

THE EFFECT EVALUATION OF PHYSICAL EDUCATION EXPERIMENTAL PROGRAM FOR PHYSICAL REHABILITATION GROUPS USING CALLANETICS ON PROGRESS LEVEL OF STUDENTS' CARDIOVASCULAR SYSTEM WITH II-III DEGREE OF SCOLIOSIS

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Summary: Nowadays there is a tendency of deterioration in young people health. Despite sharp rise in disease level of students there are no changes in current program of physical education for students of higher educational institution; it is significant problem of physical culture and sport field. It is also worth noting there is no special educational program for students who are referred to physical rehabilitation groups because of their health condition.

So in the face of the deterioration of students' health condition there appears a need to search the effective methods of physical education which can facilitate the solving of an actual problem. The objective of research is determination of the effectiveness of Callanetics experimentally during educational process of students of the II-III level of scoliosis. For achieving this goal there were used the following methods of research: theoretical analysis and synthesis; testing of functional indicators of cardiovascular system (heart rate and blood pressure – systolic, diastolic and pulse); statistical data processing. The analysis of results gives evidence about effectiveness of physical educational experimental program using callanetics for physical rehabilitation groups with students of the II-III level of scoliosis. It is proved that this program has had a significant impact on the functional indicators of the cardiovascular system, it is also defined as the criterion of fitness level and adaptation abilities of an organism. The results can be used in further practice of physical education classes with groups of physical rehabilitation faculty.

Key words: heart rate, blood pressure, students, scoliosis

Introduction

Today, the specialists in sport and physical education raise the question of a sharp increase in the number of students, which according to health state, are referred to the special departments (Drozd 1998). One reason for deviations in the health state and occurrence of pathological processes accompanied by reduced working performance is violation of posture. (Zaycev 1991).

Posture is an integrating indicator of the health state, and even minor functional disorders can cause a steady deformation of the musculoskeletal system, including scoliosis, and have complex effects on the health of young people (Dubchuk 2012).

Lack of physical activity, lack of conscious motivation to exercise and mandatory procedures for determining the level of physical condition and fitness of students as an important criterion for the quality of the physical education, are major causes of disease increase among students (Buhval, Samchuk 2009, Bouchard, Shephard 1994, Pańczyk, Sądecka 2009).

The huge problem of physical education and sport is that, not paying attention to the level of illnesses among students, the current physical education program for the students of higher educational establishment has not undergone the necessary changes (Shevchenko 2012, Kohl 2001).

It is also necessary to mention that today there is no separate educational program for students which according to health state, are referred to the physical rehabilitation group, which is a big disadvantage (Dubohaj et al. 1996).

It, in the same time, provokes the problematic situation in the practical work of specialists in this sphere that is shown primarily in determining the character of workload: on the one hand, inadequate physical activity can bring the body from the state of compensation and to provoke disadaptation or aggravation of the illness, and on the other – we cannot accept a situation where because of fear of complications in motor regime the physical activity is completely precluded or excessively limited (Pereverzeva 2008, Potashnyuk 2012, Jegier 2003).

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Tables: 1, **Figures:** 4, **References:** 14, **Full text PDF** www.hpc.edu.pl **Copyright** © Pope John Paul II State School of Higher Education In Biała Podlaska, Sidorska 95/97, 21-500 Biała Podlaska **Indexation:** Index Copernicus, Polish Ministry of Science and Higher Education. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-commercial License (<http://creativecommons.org/licenses/by-nc/3.0>), which permits use, distribution, and reproduction in any medium, provided the original work is properly cited, the use is non-commercial and is otherwise in compliance with the license.

So, in conditions of worsening of health state of students there appears the necessity of search of effective methodic of physical education that will promote the salvation of this problem (Corbin et al. 2007). In particular in the practice of physical education there wasn't found enough scientific evidence of organizational-methodological foundations of physical education classes in the groups of physical rehabilitation with using callanetics for students which have scoliosis of II-III level. In view of the above said, we have identified the main goal of our work – to evaluate the effectiveness of the experimental program of physical education for physical rehabilitation groups using callanetics for students with scoliosis of II-III levels.

