Міністерство освіти і науки України,
Кам'янець-Подільський національний університет імені Івана Огієнка (Україна),
Академія імені Яна Длугоша в Ченстохові (Республіка Польща),
Католицький університет в Ружомбероку (Словаччина),
Університет Градец Кралове (Чехія),
Державний університет фізичного виховання і спорту (Республіки Молдова)

ПЕДАГОГІЧНІ ТА СОЦІАЛЬНІ АСПЕКТИ ФІЗИЧНОГО ВИХОВАННЯ ТА ФІЗИЧНОЇ ТЕРАПІЇ

ЖУРНАЛ
КАМ'ЯНЕЦЬ-ПОДІЛЬСЬКОГО НАЦІОНАЛЬНОГО
УНІВЕРСИТЕТУ ІМЕНІ ІВАНА ОГІЄНКА
ФАКУЛЬТЕТ ФІЗИЧНОЇ КУЛЬТУРИ

ВИПУСК 1

Кам'янець-Подільський
2019

УДК 796.011.3+615.825(051) DOI: 10.32626/PASAOPEAPT.2019
Друкується за ухвалою вченої ради Кам'янець-Подільського національного університету імені Івана Огієнка
(протокол № 7 від 30 серпня 2018 р.)

Журнал Кам'янець-Подільського національного університету імені Івана Огієнка «Педагогічні та соціальні аспекти фізичного виховання та фізичної терапії» / [редкол.: І.І.Стасюк (відп. ред.) та ін.]. Кам'янець-Подільський: ТОВ «Друкарня Рута»», 2019. Вип. 1. 182 с.

У журналі подано окремі положення, що висвітлюють результати наукових досліджень з фізичного виховання, фізичної терапії, педагогіки та соціальної роботи. Матеріали друкуються в авторській редакції. Адресується науковим, науково-педагогічним, педагогічним, культурноосвітнім працівникам, вчителям фізичної культури, фахівцям з фізичної реабілітації, педагогам, докторантам та аспірантам.

Сайт журналу: http://psa-konf.kpnu.edu.ua.

The Ministry of Education and Science of Ukraine
Kamianets-Podilskyi National Ivan Ohiienko University
(Kamianets-Podilskyi, Ukraine)
Academy of Jan Dlugosz in Czestochowa (Poland)
The Catholic University of Ruzomberok (Slovakia)
University Of Hradec Králové (Czech Republic)
The State University Of Physical Education And Sport
(Republica Moldova)

PEDAGOGICAL AND SOCIAL ASPECTS OF PHYSICAL EDUCATION AND PHYSICAL THERAPY

MAGAZINE OF
KAMIANETS-PODILSKYI NATIONAL IVAN OHIIENKO
FACULTY OF PHYSICAL EDUCATION

VOLUME 1

Kamianets-Podilskyi
2019

UDC 796.011.3+615.825(051) DOI: 10.32626/PASAOPEAPT.2019

The publication is approved by the decision of the Scientific Board of
Kamianets-Podilskyi National Ivan Ohiienko University
(protocol № 7 of 30.08.2018)

Magazine of Kamianets-Podilskyi national Ivan Ohiienko «Pedagogical and social aspects of physical education and physical therapy» / [Editorial Board: I. Stasiuk (Editor-in-Chief) etc.]. Kamianets-Podilskyi: LLC «Ruta printing house», 2019. Volume 1. 182 p.

The magazine contains some provisions that cover the results of research on physical education, physical therapy, pedagogy and social work. The materials are printed in the author's wording. Addressed to scientific, scientific and pedagogical, pedagogical, cultural and educational workers, teachers of physical culture, specialists in physical rehabilitation, teachers, doctoral students and postgraduate students.

The site of the magazine: http://psa-konf.kpnu.edu.ua.

UDC: 796.386.09–057.875:378.4(477.43-21)
DOI: 10.32626/PASAOPEAPT.2019.7-24

Alieksieiev Oleksandr, Zubal Maya,
Raitarovska Iryna, Shyshkin Oleksand[1]

ANALYSIS OF COMPETITIVE ACTIVITY OF TABLE TENNIS PLAYERS OF DIFFERENT QUALIFICATIONS OF THE PHYSICAL CULTURE FACULTY

Abstract. Relevance of research: *activity of a sportsman during competitions is the effectiveness indication of the training process in general and in table tennis in particular. The analysis of competitive activity, selection of means and methods of technical and tactical preparation of sportsmen used during training, is also a search for new ways to improve the training process. In sports, particularly in table tennis, the performance of technical actions during competitive activity is not spontaneous, but only inregard to the opponent's actions. Accordingly, the assessment of technical readiness of sportsmen should be based on indicators that take into account this feature. Therefore, as one of the parameters of the training process it is necessary to consider the indicators of competition activity of sportsmen.*

Goal of research: *is to examine and analyze the indicators of technical and tactical actions of competitive activity of table tennis players of different qualifications in order to systematize the process of preparation at the stage of maximal realization of individual abilities.*

Research methods: *during research the following methods were used: pedagogical observation, testing, pedagogical experiment, mathematical and statistical methods.*

Results*: analysis of competitive activity of sportsmen of different sports qualifications revealed a mismatch of technically oriented means, used at the stage of initial sports training (I-II junior and I-II categories) to the trends in the development of table tennis and the nature of competitive activity of players of high qualification (Candidate*

[1] Kamianets-Podilskyi National Ivan Ohiienko University (Ukraine), alieksieiev@kpnu.edu.ua

to Master of Sports (CMS), Master of Sports (MS) and Master of Sports of International Class (MSIC)). Obtained qualitative and quantitative characteristics of using different technical actions of players of high qualification can be a model characteristics of the distribution of funds for technical training means in order to build the training process at the stage of initial sports preparation of table tennis players. This is manifested in increase of the share of low complexity technical actions (stroke and push) and in reducing medium complexity actions (drivesmainly). As well as, in a preferential use of technical combinations in which, in case of the technical action of any complexity, the sportsman would respond with the actions of high complexity, and to high complexity actions – with low complexity actions. Advantage at the stage of initial sport specialization of technical training means aimed at improving the simple technical action - a stroke, with a subsequent transition to a more complex technical action – top-spin, not only comply with the rule – from the simple to complex, but we also observe patterns of increasing the use in the game of a technical action "stroke" by the sportsmen of high qualification in order to achieve high results.

Key words: *competitive activity, Student's t-criterion, techniques, table tennis.*

Introduction. According to the analysis of recent research and scientific-methodological literature [1, 2, 3, 4, 5, 6, 7, 8], assessment of play activity in most sport games isconducted without analysis of the opponent's actions. So, in the works of Barchukova G., Mizin A., Bogushas V., Matytsyn O. [2, 3] the analysis of competitive activity of the table tennis player is determined by such indicators as the ratio of successfully performed game actions to the total number of their use in the game: the performance of game actions on his serve; the performance of game actions on the opponent's serve; the performance of the attacks on one's own serves; the stability of attacks on one's own serves; the performance of attacks on the opponent's serves; the stability of attacks on the opponent's serve; the performance of defensive play on the opponent's serves; the performance of transition from attacking gaming actions to

defensive ones.

A group of authors: Landyk V., Pokholenchuk Y., Artiuzov G. [5] draw attention to the fact that sports competitions are included in the system of sportsmen's training, because they are not only a direct training goal, but also provide an effective means of training. The authors note that competitions have defining specifics and help to acquire special qualities and skills only in the period of competitions. The main objectives in the competitive period are the following: improving the physical, moral and volitional qualities; improving and consolidating sports techniques; mastery of tactics and acquiring the experience of participation in competitions; improving the level of theoretical knowledge.

So, AndriiOkopnyi [6] analyzed the table tennis competitive activity of Ukrainian and foreign sportsmen. He revealed the main aspects of table tennis, which create the sportsmen preconditions for victory or defeat.

This study will be important for teachers-trainers and sportsmen, because they will be able to get acquainted with studies that relate to competitive activity of table tennis.

Goal of research – is to examine and analyze the indicators of technical and tactical actions of competitive activity of table tennis players of different qualifications in order to systematize the process of preparation at the stage of maximum realization of individual abilities.

Material and methods of research. The study involved applicants of the higher education degree "Bachelor" and "Master" of the faculty of physical culture at the Kamianets-Podilskyi University named after Ivan Ohiienko, in specialties 014.11 Secondary education (Physical education), 6.010201 Physical education*, 017 Physical culture and sport, 227 Physical rehabilitation.

The study analyzed the gaming activity of 14 tennis players who were divided into three groups: the first group included

sportsmen with the titles of MSIC, MS and CMS (n=11); the second –of I-II sports category (n=2); the third – the sportsmen with I-II junior category (n=1).

At the time of the study 2 participants reached the age of19 years, 2 – 20 years, 1 participant was 21 years old and 1 participant was 22 years old, 2 participants were 23, 1 participant – 25, 1 – 26, 1 – 27 years, 2 participants – 28, 1 participant - 30.

The research was conducted in compliance with the World Medicine Association declaration of Helsinki: Ethical principles for medical research involving human subjects, 2013. The study protocol was approved by the Ethical committee of the Kamianets-Podilskyi National Ivan Ohiienko University.

At the initial stage of the study we received permission from the leadership of the faculty of physical culture of the Kamianets-Podilskyi National Ivan Ohiienko University. During the next stage we received consent from each student-participant.

To assess the effectiveness of the methodology of technical training of table tennis players we conducted a pedagogical experiment in the study training group of sports and pedagogical development of physical culture faculty students of Kamianets-Podilskyi national University named after Ivan Ohiienko in February-March 2018. The experiment involved 14 respondents.

The training program consisted of 11 microcycles with 3 training sessions each, divided into 2 stages. In the first stage the exercises were aimed at improving the technical actions of the forehand and backhand strokes. In the second stage, the exercises to improve top-spin were added to the basic stroke exercises.

Common exercises to improve the above-mentioned technical actions were divided into groups by complexity based on their specialization. Examples of exercises for each of the groups of complexity are presented in table 1.

Table 1

The allocation of technically directed means by the groups of complexity

Groups of exercises	Description of groups of exercises	Examples of exercises
1 group	Simple exercises by elements (without complications)	1. Forehand diagonal stroke. 2. Forehand straight into the left corner.
2 group	Exercises with changes of speed and trajectory of the ball in the game by elements	1. Forehand diagonally to the corner and closer to the net. 2. Backhand diagonally in the table and at a distance of 1.5 m from the table. 3. Forehand diagonally in a corner and in a straight line.
Group 3	Exercises – combinations of various technical elements according to a predetermined scheme	1. Cut diagonally to the right, after 3 repetitions stroke in a straight line. 2. Short serve into the right corner, receiving which cuts to the right in a straight line, a top-spin to the left in a straight line, push to the right, diagonal backhand.
4 group	The exercises in the course of which the partner could play randomly	1. Cut diagonally to the right, after 3 repetitions a top-spin to the right in a straight line, arbitrary game around the table. 2. Arbitrary game around the table with drives, after 5-6 repetitions a stroke into the right corner.

The strategy of the developed methodology of technical training meant that at the first stage formation or refinement of the motor program of a motor acttakes place, which in its structure is basic, a foundation for more complex motor actions, which are practiced at the second stage.

In order to determine the moment of transition from one stage to another we analyzed the nature of the chart of the motor actions learning. Distribution of exercises for each stage was consistent with the above concept of distribution exercises of various groups of complexity at various stages of the training process. Fig. 1 shows the quantitative distribution of exercises of different complexity groups, according to training classes during the pedagogical experiment, the duration of which was 34 days.

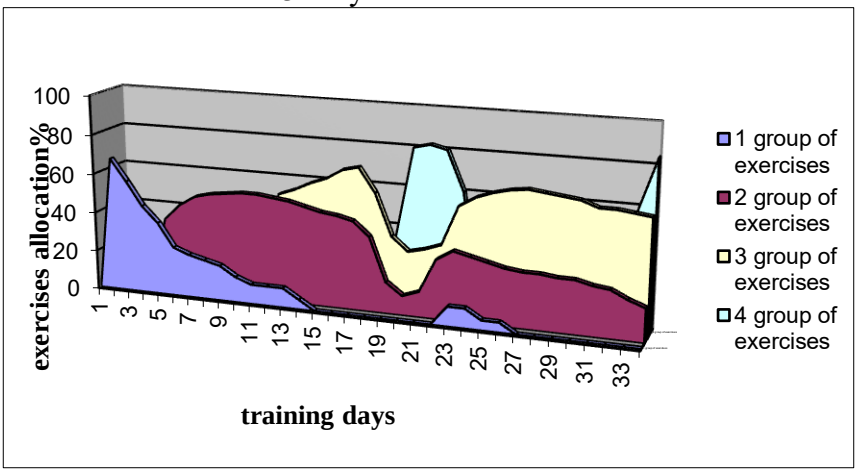


Fig. 1 *Quantitative distribution of different exercise groups according to the training classes during the pedagogical experiment*

Pedagogical research methods. During the study we used the following methods of this group: pedagogical observation, testing and pedagogical experiment.

