m² (0 points), increment only by 0, 08. Life index was 64, 01±1, 98 ml/kg (2 points) at the beginning of the research and by the end it increased and became 67, 64±0, 76 ml/kg (3 points), increment by 3, 63 (p<0, 05). At the beginning of the research their power index was 59, 84±2, 80% (-1 point), at the end – 92, 24±1, 39% (3 points), with significant increment by 32, 40% (p<0, 05). If Robinson's index was 92, 31±3, 41 conv. units (0 points) at the beginning of the researches, at the end it became 84, 35±2, 04 conv. units (3 points), with improvement only by 7, 96 conv. units (p<0, 05). The time of HBF restoration after 20 squatting during 30 sec. was 131, 41±9, 61 sec. (1 point) at the beginning of the research and it significantly improved by the end — 82, 47±3, 94 sec. (5 points), i.e. increment by 48, 94 sec. (p<0, 05). At the beginning of the research total evaluation of physical health level (the sum of points) of students, who had domination of normotonic type nervous system, was 3, 35±0, 86 points, that corresponded to low level; at the end of the researches it was 12, 12±0, 51 points (p<0, 05), that corresponded to the level higher than middle, with improvement by 8.77 points, mainly owing to the time of HBF restoration, power index and Robinson's index.

At the beginning of the researches the control group students, who had domination of sympatonic type autonomous nervous system, had body mass index 21, 98±0, 35 kg/m² (0 points), and at the end it nearly did not change and was equal to 22, 02±0, 33 kg/m² (0 points), increment only by 0, 04. Life index was 57, 46±1, 44 ml/kg (1 point) at the beginning of the research and by the end it increased and became 57, 31±1, 36 ml/kg (1 point), increment only by 0, 15. At the beginning of the research their power index was 60, 38±1, 72% (-1 point), at the end – 60, 28±1, 73% (-1 point), with insignificant increment by 0, 10%. If Robinson's index was 95, 91±2, 93 conv. units (-1 points) at the beginning of the researches, at the end it became 92, 66±2, 06 conv. units (0 points), with improvement by 3, 25 conv. units (p<0, 05). The time of HBF restoration after 20 squatting during 30 sec. was 105, 10±7 92 sec. (3 points) at the beginning of the research and by the end it became 101, 29±7, 47 sec (3 points), i.e. increment by 3, 81 sec. At the beginning of the research, total evaluation of physical health level (the sum of points) of students, who had domination of sympatonic type nervous system, was 3, 90±0, 82 points, that corresponded to low level; at the end of the researches it was 4, 57±0, 77 points that corresponded to the level lower than middle, with improvement only by 0.67 (see table 2).

Table 2

The changes of physical health level of students, who had domination of sympatonic type autonomous nervous system, in the process of the researches

№ / №	Indicators	Stage of research	Normotonic type			
			Main group		Control group	
			data	points	data	points

1	Body mass index, kg/m ²	beginning	22, 39±0, 40	0	21, 98±0, 35	0
		end	22, 35±0, 30	0	22, 02±0, 33	0
2	Life index ml/kg	beginning	66, 11±1, 61	3	57, 46±1, 44	1
		end	69, 52±0, 98	3	57, 31±1, 36	1
3	Power index, %	beginning	63, 40±2, 93	0	60, 38±1, 72	-1
		end	91, 60±2, 15	3	60, 28±1, 73	-1
4	Robinson's index, conv. units.	beginning	91, 09±3, 21	0	95, 91±2, 93	-1
		end	83, 08±1, 73	3	92, 66±2, 06	0
5	HBF restoration time	beginning	118, 00±9, 07	3	105, 10±7, 92	3
		end	90, 91±5, 89	3	101, 29±7, 47	3
6	Total evaluation	beginning	5, 55±0, 62		3, 90±0, 82	
		end	11, 00±0, 52		4, 57±0, 77	
	beginning	Low		Below middle		
	end	Higher than middle		Below middle		

The main group students, who had domination of symptotonic type autonomous nervous system, had body mass index 22, 39±0, 40 kg/m² (0 points) at the beginning of the research and at the end it nearly did not change and was equal to 22, 35±0, 30 kg/m² (0 points), increment only by 0, 04. Life index was 66, 11±1, 61 ml/kg (3 points) at the beginning of the research and by the end it increased and became 69, 52±0, 98 ml/kg (3 points), increment by 3, 41 (p<0, 05). At the beginning of the research their power index was 63, 40±2, 93% (0 points), at the end – 91, 60±2, 15% (3 points), with significant increment by 28, 20 (p<0, 05). If Robinson's index was 91, 09±3, 21 conv. units (0 points) at the beginning of the researches, at the end it became 83, 08±1, 73 conv. units (3 points), with improvement only by 8, 01 conv. units (p<0, 05). The time of HBF restoration after 20 squatting during 30 sec. was 118, 00±9, 07 sec. (3 point) at the beginning of the research and it improved by the end up to 90, 91±5, 89 sec. (3 points), i.e. increment by 27, 09 sec. (p<0, 05). At the beginning of the research total evaluation of physical health level (the sum of points) of students, who had domination of sympatotonic type nervous system, was 5, 55±0, 62 points, that corresponded to level lower than middle; at the end of the researches it was 11, 00±0, 52 points (p<0, 05), that corresponded to the middle level, with improvement by 5.45 points, mainly owing to power index and Robinson's index.