The main aim of the research is to experimentally identify the effectiveness of callanetics usage in the educational process of students with scoliosis of II-III levels and to analyze its influence on the functional parameters of cardio-vascular system.

Material and methods

For realization of the goal the following research methods were used: theoretical analysis and synthesis; testing of functional parameters of cardiovascular system (heart rate and blood pressure – systolic, diastolic and pulse) statistical analysis of the data.

Findings and discussion

On the chair of physical education and health of Lesia Ukrainka East-European National University there were examined 78 female students from 17-21 years old with scoliosis of II-III level, which according to the state of health were referred to the group of physical rehabilitation. Control group consisted of 34 female students, which worked according to conventional, generally accepted program; experimental group consisted of 44 female students which did callanetics in the condition of academic classes of physical education according to developed methodic.

The program consists of 36 lessons (72 hours), for one academic year. The process of organization and conducting of classes based on the main principles:

- consciousness, realization of which positively influenced the raise of activity of students of physical education.
- individuality – where the individual peculiarities of development, physical state and character of disease were taken into account
- systematic, which allows to save the reached level of students' fitness and as a result to form adaptation possibilities of organism to physical activity.
- principle of consistency, realization of which based on the compliance with fundamental didactic rules (“from light to heavy”, “from easy to difficult”, “from already learnt to new”).

The classes were held once a week in the conditions of academic in the terms of academic classes of physical education, the duration of which was 80 minutes. A special class of experimental program included:

- the introductory part (duration 5 minutes, measurement of heart rate, review of the objectives and finding out the optimal ways to find the solutions for them;
- preparatory part duration: 10-15 minutes, which previewed the execution of general developmental exercises in the movement of low-intensity, stretching exercises and complex of preparatory to callanetics exercises. During the warm-up the heart rate was adjusted to 120-130 beats / min., the rest between workloads was active, the number of repetitions depended on the level of fitness of students.
- the main part (duration 45-50 minutes), which included the complex of callanetics exercises. The exercises based on isometric (duration of keeping static positions up to 1 minute) and titanic (up to 100 contractions in each exercise, which were performed in pulsed regime) types of contractions, which caused the activity of deeply situated muscle groups. Each separate exercise is designed in a way that almost all the muscles of the body are involved in the work. The exercises are executed slowly, without sudden movements and excessive stress. In the starting period the classes included extra rest. The exercises were performed in front of the mirror which provided a better fixation and control of own movements. While execution, the special attention was paid to breathing – arbitrary, without delay, otherwise the body doesn't get the required amount of oxygen. The maximum pulse load in this part didn't exceed 160 beats per minute. The rest between repetitions of exercises was passive. Thanks to frequent repetition there evoked the development of adaptive possibilities of circulatory system to the growing workload and overall increase in the level of fitness.

- final part (duration 5-10 minutes), which assumed performance of exercises for relaxation and passive rest lying on a solid surface, during which the academic discussion aimed on the formation of health saving knowledge was made. The main goal of final part is a transfer of the body from a state of increased functional activity in a state close to the original (reduction of heart rate parameter to 90–100 beats per minute with subsequent return to its initial level in 5 min after the end of the class).

Testing of functional parameters of cardio-vascular system was made to evaluate the effectiveness of physical education classes in the groups of physical rehabilitation and determining the level of organism adaptation to physical exercises.

The most effective and available physiological indicator used to monitor physical activity is the heart rate (Figure 1, Table. 1). Heart-rate is one of the simplest and most accessible indicators of the functional state of the cardio-vascular system, in the same time it is quite informative. It is often used as a criterion of the changes in the level of physical fitness. But heart rate is influenced not only by physical exercises, but also by emotional state of person. High heart rate in the state of rest for a long time indicate irrational load during physical education classes and necessity to adjust it according to the functional state and adaptive capabilities of circulatory system of students.