Pedagogical observations were carried out at the study training sessions, competitions and during the comprehensive surveys at the faculty of physical culture.

They allowed to identify and to investigate the manner of conducting meetings and to substantiate the indicators of technical training of competitive activity of tennis players, to choose the most informative indicators of morpho-functional and technical-

tactical characteristics of the players of various styles of conducting meetings to create their characteristics, the biomechanics of techniques in table tennis and its conditionality by the mechanical and dynamic characteristics of the ball flight, as well as the nature of interaction of the ball with the racket.

The indicators of technical and tactical training of tennis players include: activity indicator, quantitative efficiency indicator, versatility of technical readiness, scope of technical actions, performance.

The pedagogical experiment was conducted during February-March 2018 at the faculty of physical culture. The experiment involved 14 respondents from 19 to 30 years old, with various sports qualifications in table tennis.

Before beginning of the training lessons we conducted a warm-up for 15-20 minutes and a specialized warm-up at the table – 7-10 min., after which the respondentswere trained by the proposed methodology. At the first stage of the research the training exercises were aimed at improving the technical actions - forehand and backhand strokes. During the second stage, the flicks and top-spins from the rightwere added to the training sessions.

To assess the characteristics of competitive activity and the training process of the tennis players we used the methods of steganography, video recording, video analysis, expert assessments and questionnaires. The steganography was conducted by recording the symbols (conventional signs) of technical-tactical actions in a special table. At the beginning of the pedagogical experiment, after the first stage and the second stage we conducted a video recording (video camera Panasonic HC-V770EE-K 2015, Japan) of gaming activities with the subsequent analysis of the composition of techniques used in the game.

Testing. To determine the effectiveness of a training session after the completion of the training the respondents were tested. Each player performed a series of strokes (at the first stage –

forehand and backhand strokes, at the second - top-spins from the right) (n=14), from the right and left on the target (white sheet of paper) 20x20 cm diagonally at balls, which the partner served to a certain spot of the table. We determined the number of hits of the target. In order to fix the hits, we used carbon paper, which was lying on the table, under the target. The results of the test studies were processed using the mathematical statistics methods.

Mathematical-statistical methods of research. To analyze the data obtained in the experiment we determined:

- the average arithmetic value (x) by the formula:

$$x = \frac{x_1+x_2+x_3+\ldots+x_n}{n}; \quad \text{or } x = \frac{\Sigma x_i}{n};$$

- mean square (or standard) deviation (σ) according to the formula:

$$\sigma = \pm \sqrt{\frac{\Sigma(x-m)^2}{n-1}}$$

where $\Sigma(x-m)^2$ – sum of square deviations;

n-1 is the number of degrees of freedom minus one;

- the likelihood (or probability) of differences between the arithmetic mean of the two sample sets was determined using Student's t-criterion according to the formula:

$$t = \frac{(\bar{x}_1 - \bar{x}_2)}{\sqrt{m_1^2 + m_2^2}};$$

where $\bar{x}_1$, $\bar{x}_2$ – the arithmetic mean of two sampling populations;

m_1 and m_2 - the average errors of these arithmetic mean values.

Research results. Based on the results of the quantitative and qualitative analysis of the sportsmen competition, in the ratio of pairs “action-reaction”, we designed exercises, which regulated the

actions of both players (technique combinations).

The test results of the target accuracy and the analysis of the technical actions used by players in the course of the competition, were used to determine the effectiveness of the proposed methodology of training.

Target accuracy selection as a performance indicator of a training session is due to the fact that on the one hand this indicator shows the movement reinforcement, and on the other hand table tennis is a game of accurate hitting a ball to a certain part of the table, therefore, the higher the accuracy, the higher the efficiency of the game.

As the results of the players of the experimental group testing show (Fig. 2, 3 and table. 2) there was a significant increase ($p<0.01$) of indicators of target accuracy at the end of each training stage compared to its initial values. So, the average value of the target accuracy when performing a forehand has increased from 1.2+0.67 hits to 3.9±0.70 hits, and backhand – from 1.2±0.55 hits to 3.4 ±0.82 hits.

In the result of the test there were revealed typical diagrams in training (Fig. 2 and 3), having characteristic features. Fig. 2 shows the first stage data, during which the improvement of the technical action of the stroke took place. It is noted that significant changes in the indicators of testing the target accuracy at the beginning and at the end of the stage 1 of the study as on the forehand (t_{St}=of 8.62, $p<0.01$), and backhand (t_{St} =10,40, $p<0.01$). The lack of change in the gain of accuracy during the first 9 lessons, in our opinion, is due to the following reasons:

1. The use of a large number of non-specialized exercises of the first group.

2. The relative complexity for the respondents of a motor action that is being studied.

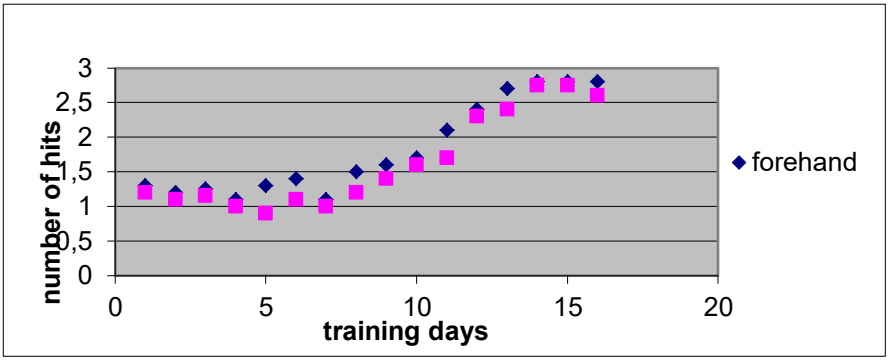


Fig. 2 *Test results of the experimental group (the data from the first stage)*

Stabilization of the estimated indicator starting from the 16 lesson, is a marker that for this group of respondents the improvement of the technical element, a stroke, is over *(when using this group of technical training means).*

Fig. 3 presents the second stage data of the training process aimed at improving the technical element, top-spin, which are, actually, identical to the previous one (Fig. 2).

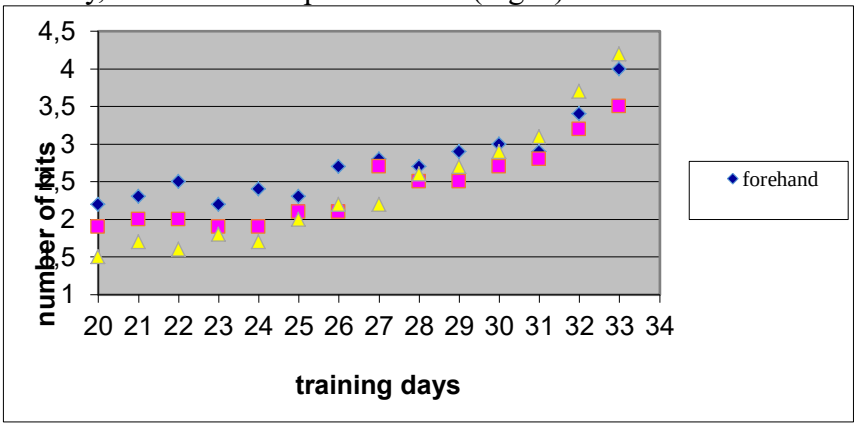


Fig. 3 *Test results of the experimental group (the second stage data)*

Initial accuracy indicators when performing the stroke are somewhat lower than at the end of the first stage. This is due to the introduction to the training process of new means to improve the top-spin.

As a positive issue, which also confirm our assumptions about the similarity of motor programs of the stroke and top-spin we can outline:

1. Relatively high accuracy indicators of the top-spin performance at the beginning of the second stage;

2. Reducing the time of beginning of learning curve growth from 9 lessons at the first stage, up to 5 lessons at the second.

Table 2

The test results of the experimental group

№ of respondents	Before the experiment		After the 1 stage of the experiment		Beginning of the 2nd stage of the experiment			After the 2nd stage of the experiment		
	Forehand	*Backhand*	*Drive from the right*	*Backhand*	*Forehand*	*Backhand*	*top-spin from the right*	*Forehand*	*Backhand*	*Forehand top-spin*
1	1	1	2	2	2	2	1	3	3	4
2	1	1	2	2	1	1	2	4	3	5
3	1	1	2	3	2	2	1	4	3	3
4	1	2	4	3	4	2	2	5	4	5
5	1	0	2	2	2	1	1	3	2	5
6	2	2	3	4	2	2	2	4	5	4
7	0	1	2	2	1	2	1	3	3	2
8	1	1	2	3	2	2	2	4	3	5
9	2	1	3	2	3	2	2	4	3	4
10	1	1	3	3	2	2	1	4	4	3
11	2	1	4	2	3	2	2	5	3	4

12	2	2	4	4	3	2	2	5	5	5
13	2	1	3	2	2	2	1	4	3	4
14	0	2	2	3	2	2	1	3	4	3
$\bar{x}$	1.2	1.2	2.7	2.6	2.2	1.8	1.5	3.9	3.4	4
σ	±0,67	±0,55	±0,79	±0,71	±0,77	±0,34	±0,50	±0,70	±0,82	±0,92
Statistical indicators	Stage 1 of the experiment				Stage 2 of the experiment					
	Forehand		Backhand		Forehand		Backhand		Top-spin	
	The beginning of the	The end of	The beginning of	The end of the	The beginning of	The end of the	The beginning of	The end of the	The beginning of	The end of the
$\bar{x}$	1.2	2.7	1.2	2.6	2.2	3.9	1.8	3.4	1.5	4
σ	±0,67	±0,79	±0,55	±0,71	±0,77	±0,70	±0,34	±0,82	±0,50	±0,92
t(p<0.01)	8.62		10.40		10.49		7.77		12.31	

The changing of testing target accuracy indicators at the beginning and at the end of the 2nd stage of the study is significantly different: the forehand – t_{St}=10.49 ($p<0.01$); backhand – t_{St}=of 7.77 ($p<0.01$), top-spin from the right, t_{St}=12,31 ($p<0.01$). The results of the pedagogical experiment shown in Fig. 3 and in table. 3, present the summary data of the analysis of changes in the composition of technical actions used in the game by the sportsmen of the experimental group before and after the pedagogical experiment. Thus, the number of applications of strokes in the game increased by 7%, the backhand – 6.8%, the top-spins from the right - by 3% (table. 3). Along with this, the number of drives from the right and drives from the left used in the game decreases (by 4% and 11.6% respectively).

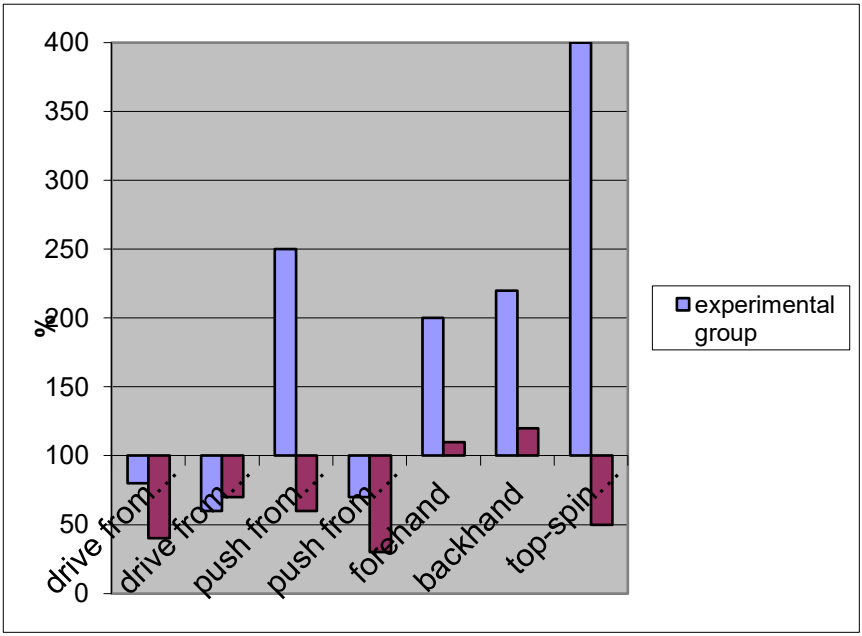


Fig. 4 *Generalized analysis of changes in the composition of technical actions used in the game by the sportsmen of the experimental group and benchmarks*

The changes of benchmarks in all technical elements are uniform and small (Fig. 4). In the experimental group were revealed significant changes in the composition of technical elements used in the game, which undergone purposeful activity in the course of the experiment.