Certain insignificant changes were registered at control group, which consisted of students with parasymptotonic type of nervous system. At the beginning of the researches their body mass index was 21, 96±0, 77 kg/m² (0 points) and at the end it nearly did not change and was equal to 21, 94±0, 78 kg/m² (0 points), increment only by 0, 02. Life index was 61, 58±1, 51 ml/kg (2 point) at the beginning of the research and by the end it increased and became 61, 99±1, 25 ml/kg (2 point), increment only by 0, 41. At the beginning of the research their power index was 68, 90±2, 13% (1point), at the end – 69, 24±1, 89% (1 point), with insignificant increment by 0, 44. If Robinson's index was 92, 13±2, 36 conv. units (0 points) at the beginning of the researches, at the end it became 89, 04±1, 82 conv. units (0 points), with improvement by 3, 09 conv. units (p<0, 05) The time of HBF restoration after 20 squatting during 30 sec. was 77, 33±5.88 sec. (5 points) at the beginning of the research and by the end it became 76, 22±5, 26 sec (5 points), i.e. increment by 1, 11 sec. At the beginning of the research total evaluation of physical health level (the sum of points) of students, who had domination of parasymptotonic type nervous system, was 7, 22±0, 83 points, that corresponded to middle level; at the end of the researches it was 8, 11±0, 83 points that also corresponded to the middle level, with improvement only by 0.89 (see table 3).

Table 4

The changes of physical health level of students, who had domination of parasymptotonic type autonomous nervous system, in the process of the researches

№ / №	Indicators	Stage of research	Normotonic type			
			Main group		Control group	
			data	points	data	points
1	Body mass index, kg/m ²	beginning	22, 92±0, 75	0	21, 96±0, 77	0
		end	22, 98±0, 58	0	21, 94±0, 78	0
2	Life index ml/kg	end	65, 57±2, 58	2	61, 58±1, 51	2
		beginning	69, 84±1, 21	3	61, 99±1, 25	2
3	Power index, %	end	66, 16±3, 41	1	68, 80±2, 13	1
		beginning	84, 58±1, 89	3	69, 24±1, 89	1
4	Robinson's index, conv. units.	end	82, 74±4, 19	3	92, 13±2, 36	0
		beginning	75, 71±2, 91	3	89, 04±1, 82	0
5	HBF restoration time	beginning	100, 50±9, 71	5	77, 33±5, 88	5
		end	71, 00±4, 99	5	76, 22±5, 26	5
6	Total evaluation	beginning	7, 70±1, 39		7, 22±0, 83	

	end	14, 50±0, 97	8, 11±0, 71
Level	beginning	middle	middle
	end	Higher than middle	Below middle

At the end of the research the main group students, who had domination of parasympatonic type of autonomous nervous system, showed increase of physical health level. If at the beginning of the research they had body mass index $22.92 \pm 0, 75 \text{ kg/m}^2$ (0 points), at the end it nearly did not change and was equal to $22, 98 \pm 0, 58 \text{ kg/m}^2$ (0 points), increment only by 0, 06. Life index was $65, 57 \pm 2, 58 \text{ ml/kg}$ (2 points) at the beginning of the research and by the end it increased and became $69, 84 \pm 1, 21 \text{ ml/kg}$ (3 points), increment by 4, 27 ($p < 0, 05$). At the beginning of the research their power index was $66, 16 \pm 3, 41\%$ (1 points), at the end – $84, 58 \pm 1, 89\%$ (3 points), with significant increment by 18, 42% ($p < 0, 05$). If Robinson's index was $82, 74 \pm 4, 19 \text{ conv. units}$ (3 points) at the beginning of the researches, at the end it became $75, 71 \pm 2, 91 \text{ conv. units}$ (3 points), with improvement only by 7, 03 conv. units ($p < 0, 05$). The time of HBF restoration after 20 squatting during 30 sec. was $100, 50 \pm 9, 71 \text{ sec.}$ (5 points) at the beginning of the research and it improved by the end up to $71, 00 \pm 4, 99 \text{ sec.}$ (5 points), i.e. increment by 29, 50 sec. ($p < 0, 05$). At the beginning of the research total evaluation of physical health level (the sum of points) of students, who had domination of parasympatonic type nervous system, was $7, 70 \pm 1, 39$ points, that corresponded to middle level; at the end of the researches it was $14, 50 \pm 0, 97$ points ($p < 0, 05$), that already corresponded to the level higher than middle, with improvement by 6.80 points, mainly owing to power and life indices.

Summary

General level of physical health of humanitarian higher educational establishments' students with different types of autonomous nervous system was on the lower than middle level. The main principle of motion activity influence on students with different types of autonomous nervous system was principle of individualization of physical loads, considering systematical character of them and gradualness. Owing to consideration of autonomous nervous system's type domination confidentially higher physical health level indicators were registered at the end of the research at main group, who consisted of students with physical health level higher than middle, mainly owing to improvement of life, power indices and Robinson's index.

The further researches will be oriented on determination of the offered students' physical education programs' influence on their physical preparedness.

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