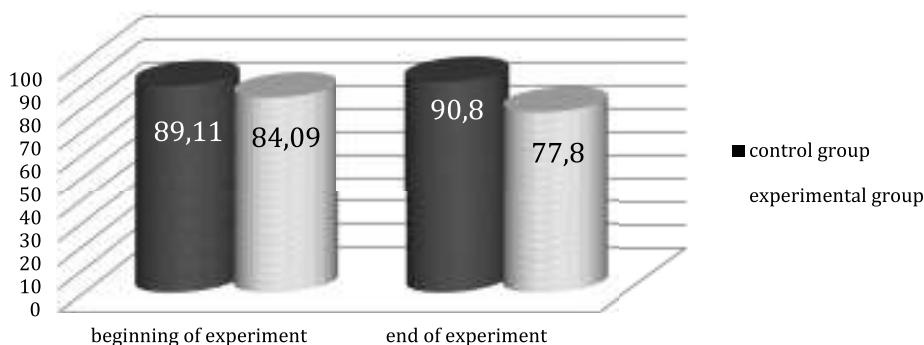


Figure 1. Heart rate level of female students of the physical rehabilitation group with scoliosis of II-III level in the different periods of experiment performance (beats per minute)

Table 1. Parameters of functional possibilities of circulatory system of female students of physical rehabilitation group with scoliosis of II-III level in different periods of experiment performance

Test	Duration of experiment	Group	n	X	S	Sx	V%	t	P
Systolic blood pressure (mm Hg.)	in the beginning of experiment	control	34	119,2	2,1	0,4	1,8	-8,440	<0,001
		experimental	44	115,3	1,9	0,3	1,6		
	in the end of experiment	control	34	123,67	1,96	0,34	1,6		
		experimental	44	112,72	1,21	0,18	1,1		
Diastolic blood pressure (mm Hg.)	in the beginning of experiment	control	34	74,7	0,9	0,1	1,2	0,828	>0,05
		experimental	44	76,1	1,3	1,7	1,7		
	in the end of experiment	control	34	75,58	1,01	1,17	1,3		
		experimental	44	71,8	1,11	1,72	1,5		
Pulse blood pressure (mm Hg.)	in the beginning of experiment	control	34	44,6	2,2	0,4	4,8	-12,744	<0,001
		experimental	44	39,2	1,3	0,2	3,3		
	in the end of experiment	control	34	48,08	1,9	0,33	4,0		
		experimental	44	40,09	1,7	0,26	4,2		
Heart rate (beats/minute)	in the beginning of experiment	control	34	89,1	0,7	0,1	0,8	-16,723	<0,001
		experimental	44	84,1	1,8	0,3	2,2		
	in the end of experiment	control	34	90,82	1,92	0,33	2,1		
		experimental	44	77,81	1,51	0,23	1,9		

The research of heart rate allowed to reveal a statistically significant reduction to 7,9 % at a female students from experimental group ($p < 0,001$) compared to students from the control group, the indicator of which raised a bit, but not significantly ($p < 0,05$).

The research of blood pressure (Figure 2,3,4, Table. 1) involved the determination of the following parameters: SBP, DBP and the PSC, the level of which depends on stroke volume and cardiac reserve capacity of the arterial system. The research of it has a particular interest, because the smaller this interest is the less blood during systole comes from the ventricles into the aorta. The research of systolic blood pressure testifies the smaller indicators ($p < 0,001$) of female students from experimental group ($112,72 \pm 1,21$) comparing with control group ($123,7 \pm 1,9$) (Figure 2.).

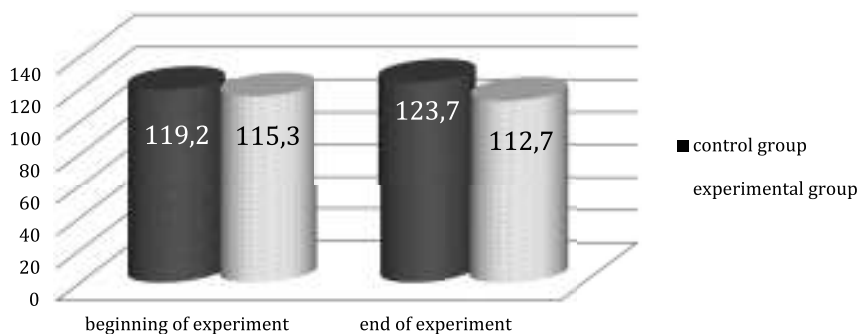


Figure 2. Level of systolic blood pressure of female students from physical rehabilitation group with scoliosis of II-III levels in the different periods of experiment performance (mm Hg)

The research of diastolic blood pressure showed the reduction of its level at female students from experimental group ($71,8 \pm 1,1$) with very high statistical reliability ($p < 0,001$), in the control group its indicators didn't significantly change (Figure 3.).