Table 3

Dynamics of changes in the application of different technical actions in the game by the sportsmen of the experimental group (n=14)

Technical actions	At the beginning of the experiment			At the end of the experiment			Increase in %
	number	in %	$x \pm \sigma$	number	in %	$x \pm \sigma$	
Drive from the right	255	20	8,50 ±5,41	209	16	8,70 ± 3,02	-4

Drive from the left	385	30	12,83 ±11,19	233	18.4	9,29 ± 5,90	-11.6
Flick from the right	43	3.6	1,43 ±1,71	119	8.8	4,95 ±3,91	5.2
Flick from the left	371	29	12,36 ± 8,49	269	21.8	11,20 ±5,86	-8.2
Forehand	91	7	3,03 ± 2,72	149	14	6,20 ± 2,82	7
Backhand	70	5.5	2,33 ±4,51	97	12.3	4,04 ±2,19	6.8
Push from the right	11	1	0,36 ± 0,66	6	0.8	0,29 ± 0,67	-0.2
Push from the left	12	1	0,40 ± 0,67	4	0.4	0,16 ±0,38	-0.6
Flick from the left	1	0.1	0,03 ±0,18	4	0.4	0,16 ±0,38	0.3
Top-spin from the right	11	1	0,36 ±1,29	16	4	0,66 ±0,70	3
Lob	2	0.2	0,06 ± 0,25	1	0.1	0,04 ± 0,20	-0.1
Active receiving of services	19	0.9	0,63 ±2,41	28	3	1,16 ± 1,60	2.1
In total	1271	100%		1125	100%		

Discussion. Evaluation of the competitive activity of the table tennis player by the quantitative indicators allows to some extent assess his technical readiness, but these indicators do not give the answer to the question about the causality of the player's actions by the opponent's actions. In contrast to earlier studies of the analysis of gaming activity, in our study along with the quantitative analysis of technical actions used by sportsmen in the game, also were analyzed the actions of the opponent. In other words, not only the technical action was considered, but also its dependence on previous actions of the opponent.

The analysis of competitive activity of tennis players of different qualification have shown that primarily the sportsmen in the game (more than 10 % of cases) use no more than 40% of technical actions, among which there are separate groups of

technical actions used in the game more often than others. There is a significant difference in the number of actions used by the sportsmen of high and low qualification. Highly qualified sportsmen use the entire scope of technical actions. The sportsmen with low qualification use less than 50% of the possible actions, although during the workouts they do exercises that include all the scope of technical actions.

Proposed schematic model for the allocation of technically directed means presuppose the use of such provisions:

- reaching the highest values of the level of technical readiness during the course of the main competitions of the year;
- systematic change of some technical training means by other ones during the transition from one stage to another (using of exercises of various degrees of complexity), due to the increasing complexity of tasks;
- adhering to physiological laws, and pedagogical principles of formation and change of motor programs.
- continuity in formulation and solution of problems during the transition from one stage of technical preparation to another.

Conclusions. In the analysis of competitive activity of table tennis players were revealed the qualitative and quantitative characteristics of the use of different technical actions by the players of high qualification, which can be model characteristics of the technical training means distribution when building the training process for the table tennis players at the stage of initial sports specialization. There is an increase (from 0.3% to 24.2 %, $p<0.05$) in the proportion of technical actions of low complexity and decrease (from 73.3 % to 15.8 %, $p<0.05$) of the actions of average difficulty.

The results of the pedagogical experiment showed that changes in testing indicators of target accuracy at the beginning and at the end of the second stage of the study are significantly different: the forehand – t=of 10.49 ($p<0.01$), the backhand – t=of

7.77 ($p<0.01$), top-spin from the right – $t=12,31$ ($p<0.01$). The sportsmen of the experimental group showed the increase of technical actions used in the game, which were purposefully practiced in the process of the pedagogical experiment: the forehand – by 7 %, the backhand – by 6.8 %, top-spin from the right 3 %. In the control group, changes in all of the technical elements were uniform and not essential.

The strategy of the developed methodology of technical training was that at the first stage the formation or refinement of the motor program of a motor act took place, which in its structure is the basis, the foundation for a more complex motor action, practicing of which was conducted during the second stage.

Список використаних джерел:

1. Ахметов Р., Кутек Т. Использование современных биомеханических технологий в системе подготовки высококвалифицированных спортсменов. Наука в олимпийском спорте. 2013. № 1. С. 100-118.

2. Барчукова Г.В., Мизин А. Н. Настольный теннис. Учебное пособие для студентов. Москва.: ТВТ Дивизион, 2008. 188 с.

3. Барчукова Г. В., Богушас В. М., Матыцин О. В. Теория и методика настольного тенниса: учебник для студ. высш. учеб.заведений. Москва: Издательский центр «Академия», 2006. 528 с.

4. Зюзь В. М. Основи багаторічної підготовки в настільному тенісі: передпочатковий, початковий, попередньо-базовий етапи (5-12 років).Теорія та методика навчання (фізична культура і спорт). НПУ імені М.П. Драгоманова, 2004. С. 36-40.

5. Ландик В. И., Похоленчук Ю. Т., Арзютов Г. Н. Методологияспортивнойподготовки: настольныйтеннис. Донецьк: Норд-Прес, 2005. 612 с.http://repository.ldufk.edu.ua/bitstream/34606048/6297/1/%D0%90%20.%D0%9E%D0%BA%

D0%BE%D0%BF%D0%BD%D0%B8%D0%B9.pdf
(дата звернення: 10.03.2018)

6. Окопний А. Аналіз змагальної діяльності гравців високої кваліфікації у настільному тенісі в Україні та закордоном: http://repository.ldufk.edu.ua/bitstream/34606048/6297/1/%D0%90%20.%D0%9E%D0%BA%D0%BE%D0%BF%D0%BD%D0%B8%D0%B9.pdf (дата звернення: 10.03.2018)

7. Сутула В. О. Періодизація багаторічної підготовки спортсменів як наукова проблема. Слобожанський науково-спортивний вісник. 2013. № 3. С. 40-44.

8. Титов Д. Н., Барчукова Г. В. Динамика соревновательной деятельности российских и зарубежных теннисистов за последние десятилетие. Юбилейный сборник трудов молодых ученых и студентов РГАФК, посвященный 80-летию академии.Москва: Физкультура, образование, наука. 1998.С. 180-185.

References

1. Akhmetov R., Kutek T. The use of modern biomechanical technologies in the system of training of highly qualified sportsmen.Science in Olympic sports.2013. No. 1. P. 100-118.

2. Barchukova G. V., Mizin A. N. Table tennis. Study guide for students. Moscow.: TVT Division, 2008. 188 p.

3. Barchukova G. V., Bogushas V. M.,Matytsyn O. V. Theory and methodology of table tennis: a textbook for stud. higher. educ. establ. Moscow: Publishing center "Akademiya", 2006. 528 p.

4. Ziuz V. M. The basics of long-term training in table tennis: preliminary, initial, pre-basic stages (5-12 years). Theory and methodology of education (physical education and sport). NPU named after M. P. Dragomanov, 2004. P. 36-40.

5. Landyk V. I., Pokholenchuk Y. T., Artiuzov G. N. Methodology of sports training: table tennis. Donetsk: Nord-Press,

2005. 612 P. http://repository.ldufk.edu.ua/bitstream/34606048/6297/1/%D0%90%20.%D0%9E%D0%BA%D0%BE%D0%BF%D0%BD%D0%B8%D0%B9.pdf (accessed: 10.03.2018)

6. Okopnyi A. The analysis of competitive activity of high qualification table tennis players in Ukraine and abroad: http://repository.ldufk.edu.ua/bitstream/34606048/6297/1/%D0%90%20.%D0%9E%D0%BA%D0%BE%D0%BF%D0%BD%D0%B8%D0%B9.pdf (accessed: 10.03.2018)

7. Sutula V. O. Periodization of long-term preparation of sportsmen as a scientific problem.Slobozhanskyi Scientific Sports Herald.2013. No. 3. P. 40-44.

8. Tytov D. N., Barchukova G. V. Dynamics of competitive activity of Russian and foreign players over the last decade. The anniversary collection of works of RGAFK young scientists and students, dedicated to the 80th anniversary of the Academy. Moscow: Physical culture, education, science. 1998. P. 180-185.

UDC 37.091.12.11.3-051:796
DOI: 10.32626/PASAOPEAPT.2019.25-42

Aftimichuk Olga[2]

REGULARITIES OF THE DIALECTICS OF RHYTHM-STRUCTURAL ORGANIZATION OF THE DIDACTIC ACTIVITY OF THE PHYSICAL CULTURE TEACHER

Abstract. ***Relevance of research****: Rhythm binds the discrete acts of human activity to continuous integrity. From these positions, we should also consider the regularities of learning that determine the essential, objective and stable links between the constitutive components of the didactic process in its entirety. External and internal regularities of learning are in close interconnection: the change of the first ones entails the transformation of the latter.*

Goal of research: *was supposed to establish the characteristics of the rhythm for determining the dialectic of rhythmic construction in the system of physical education.*

Research methods: *The methods of theoretical investigation that were used in the given work can be considered as follows: abstract and axiomatic method, analysis and synthesis, induction and deduction, idealization, comparison and generalization, projection.*

Results: *Pedagogical activity, like any other processes, is built according to the canons of rhythm. From the standpoint of pedagogical activity, this may imply a rhythm of the performed professional actions of the teacher, each of which will imply a certain rhythm of pedagogical operations aimed at resolving the corresponding pedagogical situations. Taking into account that the whole process of professional and pedagogical activity presupposes a certain stage in its realization, which is repeated in all manifestations of the teacher's work, one can state its rhythmic character. There can be observed the whole spectrum of the characteristics of the rhythm: periodicity, cyclicity, repetition, helicity, waviness, etc., taking place in the pedagogical process. The*

[2] The State University Of Physical Education And Sport (Republica Moldova)
aftolig@mail.ru

manifestation of the process itself is carried out according to the laws of dialectics. This allows us to ascertain the formation of the rhythm of professional and pedagogical activity in accordance with dialectical laws.

Conclusions: *characteristics of current issues and challenges of innovative educational processes in vocational training of physical culture experts is impossible without taking into account the laws of dialectical development. In this regard, it raises the problem towards education of pedagogical activity rhythm skills in the future teaching staff of physical education and sport, which implies the organization of a series of new studies.*

Keywords: *rhythm, activity, physical culture teacher*.

Introduction. In the modern conditions, the educational process of students in the pedagogical specialties of the University requires the creation of new models that imply the realization of the potential of the praxeologycal approach as a method of optimizing educational systems that provides for the consideration of vocational training from the standpoint of the students' personal abilities aimed at achieving a given quality of the product. In this aspect, the characteristics/indices of the "rhythm" category are of interest for pedagogical studies.

Rhythm demonstrates the objective regularity of any process, starting with the universe and having a continuation in everything that happens in our world. It organizes human daily activities, both from the side of functional systems, and from its external side, makes it more productive, rational. When teaching labour and sports movements an important role is played by the process of the correct rhythm assimilation of the motor action, because it determines the optimal variant of the movement, which is manifested in the reduction of the process of its automation, as a result of which physical strength and nervous energy of human beings are saved.

Rhythm connects the discrete actions of human activity to continuous integrity. From these positions, it should be also

considered the patterns of learning that determine the essential, objective and stable links between the composite components of the didactic process in its entirety. External and internal patterns of learning are in close interconnection: the change of the former causes the transformation of the latter one.

Within the process of studying scientific and theoretical literature in the field of philosophy, psychology, physiology, pedagogy [11, 15, 18, 21 and many others], as well as specialized literary sources of other areas [9, 19, 22, etc.] that deal with rhythm problems, it was established that the same rhythmic patterns can be traced both in natural and in social phenomena, many of which predetermine a process where the manifestation of the rhythmic characteristic is indicated by the periodicity of its cycles.

Thus, the physiologists A.A. Ukhtomsky [21], N. Wiener [8], N.M. Amosov [3], S.P. Kurdyumov [14], etc., noted the importance of *rhythmic processes* within the work of the functional systems of the human body and their adjustment to a single rhythm when combined into a holistic process.

Psycho-physiologists A.R. Luria [16], N.A. Bernstein [6], Yu.I. Alexandrov [1, 2], and others, focused their attention on the category of *"rhythm"* as a characteristic of the activities performed.

In the pedagogy field the attention to the *rhythmic characteristic* of the training sessions was paid by V.A. Kan-Kalik [4], who had noted its orderliness and organization.

This given position determined **the goal of research**, which assumed the establishment of characteristics of the rhythm for determining the dialectic of rhythmic building in the system of physical education.

Methods of research. In order to realize this goal, during the work were used the methods of theoretical research: abstract and axiomatic method, analysis and synthesis, induction and deduction, idealization, comparison and generalization, design.

Results of the study and discussion. Any cycle has *its beginning, trajectory* and *finish/end*. In turn, *the trajectory* includes such phases as *development → vertex/peak → fading* (Fig. 1).

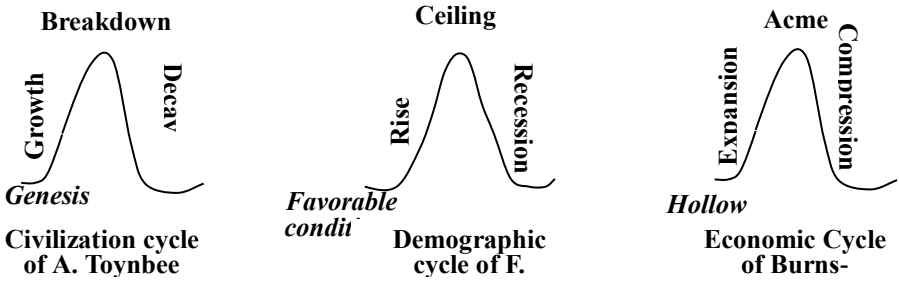


Fig. 1. Known cycles in various fields of science [1, p. 8.]

This can be followed in the physiological cycles: *systole – proto-diastolic period – diastole*; in psychological ones: *optimism – excitement – disappointment*; in psycho-physiological: *training – stable working capacity – fatigue*.

Economic cycles also consist of three main phases: *ascent – crisis – depression.* A similar alignment we find in philosophy, comparing development with progress: *becoming – flourishing – degradation*. In pedagogical activity, this is correlated with its stages: *preparatory/indicative – executive – evaluation-adjustment/control-adjusting,* as well as with parts of the lesson: *the preparatory part – the main part – the final part.* In all the fields represented, a three-phase manifestation of any of the processes is observed. Even in the field of art, the "carrying cycle" is also represented by three categories: *the tragic – the beautiful – the low*, although it has a slightly different accompaniment.

Here it can be noted that the number **"three"** symbolizes the integrity, the triple nature of the World, its versatility, the triune unity of creating, destroying and preserving forces of Nature – the reconciling and balancing principle, the happy Harmony, creative perfection and success. Another Syrian priest

and prophet Zarathustra in the VI-V centuries. B.C. proclaimed the "reign" of the number three in the whole universe [23]. It is noteworthy for the fact that it has a beginning, middle and end, and also, according to Aristotle [10], it is the number of the *"Universum"*, where the given concept denotes the entire objective reality in time and space, as the totality of objects and phenomena as a whole, considered in as a *unified system.*

Trinity is considered to be the simplest version of "phasing", therefore **three** categories are a universal set of various sciences that describe processes. As explained by Doctor of Philosophy, Professor Nikolai N. Alexandrov, "... a procedural three-phase module is prescribed for one cycle ..." [2, p.53]. And since the process, according to Hegel [20], represent an independent *cycle*, we can talk about the three phases of one of the system-procedural cycles.

According to the confirmation of N.N. Alexandrov, "In a general form, the *"cycle*" is an invariant way of marking, image of the *"process"* concept [1, p.7]. And all the procedural models can be perceived as both cyclical and spiral. It is not without reason that we operate with the phrase: *Everything new is a well forgotten old*, which is in some way consonant with the law of dialectics: **Denial of negation.**

And this assumes a procedural *spiral*, which can be represented by different forms: *cylindrical* (Fig. 2), assuming constancy and infinity and *conic* (Fig. 3), differing in the presence of a static point, or the "0" beginning, and a dynamic funnel, going to infinity.

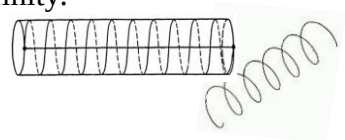
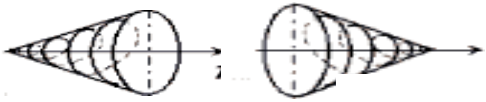


Fig. 2. Cylindrical spirals



a – divergent *b – convergent*

Fig. 3. Types of conical spiral

In turn, it is distinguished *divergent* (Fig. 3a) and c*onvergent* (Fig. 3b) type of conical spiral, suggesting two qualitatively different processes: *"centripetal"* and *"centrifugal"*, with positive and negative feedback. Here you can consider certain laws, both nature and society, consisting, in the first case, in *development, filling, analysis*, etc.; and in the second – in *degradation, devastation, synthesis*, etc., the opposites of which are in close interaction. When they are combined, a new integral rhythmic unit of the process cycle is formed, which determines *the impulse* (Fig. 4), as a kind of contradiction, without which the existence of any of the developing systems is impossible.

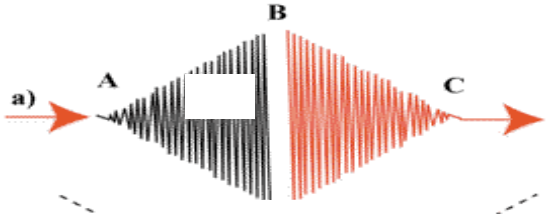


Fig. 4. Impulse

The termination of an impulse in any system means its transition to a new quality, which is reflected in the *noosphere theory* of V.I. Vernadsky [7]. This can be traced through the stages of society development that represent a change in socio-economic formations*: the primitive communal system → the state-communal system → slave ownership → feudalism → capitalism.*

Each of the designated formations represents by itself a single cycle (AC) in the form of an *impulse* (Fig. 5), assuming the *beginning* (A) of the system creation, its *development* (BAD), *culmination* (B) in development, *degradation* (BCD), *completion* (C) existence, passing to the initial point of the emergence of the next system, which predetermines the ***dialectic laws: the unity and struggle of opposites***, ***the negation of negation***, assuming the end of the impulse in any system as its transition to a new quality,

which is due to the law of ***the transition of quantitative indicators into qualitative.***

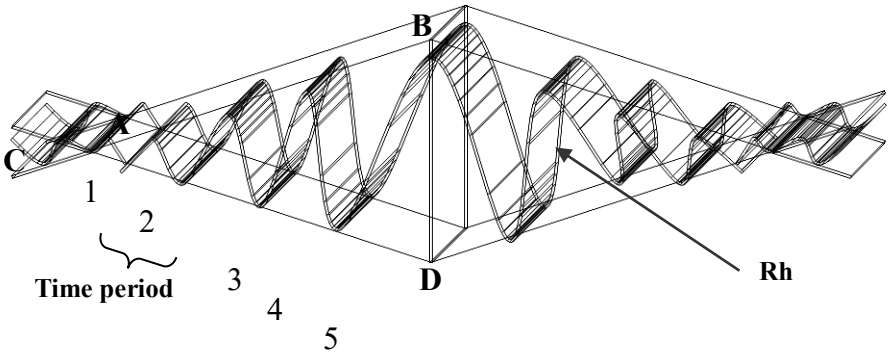


Fig. 5. Immanent impulse rhythm formation

The internal content of the *Impulse* represents by itself the rhythm of one cycle. The development of society occurs in the appropriate rhythm of changing formations. And within each formation there is a rhythm of the passage of the existence stages, where each of them also has an individual rhythmic basis, etc. On the example of the society development, we can trace the rhythm of the development of any system, and therefore, of any existing process. And since any activity is a process, the regularities of rhythm are observed also directly in any human activity.

From the standpoint of pedagogical *activity*, this may imply a rhythm of the performed professional *actions* of the teacher, each of which will imply a certain rhythm of pedagogical *operations* aimed at resolving the corresponding pedagogical situations (Fig. 6).

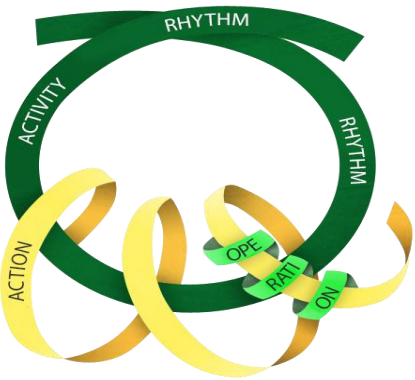


Fig. 6. Activity structural rhythm components [4]

This way, the rhythm characteristic of the development of any system, and therefore of any existing process, is subject to dialectical laws. In turn, the dialectical processes of development according to L. Klinberg imply the following features and characteristic features [13, p. 74-75]:

- "development as a qualitative process;
- development as self-movement;
- the contradiction, the unity of the struggle of opposites as a "source" and the moving force of development;
- development as a negation of negation;
- irreversibility of development ".

This allows us to state that the laws of rhythm are comparable with the dialectic of development.

In addition, it is necessary to identify a number of parameters that determine the specifics and characteristics of the rhythm: periodicity, cyclicity, repetition at a higher level, spiral feature, changing the pole of phenomena, progressive movement, sequential order, development, adaptation (internal to external), economy.

Given the fact that the whole process of professional and pedagogical activity assumes certain stages (preparatory, executive, evaluation and correction ones) in its implementation, which is repeated in all manifestations of the teacher's work, we can state its *rhythmic* nature. Here we observe the whole spectrum of the rhythm characteristics: *periodicity, cyclicity, repetition, spiral, waviness,* etc., taking place in the pedagogical process.

This way, the concept of *periodicity* consists in the determination of the activity periods that can be represented in schools and universities in terms of trimesters and semesters in the academic year, within which there are solved tasks, both general and private.

If the individual tasks vary depending on the temporary study period, the general ones do not exclude their importance in all periods of the academic year, which determines the periodicity of professional and pedagogical activity.

Cyclicity is manifested in the assessment of students' knowledge and skills (operational, current, final), traced within each of the terms, as well as for the entire period of study. Here the cycle sees the distribution of the time series for the organization and conduct of each type of assessment, which fixes the notion of something completed. In this case, a similar cycle is observed for all academic disciplines.

Repetition in the pedagogical activity can be observed also when it is renewed, either in equivalent groups of students or in the new school year. At the same time, with the acquisition of professional experience, as well as a result of self-improvement, repetition in personal pedagogical activity is carried out at a higher level, which presupposes dialectical *spiral* feature. Each round of the educational process is carried out on a more professional level.

Every process has a beginning and an end, between which the phase of development takes place, the moment of culmination and the phase of fading. Then everything resumes within the same

scheme. This form of flow of any process is determined by the *wave* form. This can be judged by considering the learning process as a conditioned system of educational disciplines, each of which represents one of the phases of wave formation. Within the framework of any discipline, we observe the process of accumulating knowledge, the process of educating skills with access to the formation of a skill that associates the climax. Then, to consolidate the education received, the process of inhibition begins in terms of obtaining new information and training new skills. The phase of preparation and passing of examinations comes. With each new discipline, the learning process resumes according to the scheme outlined, which demonstrates the wavy character of the entire educational system.

As we can see, each of the characteristics of the rhythm takes place in the pedagogical activity/process and each of them can represent the category "rhythm" according to its indicators. Given that the rhythm is a kind of alternation and the organization in time of some elements with a certain sequence and frequency you can interpret the rhythmic construction in a separate educational process, a lesson.

Following the dialectics of the pedagogical process, the formation of the rhythm of professional and pedagogical activity must be considered, both from the point of view of general provisions and *particular*/*concrete.*

General provisions will be directly correlated with the **dialectic laws**.

Within the framework of ***the law of unity and struggle of opposites***, the rhythm-formation of pedagogical activity will manifest itself in the contradictions of the earlier obsolete pedagogical views, concepts, the practical organization of the educational process, and the new, modern, increasingly sophisticated requirements that develop on their basis.

In the case of a *particular* vision of the rhythmic construction, it is necessary to address concrete didactic

situations, when, against the background of previously formed ideas about the conduct of the lesson, another path is proposed, improved to form a professional activity, consisting in the development of rhythm components of all its hierarchical levels (Fig. 7).