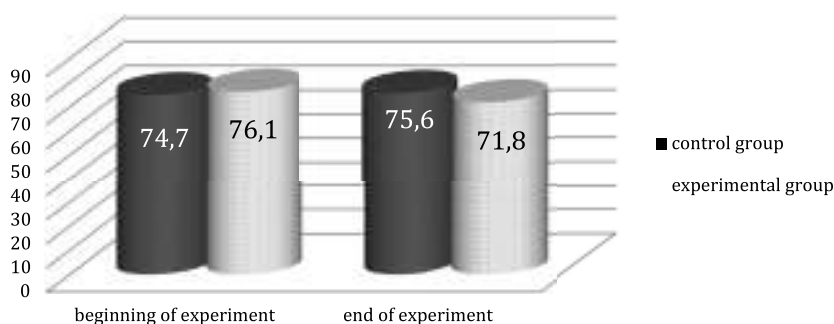


Figure 3. Level of diastolic blood pressure of students from physical rehabilitation group with scoliosis of II-III level in different periods of experiment performance (mm Hg)

The measurement of pulse blood pressure, which characterizes motive power of blood circulation affirmed significantly better results in the experimental group ($40,1 \pm 1,7$), than in control ($48,1 \pm 1,9$). Thus the index of statistical reliability was very high ($p < 0,001$) (Figure 4.).

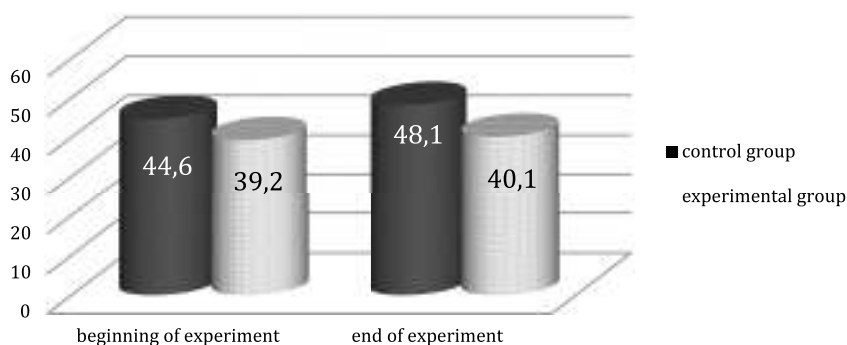


Figure 4. The level of blood pressure of students from physical rehabilitation group with scoliosis of II-III level in different periods of experiment performance (mm Hg)

So, conducted researches, according to evaluation of functional indicators of cardio-vascular system, proved the effectiveness of callentics classes in this contingent of patients.

Conclusions

Methodically sound organization of physical education with students from specialized departments causes the complex of changes in the organism, which significantly broadens the functional possibilities of organs and systems and raises the resistance to negative influence of factors from external environment and increases the adaptive possibilities of organism.

It was experimentally proved that a program of physical education for the groups of physical rehabilitation which practice callentics is developed basing on individual characteristics of physical state and physical development of students with scoliosis of II-III level, that it contributed to the growth of fitness and adaptive possibilities of circulatory system, through the reduction of heart rate, systolic and diastolic blood pressure and normalization of pulse blood pressure of female students from experimental group.

The analysis of obtained results affirms the effectiveness of experimental program of physical education for the groups of physical rehabilitation, using callentics for students who suffer from scoliosis. It is expected that obtained results of the research can be used in the further practice of organization and conducting of physical education classes in the groups of physical rehabilitation for students with scoliosis.

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