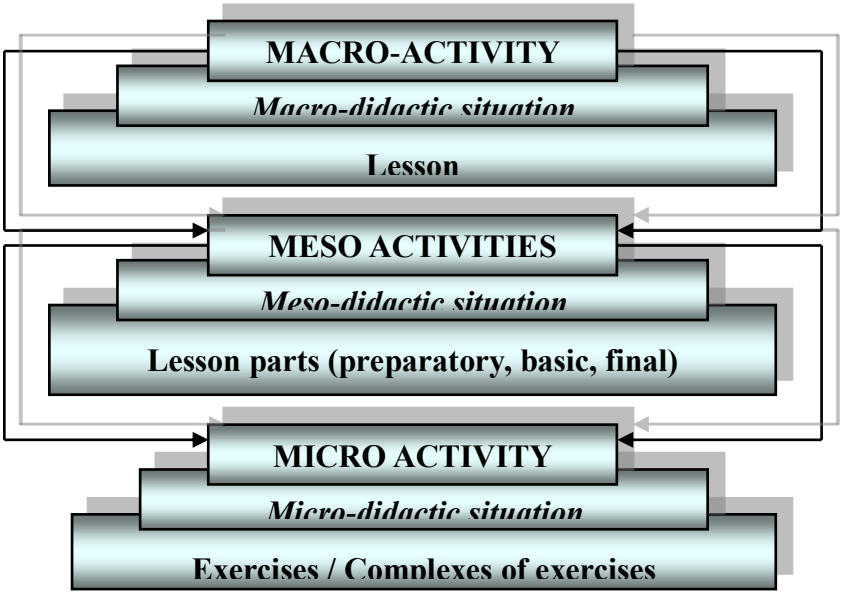


Fig. 7. Structural organization of didactic activity of physical education teachers

The law of transition of quantitative changes to qualitative ones, as an example, is well represented in the Design-Model of the structural composition of *the holistic didactic activity* of the Physical Education Teacher (Table 1). Here are well shown, the quantitative characteristics of the indicated activities, which are optimal/qualitative in the context of didactic technology, which implies the intensification of professional pedagogical training.

Table 1. Project-model of the structural composition of the integrated didactic activity of the teacher of physical culture

in the pedagogical system "Macro didactic situation Preparation Lesson Part" [5]

Meso-didactic situations	Quantity		Types of micro texts			Coordination level		Activity level			Tempo	Time
	Micro-texts	*Structural units of micro-text*	*Organisational*	*Didactic*	*Independent*	*Hearing-speech-vision-motor*	*Hearing-speech-visual*	*Reproductive*	*Adaptive*	*Local modelling*		
	Units		Units			Units		Units			B/min	Sec
1. *Walk (variants)*	32	64	12	12	8	8	24	8	16	8	60	64
2. *Run, jumps (variants)*	32	64	12	12	8	8	24	8	16	8	60	64
3. *Exercises for the muscles of the cervical spine*	32	128	12	12	8	8	24	8	16	8	60	128
4. *Exercises for the muscles of the shoulder girdle*	32	128	12	12	8	8	24	8	16	8	60	128
5. *Exercises for hands muscles*	32	128	12	12	8	8	24	8	16	8	60	128
6. *Exercises*	32	128	12	12	8	8	24	8	16	8	60	128

for the trunk												
7. *Exercises for the muscles of the lower extremity belt*	32	128	12	12	8	8	24	8	16	8	60	128
8. *Jumping dance elements*	32	64	12	12	8	8	24	8	16	8	60	64
9. *Exercises for the breathing functions*	6	64	6	4	6	4	4	8	8	4	60	64
Total:	272	896	102	100	70	68	204	68	136	68	60	896
Total:	100 %		37,5 %	36,8 %	25,7 %	25,0 %	25,0 %	75,0 %	50%	25,0 %	Mode-rate	14'55"

Negation of negation*,** as a dialectical ***law, testifies to the birth of the *new* as a well-forgotten *old*. And here the rhythmic construction of pedagogical activity in our research is based on the declarations of such teacher-researchers as A.S. Makarenko [17] and V.A. Kan-Kalik [11], the presence of rhythm in the educational process, but not substantiating (proving) this phenomenon. The development of the rhythm of activity in their research is demonstrated by self-sufficient studies of professional motor and communicative activities, which, in the framework of the integral pedagogical activity of a specialist in physical culture, determines its specificity.

Thus, the designation of ***the rhythm*** in the activity of the teacher, on the one hand, and its differentiated formation in the structure of the specialist's activity, on the other hand, testifies to the repetition of *the old* one at a *new* higher level.

Conclusions and prospects for further research. In

conclusion, it can be stated that the organizing and ordering functions of the category *"rhythm"* attract attention of researchers in various fields of science, art, and technology. From these points of view, pedagogy embodies two areas: *the science* of education and *the art* of human education [12], which is justified by the rhythmic beginning of the world around us, where man is its small component. The characteristics of actual problems and tasks of innovative educational processes in vocational education, and hence the system of professional training, in our case, a specialist in physical culture, is impossible without taking into account the laws of dialectical development.

This way, the problem of educating the rhythm of pedagogical activity in future didactic cadres in physical education and sport is raised, which presupposes the organization of a series of new studies.

Список использованых источников:

1. Александров Н.Н. Циклическая динамика. Книга 2. Основные понятия циклической парадигмы: Монография. Москва: Изд-во Академия Тринитаризма, 2013. 127 с.

2. Александров Н.Н. Циклическая динамика. Книга 4. Фазы цикла и матрицы истории: Монография. Москва: Изд-во Академия Тринитаризма, 2013. 457 с.

3. Амосов Н.М. Алгоритмы разума. Киев: Наукова думка, 1979. 223 с.

4. Афтимичук О.Е. Феномен ритма общения в коммуникативной деятельности учителя: Монография. Кишинёв: Valinex, 2011. 118 с.

5. Афтимичук О.Е. Структурный состав целостной дидактической деятельности преподавателя физического воспитания в педагогической системе «Подготовительная часть урока» // Национальная ассоциация ученых (НАУ); Педагогические науки, 2014. № 5. Ч. 4. С. 6-9.

6. Бернштейн Н.А. Биомеханика и физиология движений [Текст]: Избранные психологические труды / Под ред. В.П. Зинченко. 2-е изд. Москва; Воронеж: МПСИ: МОДЭК, 2004. 688 с.

7. В.И. Вернадский и ноосферная парадигма развития общества, науки, культуры, образования и экономики в XXI веке: Коллективная монография / Под науч. ред. А.И. Субетто и В.А. Шамахова. В 3-х томах. Том 1. Санкт-Петербург: Астерион, 2013. 574 с.

8. Винер Н. Кибернетика, или Управление и связь в животном и машине / Пер. с англ. И.В. Соловьева и Г.Н. Поварова; Под ред. Г.Н. Поварова. 2-е издание. Москва: Наука; Главная редакция изданий для зарубежных стран, 1983. 344 с.

9. Виноградов М.И. Физиология трудовых процессов. Москва: Медицина, 1996. 234 с.

10. Гайденко П.П. История греческой философии в ее связи с наукой. Москва: Книжный дом «ЛИБРОКОМ», 2009. 264 с.

11. Кан-Калик В.А. Техника педагогического общения [Текст]: Учителю о педагогической технике / Под ред. Л.И. Рувинского. Москва: Педагогика, 1987. С. 14-48.

12. Каптерев П.Ф. Педагогика – наука или искусство? [Текст]: Избранные педагогические сочинения / Под ред. А.М. Арсеньева; сост. П.А. Лебедев; Акад. пед. наук СССР. Москва: Педагогика, 1982. С. 49-62.

13. Клинберг Л. Проблемы теории обучения / Пер. с нем. Москва: Педагогика, 1984. 256 с.

14. Князева Е.Н., Курдюмов С.П. Основания синергетики. Синергетическое мировидение. Москва: КомКнига, 2005. 240 с.

15. Леонтьев А.Н. Деятельность. Сознание. Личность. Москва: Смысл, Академия, 2005. 352 с.

16. Лурия А.Р. Нейропсихология памяти. (Нарушения памяти при локальных поражениях мозга). Москва: Педагогика, 1974. 312 с.

17. Макаренко А.С. Педагогические сочинения: В 8 т.т. / Сост. М.В. Виноградова, А.А. Фролов. Москва: Педагогика, 1984. Т.4. 400 с.

18. Мейлах Б.С. Проблемы ритма пространства [Текст]: Ритм, пространство и время в литературе и искусстве. Ленинград: Наука, 1974. С. 3-10.

19. Пэрна Н.Я. Ритм, жизнь и творчество. Ленинград-Москва: Петроград, 1925. 143 с.

20. Рормозер Г., Френкин А.А. Новый консерватизм: вызов для России [Текст]: [пер. с нем.]. Москва: Ин-т философии РАН, 1996. 236, [1] с.

21. Ухтомский А.А. Доминанта. Статьи разных лет. 1887-1939. Санкт-Петербург: Питер, 2002. 448 с.

22. Чубур А.А. Ритмы в природе и в истории [Текст]: Краткий курс истории естествознания. Брянск: Издательский комплекс БФ МГСУ, 2003. 70 с.

23. Nigosian S.A. The Zoroastrian Faith: Tradition and Modern Research. Canada: McGill-Queen’s University Press, 1993. 157 p.

References

1. Aleksandrov N.N. Tsiklicheskaja dinamika. Kniga 2. Osnovnye ponjatija tsiklicheskoj paradigmy: Monografija. Moskva: Akademija Trinitapizma, 2013. 127s.

2. Aleksandrov N.N. Tsiklicheskaja dinamika. Kniga 4. Fazy tsikla i matritsy istorii: Monografija. Moskva: Akademija Trinitapizma, 2013. 457 s.

3. Amosov N.M. Algoritmy razuma. Kiev: Naukova dumka, 1979. 223 s.

4. Aftimichuk O.E. Fenomen ritma obshchenija v kommunikativnoj dejatel'nosti uchitelja: Monografija. Kishinyov: Valinex, 2011. 118 s.

5. Aftimichuk O.E. Strukturnyj sostav tselostnoj didakticheskoj dejatel'nosti prepodavatelja fizicheskogo vospitanija v pedagogicheskoi sisteme "Podgotovitel'naja chasti uroka" // Natsional'naja assotsiatsija uchyonyh (NAU); Pedagogicheskie nauki, 2014. № 5. Ch. 4. S. 6-9.

6. Bernshtejn N.A. Biomekhanika i fiziologija dvizhenij [Tekst]: Izbrannye psikhologicheskie trudy / Pod pedaktsiej V.P. Zinchenko. 2-e izdanie. Moskva; Voronezh: MPSI: MODEK, 2004. 688 s.

7. V.I. Vernadskij i noosfernaja paradigma razvitija obshchestva, nauki, kul'tury, obrazovanija ekonomiki v XXI veke: Kollektivnaja monografija / Pod nauchnoj pedaktsiei A.I. Subetto I V.A. Shamakhova. V 3 tomah. Tom 1. Sankt-Peterburg: Asterion, 2013. 574 s.

8. Viner N. Kibernetika, ili Upravlenie i svjaz' v zhivotnom i mashine / Perevod s anglijskogo I.V. Solov'eva i G.N. Povarova; Pod redaktsiei G.N. Povarova. 2-e izdanie. Moskva: Nauka; Glavnaja redaktsija izdanij dlja zarubezhnykh stran, 1983. 344 s.

9. Vinogradov M.I. Fiziologija trudovyh protsessov. Moskva: Meditsina, 1996. 234 s.

10. Gajdenko P.P. Istorija grecheskoj filosofii v eyo svjazi s naukoi. Moskva: Knishnyj dom "LIBROKOM", 2009. 264 s.

11. Kan-Kalik V.A. Tekhnika pedagogicheskogo obshchenija [Tekst]: Uchitelyu o pedagogicheskoi tekhnike / Pod redaktsiej L.I. Ruvinskogo. Moskva: Pedagogika, 1987. S. 14-48.

12. Kapterev P.F. Pedagogika – nauka ili iskusstvo? [Tekst]: Izbrannye pedagogicheskie sochinenija / Pod redaktsiej A.M. Arsen'eva; sostavitel' P.A. Lebedev. Moskva: Pedagogika, 1982. S. 49-62.

13. Klinberg L. Problemy teorii obuchenija / Perevod s nemetskogo. Moskva: Pedagogika, 1984. 256 s.

14. Knjazeva E.N., Kuryumov S.P. Osnovanija sinergetiki. Sinergeticheskoe mirovidenie. Moskva: KomKniga, 2005. 240 s.

15. Leont'ev A.N. Deatel'nost'. Soznaie. Lichnost'. Moskva: Smysl, Akademija, 2005. 352 s.

16. Lurija A.R. Nejropsikhologija pamjati. (Narushenija pamjati pri lokal'nykh porazhenijakh mozga). Moskva: Pedagogika, 1974. 312 s.

17. Makarenko A.S. Pedagogicheskie sochinenija: V 8 т.т. / Sostaviteli M.V. Vinogradova, A.A. Frolov. Moskva: Pedagogika, 1984. T.4. 400 s.

18. Mejlakh B.S. Problemy ritma prostranstva [Tekst]: Ritm, prostranstvo i vremja v literature i iskusstve. Leningrad: Nauka, 1974. S. 3-10.

19. Perna N.Ja. Ritm, zhizn' i tvorchestvo. Leningrad-Moskva: Petrograd, 1925. 143 s.

20. Rormozer G., Frenkin A.A. Novyj konservatizm: vyzov dlja Rossii [Tekst]: [perevod s nemetskogo]. Moskva: Institut filosofii RAN, 1996. 236, [1] s.

21. Ukhtomskij A.A. Dominanta. Stat'i raznykh let. 1887-1939. Sankt-Peterburg: Piter, 2002. 448 s.

22. Chubur A.A. Ritmy v prirode i v istorii [Tekst]: Kratkij kurs istorii estestvoznanija. Brjansk: Izdatel'skij kmpleks BF MGSU, 2003. 70 s.

23. Nigosian S.A. The Zoroastrian Faith: Tradition and Modern Research. Canada: McGill-Queen's University Press, 1993. 157 p.

UDC 615.83:314.37-058.865
DOI: 10.32626/PASAOPEAPT.2019.43-54

Urszula Gruca-Miąsik[3]

PEDAGOGICAL ASPECTS OF PHYSICAL THERAPY FOR CHILDREN LIVING IN THERAPEUTIC FOSTER FAMILIES

Abstract. Relevance of research*: personalistic philosophy proclaimed the supremacy of the human person over socio-economic and historical conditions. There is no doubt that a family is the first provider for their children, as a natural community of everyday life is a peculiar institution created to educate their children (younger generation). Children, surrounded by love easier accustom to the proper order of things, though naturally excreted in their souls over the youthful years, tested forms of human culture. When procreation is not possible, married life does not lose its value for this reason. Moreover, this infertility may provide an opportunity for spouses in other important service for the life of the human, for example, adoption, foster care, various forms of educational work, and assistance to other families, whether with poor or handicapped children. John Paul II stated that the family "is the first place" for »humanizing« "the person and society" and stressed that "the future of humanity is through the family." The Pope always underlined that a humane person cannot be treated as an object of use, as it is in fact a great good.*

Goal of research: *to present problems of modern society concerning social orphanhood and social diseases. The basis of these "social diseases" in the "lost community" – is a personality disorder with the symptoms of disorientation and confusion, alienation, acquired helplessness, and the development of disharmony and disintegration. Social disintegration may also cause such cultural imponderables as habits, resentments, frustrations, widespread disappointment, apathy and others.*

[3] University of Rzeszow (Poland), ulagrucamiasik@o2.pl

Research methods: *among optimal forms of family care for an orphaned child, there is a foster family, which is a specific care and educational institution, right after adoption, the closest to the family environment. In terms of sociology and pedagogy, placing a child in a foster family is treated as an opportunity to overcome the negative effects of social orphanhood (deprivation of needs) and to ensure the proper child development and socialization.*

Results*: foster families should get psychological and pedagogical care to acquire communicative competence, contributing to the growth of the individuals' skills in expressing their feelings and boundary control. It would also suggest working on increasing the adaptive mechanisms of the family and its cohesion. Physical therapy is very important for a child living in a foster family but also foster parents need this kind of support.*

Key words: *personalism, social orphanhood, foster family, care for an orphaned child, a mental or physical disability, physical therapy.*

Introduction. Before considering the view of pedagogical aspects of physical therapy for children living in therapeutic foster families, it is worth reminding that the term "personalism" which is fundamental, from my point of view when thinking about foster families, describes several contemporary (often overlapping) directions aimed at describing the autonomous value of a human personality with a particular emphasis on the concept of "a person"[1].

1. Personalistic philosophy – the concept of a person

The term "personalism" was first used by Friedrich Schleiermache[2], thereby indicating the principle of the concept of a personal God. This concept was opposed by pantheism[3].

[1] Presented text, in many parts, one can find in a book U. Gruca-Miąsik "Moral dimension of functioning of foster families viewed from the systemic perspective (2001-2011), Rzeszow 2012

[2] Friedrich Daniel Ernst Schleiermacher (born 21.11.1768, died. 12.01.1834 r.) – Protestant theologian, philosopher and educator. Although he did not establish a new school of thought, he initiated a new era in philosophy, and became

Among personalistic philosophy a stream of twentieth-century philosophy can be distinguished, which proclaimed the supremacy of the human person over socio-economic and historical conditions. It has developed in two versions: an integral humanism one (Jacques Maritain, Józef Tischner, John Paul 2), and in a social one (Emmanuel Mounier)[1].

"Wojtyla is the creator of one of the most honest and insightful conceptions of a human. Continuing the phenomenological-personalistic thinking about a man gives it his own original shape. In the center of anthropology there is a human. Wojtyla sees that person through an act opposed to the happening and the experience of it. An entity is not only a criminal and his observer, but its cause" (Palka 1999, p. 91).

During his pontificate, Pope John Paul 2 has repeatedly stressed that "a family is first and foremost like a mother and our

---

famous as a pioneer in the field of biblical criticism, which resulted in calling Schleiermacher in some circles the first great theologian after Kant. Schleiermacher chose the middle path between the secular philosophy and orthodox Christianity, taking as a starting point for consideration the phenomenon of religious experience. He saw the essence of religion in experiencing, in realizing by faithfuls total dependence on God. These items assessed as the key to every other Christian doctrine. Lack of dependence on God considered the essence of sin. Christ was (according to Schleiermacher) a man dependent on God to his end in every action, thought, word and deed. This relationship was expressed in the existence of God in Him (in Jesus). The mission of Jesus was to spell out the people of this total dependence – see. http://pl.wikipedia.org/wiki/Friedrich_Daniel _Ernst_Schleiermacher (accessed 02/06/2011).

[3] Pantheism is a theological, philosophical or religious view identifying God with the world, understood as nature. Pantheism is often combined with the ideas of the rational development of the universe, unity, eternity, and the vividness of the material world. Denies the existence of God as a rational being, claims God's penetration in all earthly substances. Among major pantheistic philosophy we include Stoicism, Neoplatonism, Theosophy, Philosophy of John Scotus Eriugena, Giordano Bruno and Baruch Spinoza – (see, eg, Adamski 2011).

provider [...]; in her children, surrounded by love, it's easier to accustom to the proper order of things, though naturally excreted in their souls over the youthful years, tested forms of human culture" (*Encyclopedia of education*... 2003, p. 426). There is no doubt that a family, as a natural community of everyday life[2], is a peculiar institution created to educate their children (younger generation). The inviolable laws are the rights of the family to educate their children.

John Paul 2 frequently stated that the family has a big job to do. "Children should grow in the right of freedom against material goods, by adopting a simple and austere way of life in the deep conviction that a man is more precious because of what he is than for what he has" (Apostolic Exhortation Familiaris Consortio, 1981).

It is in the family – as noted by the Pope – "that a man learns to recognize the dignity of the person and the child of God, because in each one, and above all the poor, the weak and afflicted, he sees the face of Christ, which he has to love and serve."

It should be noted, however, that the Polish Pope frequently drew attention to the fact that "when procreation is not possible, married life does not lose its value for this reason. Moreover, this infertility »may provide an opportunity for spouses in other important service for the life of the human, for example, adoption, various forms of educational work, and assistance to other families, whether with poor or handicapped children«" (Apostolic Exhortation *Familiaris Consortio*, Rome 1981).

John Paul 2 in *Familiaris consortio* also stated that the family "is the first place" for »humanizing« "the person and society" and stressed that "the future of humanity is through the family." The Pope always underlined that a humane person cannot be treated as an object of use, as it is in fact a great good. Speaking about the dignity of a man, the Pope had the view that

[2] In this way saint Thomas Aquinas defined family

the dignity of every human being covers, regardless of its defects, a mental or physical disability. Everyone is different, unique and each person should be approached individually. “True human development happens through personal relationships with other people. These relationships are founded upon the anthropological structure of the individual. Every man is by nature a social being and in his structure lies the basis for a variety of interpersonal references.” It is not possible to open people's souls and hearts using the same set of methods and means. A teacher (and a parent) must be an explorer, creator – only a person can be brought up, an animal can only be trained (Adamski 2011).

2. Social orphanhood – social disintegration

Material and methods of research. Social orphanhood is a problem that concerns modern society due to the scope of the phenomenon, the various forms of occurrence, and the difficulties in preventing as well as diagnosing the situation causing this phenomenon. This issue was undertaken by a number of educators and psychologists. Among others, Alice Szymborska (1969, 1973), Albin Kelm (1979, 1983), Alexander Tynelski (1979), Hedwig Ass (1983), Maria Schutterly-Fita (1985), Stanislaw Kozak (1986), Barbara Czeredrecka (1988), Janina Maciaszkowa (1991), Anna Maciarz (1991), Sylvia Badora (1998), Eve Sierankiewicz (1999) can be mentioned (see also Gruca-Miąsik, 1998a, p. 135–147; Gruca-Miąsik 1998b; Gruca-Miąsik 1999, p. 205–213).

Currently, in addition to natural orphanhood, which occurred particularly after World War II (in 1947, 54.5% of all orphans were natural orphans) an alarming phenomenon of “social orphans” is growing in numbers. This term was extracted from the Central Statistical Office in 1967 (Kozak 1986, p. 5). For decades, the term “social orphanhood” did not get the precise and accepted by everyone definition because the concept is still ambiguous.

In pedagogical literature we can distinguish a broad and narrow recognition of social orphanhood. In broad terms, two positions are distinguished. The representatives of the first tend

to consider, all children having a subjective feeling of loneliness as social orphans, even those who live with their parents and stay under their care. Representatives of the second one consider all juveniles remaining under the constant or periodic total care outside their own family social orphans, including those who maintain close contact with their family, (Maciaszkowa 1991, s 88).

Both of these broad streams show a considerable expansiveness. They have been fostered in common language, pedagogical and social journalism, the first of which is supported principally among psychologists, the second of which is closer to teachers and employees of the educational administration. Therefore, noting the functioning of the rather broad scope of the concept "social orphanhood" in social consciousness, one must also acknowledge that it includes children of very diverse situation in life and teaching.

According to S. Kozak, social orphanhood is a "phenomenon of the lack of parental care primarily due to a disruption in the functioning of the family: the lack of concern for the child, parents" delinquency and demoralisation, alcoholism, and serious parenting mistakes (Kozak 1986, p. 5).

Social orphans are children who are often under the care of probation officers, divorcing parents, imprisoned parents, alcoholics, drug addicts, prostitute mothers, of inefficient parents in terms of welfare and education, of families on the borderline of subsistence, but also of so-called respectable families in which the child does not feel an emotional bond with their parents.

In a situation of rapid changes, social disorganization appears, manifested inter alia in alcoholism, drug addiction, homelessness, social orphanhood, unemployment or social maladjustment. The basis of these "social diseases" in the "lost community" – as A. Olubiński writes (1996), is a personality disorder with the symptoms of disorientation and confusion, alienation, acquired helplessness, and the development of

disharmony and disintegration. Social disintegration may also cause such cultural imponderables as habits, resentments, frustrations, widespread disappointment, apathy and others (Sztompka 1997).

This negligence may arise in terms of ignoring the basic developmental emotional and physical needs of a child, on the one hand, by his parents, and on the other hand – by the state.

Family is defined as a social microsystem that is characterized by social cohesion, harmony and eufunction, i.e. the implementation of all basic functions assigned to it.

The process of family disfunction can take place at the level of tension, existing conflicts, deprivation of specific needs, neglecting of care and education, as well as decay, break up and pathological behaviors (Kawula, Brągiel, Janke 1997, p. 115–153).

When a child goes to a care institution, their situation essentially violates the basic psychological needs of the child, causing orphan disease. Such children cannot usually establish emotional ties with the environment; they are characterized by a lack of concentration, creativity, imagination, poor abstract thinking, and self-centeredness. With the situation of social orphanhood understood in a peculiar way we may also have in the pathological family.

Individual researchers have focused their attention on various manifestations of disorders, pointing out in children raised from infancy outside their own family, a variety of abnormal physiological, morphological changes, the reduced ability of reflective and abstract thinking, listlessness, emotional immaturity, and poor adaptation to conscious action (Maciaszkowa 1991). Social orphans are characterized by large deficits in physical, emotional, social and mental development.

3. Foster family care as optimal form of family for an orphaned child right after adoption

Research results. Among optimal forms of family care for an orphaned child, there is a foster family, which is a specific care and educational institution, right after adoption, the closest to the family environment. The range of responsibilities imposed on foster families almost do not differ from the ones of the natural family environment, because its special rights, but also duties, include the exercise of the current educational care of a baby having been orphaned naturally or socially. The upbringing of a child thus becomes the most important aspect of the functioning of the foster family.

Certainly, a foster family shall never fully replace the natural family for the child, however, it is a great chance for normal development and normal life for it, because it provides an opportunity for the child to participate in a favorable family environment, a sense of security, development as well as social and moral education.

In terms of sociology and pedagogy, placing a child in a foster family is treated as an opportunity to overcome the negative effects of social orphanhood (deprivation of needs) and to ensure the proper child development and socialization (Stelmaszuk 2000, p. 107).

No one doubts that the phenomenon of child loneliness can result from various situations. Research and experience clearly show that a child feels, educates and develops the best in a natural family environment. It is clearly confirmed by the Convention for the Protection of the Rights of the Child, which explicitly formulates the child's right to have a family. However, if the natural family disintegrates as a result of the death of the parents (natural orphanhood), or is unable to fulfill their duty of caring for and educating the child, care may be deprived of the natural caregivers. This phenomenon is occurring in society objectively, requiring consideration in search of the environment for replacement. Recent years have brought a wave of criticism of foster care institutions, for example, state orphanages. It is mostly

about emotional undertone, putting orphanages in comparison to a family environment.

Discussion. When a child enters a family, becomes its member, and starts relationships with individuals in this family, it becomes part of the system. According to the systems theory, a human is a part of the overall more complex system, which is a family. It should also be noted that an educational environment is able to create such situations in which the personality of the individual imposes on a given stimulus situation (or the project of transformation) its own, often an individual mark (Radziewicz-Winnicki 2008, p. 225 et seq.).

When a child is placed in a foster family on the basis of a court decision on the deprivation of parental custody, the court establishes legal custody of the child. The legal guardians of children placed in foster care tend to be foster parents, which leads to a desirable situation when both the educational and legal care belong to the same parents (Andrzejewski 2001, p. 91).

According to the Decree of the Minister of Labour and Social Policy of 4 June 2010 on foster families, the Support Centre prepares a foster family to take a child by "providing the detailed information about the child and its family situation, including the information about siblings and ensuring, as far as necessary, contact with the child before placing it in the family; for information about the specific needs of the child, including the decision about the need for special education, a compulsory pre-school year, individual teaching, rehabilitation and educational courses early support of child development preventive and educational or rehabilitative help, the Assistance Center enables a foster family to get advice in psychological and educational counseling or other specialized expertise and to undergo therapy."[3]

[3] The Regulation of the Minister of Labour and Social Affairs of 4 June 2010 on foster families (OJ of 23 June 2010)

Foster families differ in internal structure, specific task, which they may implement, and the type and strength of legal and emotional ties. Each of the above mentioned factors could be the determinant of the typology. Foster families which are kinship to a child, unrelated to a child, professionally unrelated to a child, also including many children, specialized and of family emergency nature can be distinguished (Brągiel, Badora 2005, p. 280).

Conclusions. In conclusion, it should be emphasized that it is difficult to draw general comparative conclusions about foster families in Poland. Moreover, there is still too little knowledge about the educational aspects of foster families, the psychosocial situation of children disconnected from their parents, and the problems of their personality and identity. So it is worth examining and analyzing the situation of a child's separation from the family, its psychological causes and social consequences. There is still a lack of analysis on families who neglect a child as well as a lack of indications resulting from the research for family therapy and social work (Arczewska 2004, p. 93).

Foster families should get psychological and pedagogical care to acquire communicative competence, contributing to the growth of the individuals' skills in expressing their feelings and boundary control. It would also suggest to work on increasing the adaptive mechanisms of the family and its cohesion.

To summarize the above considerations, it must be said that a foster family, although it is a positive educational environment, requires special assistance from institutions involved in family problems. Foster parents often need support themselves. Physical therapy is very important for a child living in a therapeutic foster family but also foster parents need this kind of support. For example, it is said that lack of exercise can shrink man’s brain so we should prepare the programs both for children as for parents and let them join it together.

One should remember that approximately 30% of children in foster care have severe emotional, behavioral, or developmental problems. A systematic research synthesis of empirical studies can be conducted in an attempt to identify and classify therapeutic interventions for foster children. With the increasing number of foster children entering the system, effective, evidence-based, therapeutic interventions are needed to treat this vulnerable population of children. Increasing emphasis should be placed on studying early protective and risk factors that appear common to many disorders. It has been well documented that intervening early in placement is essential in treating foster children also in part of physical therapy for children living in therapeutic foster families.

References

1. Adamski F. (red.),*Wychowanie osobowe*, Kraków 2011.
2. Andrzejewski M., *Prawne podstawy systemu opieki nad dzieckiem. Wprowadzenie*, [w:] „Problemy Opiekuńczo Wychowawcze", nr 4, 2001.
3. Brągiel J., Badora S., *Formy opieki*, *wychowania i wsparcia w zreformowanym systemie pomocy społecznej*, Opole 2005.
4. Gruca-Miąsik U., *Funkcjonowanie rodzin zastępczych jako optymalna forma opieki nad dzieckiem osieroconym* [w:] J. Sowa, D. Pstrąg (red.), Pedagogika opiekuńcza wobec współczesnej orientacji filozoficznej i praktyki pedagogicznej, Rzeszów 1998.
5. Gruca-Miąsik U., *Zawód: matka zastępcza*, [w:] J. Homplewicz, A. Garbarz (red.), Służba dziecku w instytucjach świeckich i kościelnych, Rzeszów 1998.
6. Gruca-Miąsik U., *Kompensacja sieroctwa społecznego w rodzinach zastępczych* [w:] G. Gajewska, M. Hejne (red.), Sieroctwo społeczne i jego kompensacja, Zielona Góra 1999.

7. Gruca-Miąsik U., *Rodzina zastępcza jako instytucja wspomagająca w środowisku lokalnym*, "Kwartalnik Edukacyjny", nr 1–2, 1999.

8. Gruca-Miąsik U., *Moral dimension of functioning of foster families viewed from the systemic perspective* (2001-2011), Rzeszow 2012.

9. Kawula S., Brągiel J., Janke A. W., *Pedagogika rodziny*, Toruń 1997.

10. Kozak St., *Sieroctwo społeczne*, Warszawa 1986.

11. Maciaszkowa J. (red.), *Z teorii i praktyki pedagogiki opiekuńczej*, Warszawa 1991.

12. Olubiński A., *Wsparcie społeczne w pracy socjalno-wychowawczej*, "Wychowanie na co dzień", nr 10–11, 1996.

13. Palka S., *Pedagogika w stanie tworzenia*, Kraków 1999.

14. Radziewicz-Winnicki A., *Pedagogika społeczna w obliczu realiów codzienności*, Warszawa 2008.

15. Stelmaszuk Z. W., *Dziecko w rodzinie zastępczej* [w:] E. Milewska, A. Szymanowska (red.), Rodzice i dzieci. Psychologiczny obraz sytuacji problemowych, Warszawa 2000.

16. Sztompka P., *Kulturowe imponderabilia szybkich zmian społecznych*, *zaufania*, *lojalności*, *solidarności*, "Studia Socjologiczne" nr 4, 1997.

17. Zwoliński A. (red.), *Encyklopedia nauczania społecznego Jana Pawła II*, Polskie Wydawnictwo Encyklopedyczne POLWEN, Radom 2003.

18. http://pl.wikipedia.org/wiki/Friedrich_Daniel_Ernst_Schleiermacher (accessed 02/06/2011).

UDC 796.012.6:617.753.2-053.6
DOI: 10.32626/PASAOPEAPT.2019.55-65

Hrystych Tamara, Zhyguliova Evelina,
Sovtysik Dmytro, Molev Valeriy, Butov Ruslan[4]

PHYSICAL THERAPY OF 13-14 AGED CHILDREN WITH MYOPIA

Abstract. Relevance of research*: according to World Health Organization data, every year amount of people with sight defects in the world grows in 1 million, every 5 seconds one adult is diagnosed vision disorder, every second – one child. Physical therapy is integral part of children with vision disorders health renewal and is aimed to facilitate improvement of vision system, develop physical and mental abilities to provide their optimal integration into conditions of modern life.*

Goal and methods of research*: to lay scientific foundation and develop a program of physical therapy of 13-14 aged children with myopia in conditions of specialized educational establishment. Theoretical analysis and summarizing of scientific methodological literature, documental materials and other sources; clinical methods; instrumental methods; methods of mathematical statistics.*

Results*: the results of Shtange test showed the following positive dynamics: in Basic Group (BG) 1 in 10%, in Controlled Group (CG) 1 in 8%. Positive dynamics was also observed while checking index of Heart Rate (HR) in BG 1 in 4%, in CG in 2%. Analyzing data of visual acuity it was revealed that in BG 1 this index improved in –0,53 dpt., in CG 1 in – 0,19 dpt. ($p<0,05$). Received figures gives the reason to claim that given program of physical therapy influences positively on visual analyzer function and physical condition components, and proves expediency of using of curative gymnastics during lessons.Created physical therapy program is based on consistent and balanced usage of the following elements: curative gymnastics, physiotherapy, curative massage, healthy diet and computer programs as means of physical*

[4] Kamianets-Podilskyi National Ivan Ohiienko University, Kamianets-Podilskiy, (Ukraine), kaf_fiz_reabil@kpnu.edu.ua.

rehabilitation. Learning of its effectiveness proves its advantage comparing to the previous and lets optimize process of physical therapy of 13-14 aged children with myopia in conditions of specialized educational establishment.

Key words: *children health, visual acuity, myopia, physical therapy.*

Introduction. Part or full losing of sight is hard illness, which considerably limits human abilities, effects our physical, psycho-emotional state, social adaptation. Because of visual disorders, children suffer from secondary deviations in physical development and forming of motor skills.

According to Euro integration processes in Ukraine, social adaptation of children with limited health abilities, visual disorders in particular, becomes very important. But successful socialization of such children is impossible without sufficient level of somatic health and physical development. At the same time, it is useful to mention that full or part losing of sight limits considerably amount of physical exercises and possibility of their using. In recent years some researchers (Kotkova, 2009) established theoretically and experimentally methods, which are aimed to correct motor disorders of children with weak eyesight in the proses of physical education. Yerakova (2005) created and tested health fitness technology in conditions of specialized educational establishment. Diachenko created posture faults corrective technology for primary school children with weak eyesight. Yurchenko created modular corrective technology of body positioning disorders. Using of physical exercises, aimed to increase the level of physical conditions of healthy children and children with vision and hearing disorders, is considerably wider due to computer systems.

At the same time, certain accumulated theoretical and practical material connected with physical rehabilitation, development and formation of motor skills of teenagers with vision disorders witnesses about insufficient results of created

physical therapy technologies in conditions of specialized educational establishment.

Goal of research – to lay scientific foundation and develop a program of physical therapy of 13-14 aged children with myopia in conditions of specialized educational establishment.

Material and methods of research. Researching was held on the basis of Kamianets-Podilskiy specialized boarding school of I-III levels according to contract, dating 12 February 2017, about cooperation in the field of developing the physical therapy program for children of different age with vision disorders. Contingent of research consisted of 32 children with myopia, age 13-14, Basic Group (BG) – 16 children, Controlled Group (CG) – 16 children.

Tasks of research were set stage by stage. At the first stage (October 2017) and on the second stage (November – December 2017) implemented effectiveness of created complex physical therapy program was defined, results of given program were checked experimentally by means of comparing, using methods of Maths statistics of opening, intermediate and final, results of testing of functional systems of children with myopia in basic and controlled groups.

At the third stage (January – March 2018) received results were summarized, conclusions were made, research work was formatted.

Vital capacity of lungs (VCL) is measured by spirometer. Person being investigated stands in front of device, nose is squeezed with special clip, the end of tube with tip is placed at the level of patient's lips, it shouldn't bend. Person, being investigated, makes maximal deep inhale, place tip in to the mouth and makes slow maximal exhale. Children make two deep inhales then each 15 seconds three measurements were made. The best result was recorded. [1,7]

Defining heart rate (HR) allows to monitor the reaction of cardiac system to loading. Heart rate was checked by pulse.

Checking HR was made by means of palpation the heart push. Amount of pushes in 1 minute was defined (bpm^{-1}).

Skiascopy (shadow test). Ophthalmologist very often needs to define the level of myopia. Certainly, it is possible to do this with the help of Sivtsev Table and set of small glasses with dioptric but such method won't be reliable enough. Skiascopy is more effective mean for checking the condition of visual system, the term is translated as "observing the shadow". Cornea and lens are responsible for refraction of light. To check it the doctor directs the ray of light, with the help of special mirror, onto pupil and observes the movement of shadows in the eye.

Significance of difference between the evaluations of physical indexes (VCL, HR) of children with myopia, who were divided according to normal law, was checked by means of Student t- criteria. Non parametrical criteria of Mann-Witney was used to compare skiascopy samples of children with visual disorders in basic and controlled groups. During data processing reliability P = 95% (probability of mistake 5%) was assumed, that means that level of significance p = 0,05. Mathematical data processing was done by means of MS Excel XP (Microsoft, the USA), Statistica 6.0 (StatSoft, the USA).

Research results. Discussion. General duration of rehabilitation course was 3 months according to specialized school program as well as created program [4,5,7].

Attenuated regime was set during first period (duration 1 month). Tasks of the period: Attenuated regime was set during first period (duration 1 month): adaptation of organism to physical loadings, improvement of muscular-ligamentous apparatus of eye, with accent on muscles, which take part in formation of vision. Curative gymnastics during the first period of physical therapy program was used four times a week. Duration of the curative gymnastics activity was 90 minutes. Besides, computer program "eYe" was used 3 times a week during attenuated regime. From physiotherapy manipulations Ambliokor device and laser therapy

were used. Ambliokor device was used once a week, laser therapy was used twice a week. Curative massage was given 5 times a week. After computer program exercises, curative eye massage was given, the other days special massage was given. Balanced diet was kept according to school menu [1,2,3].

Attenuated training regime was set during second period (duration 2 month). Tasks of the period: form muscle sling, rise the level of physical condition, further strengthening of eye muscles, improve blood supply of eye tissues and muscles.

Curative gymnastics exercises during the second period were held 5 times a week. Duration of the curative gymnastics activity was 90 minutes. Computer program "Chibis" was also used once a week and program "Shulte table" twice a week. From physiotherapy manipulations, devices Ambliokor and Strumok were used. Ambliokor device was used twice a week, Strumok device was used once a week. Curative massage was given 3 times a week. After computer program exercises, curative eye massage was given. Balanced diet was kept according to school menu. Healthy curative diet was kept according to school menu [6].

Analysis of VCL defining showed that among pupils medium index before rehabilitation was 2388±351 ml ($\overline{X}$±S), CG – 2346±376 ml. Comparing received data with standard indicators we can claim that in BG VSL is 30% less than standard, in CG 31% less.

After performing rehabilitation manipulations (examine after I period), VCL index in BG of pupils was 2516±367 ml, in CG 1 – 2457±394 ml. Thus in BG medium index of VCL improved in 130 ml, in CG in 111 ml. Comparing received data with standard indicators we can claim that in BG 1 VSL 27% less than standard, in CG 28% less.

After performing rehabilitation manipulations (examine after II period), VCL index in BG of pupils was 2792±284 ml, in CG 2671±401 ml. Thus in BG medium index of VCL improved in

376 ml, in CG 1 in 214 ml. Comparing received data with standard indicators we can claim that in BG 1 VSL 20% less than standard, in CG 23% less.

Thus in BG medium index of VCL improved in 406 ml, in CG 1 in 325 ml. That shows that after performing rehabilitation manipulations VCL index in BG improved in 10%, in CG in 8%.

At the beginning, medium index of VCL among boys of BG was 2578±283 ml ($\bar{X}$±S), CG – 2569±344 ml. Among girls, corresponding indexes were defined: in BG VCL was 2120±248 ml, CG – 2050±138 ml.

After performing rehabilitation manipulations, (examine after I period) VCL index among boys in BG was 2700±325 ml, CG– 2675±386 ml. Among girls, corresponding indexes were defined. In BG VCL index was – 2260±249 ml, CG 2167±124 ml. Thus among boys of BG medium VCL index improved in 122 ml, CG – in 106 ml. Among girls of BG medium VCL index improved in 140 ml, CG in 117 ml.

After performing rehabilitation manipulations (examine after II period), VCL index in BG among boys was 3014±339 ml ($\bar{X}$±S), CG – 2900±384 ml. Among girls, corresponding indexes were defined. In BG VCL index was 2480±160 ml, CG - 2367±124 ml. Thus among boys of BG medium VCL index improved in 436 ml, CG – in 331 ml. Among girls of BG medium VCL index improved in 360 ml, CG in 317 ml.

Analysis of HR defining showed that among pupils medium index before rehabilitation was 80,4±4,4 bpm^{-1} ($\bar{X}$±S), CG – 78,9±4,8 bpm^{-1}. Comparing received data with standard indicators, we can claim that in BG HR is 14% more than standard, in CG in 12%.

After performing rehabilitation manipulations (examine after I period), HR index among pupils of BG was 78,4±4,1 bpm^{-1}, CG – 78,1±4,6. Thus in BG medium HR index lowered in 2 bpm^{-1}, in CG in 0,8 bpm^{-1}. Comparing received data with standard indicators, we can claim that in BG HR is more than

standard in 12%, in CG in 11%.

After performing rehabilitation manipulations (examine after II period), HR index among pupils in BG was 77,1±3,4 bpm^{-1}, CG – 77,2±3,9 bpm^{-1}. Thus in BG medium HR index lowered in 3,3 bpm^{-1}, CG 1 – in 1,7 bpm^{-1}. Comparing received data with standard indicators, we can claim that in BG HR is more than standard in 10%, in CG in 10%.

That means that after performing rehabilitation manipulations HR index improved in BG in 4%, in CG in 2%.

At the beginning, medium HR index among boys of BG was 78,1±3,5 bpm^{-1} ($\bar{X}$±S), CG – 76,9±3,8 bpm^{-1}. Among girls, corresponding indexes were defined: in BG HR was 83,3±3,7 bpm^{-1}, in CG – 81,8±4,4 bpm^{-1}.

After performing rehabilitation manipulations (examine after I period), HR index among pupils in BG was 76,6±3,4 bpm^{-1}, in CG – 75,7±3,5 bpm^{-1}. Among girls, corresponding indexes were defined: in BG HR was – 80,7±3,6 bpm^{-1}, in CG – 81,4±4,1 bpm^{-1}. Thus in BG among boys medium HR index lowered in 1,5 bpm^{-1}, in CG in 1,2 bpm^{-1}. Among girls in BG medium HR index lowered in 2,6 bpm^{-1}, in CG in 0,4 bpm^{-1}.

After performing rehabilitation manipulations (examine after II period), HR index among boys in BG was 75,6±3,2 bpm^{-1} ($\bar{x}$±S), CG – 75,7±3,4 bpm^{-1}. Among girls, corresponding indexes were defined: in BG HR was 79±2,5 bpm^{-1}, CG – 79,2±3,6 bpm^{-1}. Thus in BG among boys medium HR index lowered in 2,5 bpm^{-1}, CG in 1,2 bpm^{-1}. Among girls in BG medium HR index lowered in 4,3 bpm^{-1}, in CG in 2,6 bpm^{-1}.

Analysis of visual acuity defining showed that among pupils medium index before rehabilitation was (–2,42±0.61) dpt. ($\bar{X}$±S), CG – (–2,19±0.77) dpt.

After performing rehabilitation manipulations (examine after I period) visual acuity index among pupils in BG was (–2,24±0,55) dpt. ($\bar{X}$±S), CG – (–2,17±0.79) dpt. Thus, in BG medium visual acuity index improved in (–0,18) dpt., KG 1 – in (–

0,02) dpt.

After performing rehabilitation manipulations (examine after II period) visual acuity index among pupils in BG was (–1,89±0.56) dpt. ($\bar{X}$±S), CG – (–2 ±0.83) dpt. Thus, in BG medium visual acuity index improved in (–0,53) dpt., KG 1 – in (–0,19) dpt.

At the beginning, medium visual acuity index among boys of BG was (–2,5±0.61) dpt. ($\bar{X}$±S), CG (–1,71±0.59) dpt. Among girls the following indexes were defined: in BG (–2,58±0.60) dpt., КГ (–2±0.32) dpt.

After performing rehabilitation manipulations (examine after I period) visual acuity index among boys in BG was (–2,31±0.55) dpt. ($\bar{X}$±S), CG (–1,71±0.59) dpt. Among girls, corresponding indexes were defined: (–2,33±0.47) dpt., CG (–2±0.32) dpt. Thus in BG among boys medium visual acuity index improved in (–0,19) dpt., in CG index did not change. Among girls in BG medium visual acuity index improved in (–0,25) dpt., in CG index did not change.

After performing rehabilitation manipulations (examine after II period) visual acuity index among boys in BG was (–1,94±0.58) dpt., CG (–1,5±0.38) dpt. Among girls the following indexes were defined: in BG 1 (–2,08±0.60) dpt., CG (–1,7±0.83) dpt. Thus in BG among boys medium visual acuity index improved in (–0,56) dpt., CG – in (–0,21) dpt. Among girls in BG medium visual acuity index improved in (–0,5) dpt., CG – in (–0,3) dpt.

Conclusions. Thus, received data give reason to claim that created physical therapy program for children of 13-14 age with myopia, who study in specialized educational establishment. Comparing to previous program of rehabilitation, this program influences positively on visual analyzer function and physical condition components, helps children with myopia accommodate to surrounding environment quicker and with better quality and proves expediency of using of curative gymnastics during lessons.

The results of Shtange test showed the following positive dynamics: in Basic Group (BG) 1 in 10%, in Controlled Group (CG) 1 in 8%.

Positive dynamics was also observed while checking index of Heart Rate (HR) in BG 1 in 4%, in CG in 2%.

Analyzing data of visual acuity, it was revealed that in BG 1 this index improved in –0,53 dpt., in CG 1 in –0,19 dpt. ($p<0,05$).

Dynamic of visual indexes among researched children in basic group was more vivid after using curative gymnastics during lessons in physical therapy program for 13-14 aged children with myopia.

Further researching perspective is connected with learning of effectiveness of created physical therapy program for rehabilitation children of young schooling age with vision disorders in conditions of specialized educational establishment.

Список використаних джерел:

1. Алёшина А.И. Характеристика специальных физических упражнений в системе физической реабилитации при близорукости / А. И. Алёшина // Фізичне виховання, спорт і культура здлров'я у сучасному суспільстві– Луцьк, 2014.–Вип. 13. – С. 100-112.

2. Алёшина А. И. Современные представления о комплексной физической реабилитации школьников с близорукостью / А.И. Алёшина // Молодіжний науковий вісник Волинського національного університету імені Лесі Українки. – Луцьк, 2014.– Вип. №14. – С. 11-17.

3. Афанасьєв С. М. Особливості впливу порушення функцій зорової та слухової систем на організм дитини і підлітка / С. М. Афанасьєв, О. С. Афанасьєва // Спортивний вісник Придніпров'я – 2014. – № 3.– С. 145-148.

4. Баннікова Р. Фізична реабілітація слабозорих дітей шкільного віку з функціональними порушеннями опорно-рухового апарату в умовах спеціалізованого навчального

закладу / Римма Баннікова, Руслан Бутов // Молодіжний науковий вісник Східноєвропейського національного університету імені Лесі Українки. Сер.: Фізичне виховання і спорт. – 2016. – Вип. 22 – С. 105–111

5. Бутов Р. С. Комплексная программа физической реабилитации для слабовидящих детей 13-15 лет / Р. С. Бутов // Инновационные образовательные технологии. – Минск, 2014. – №2. – С. 80-84.

6. Редковец Т. Г. О влиянии программы физической реабилитации при близорукости у подростков, учащихся общеобразовательных школ, на поликлиническом этапе / Т. Г. Редковец, Хайсам Ромман Дж. М. // Науковий часопис НПУ імені М. П. Драгоманова Серія 15. Науково-педагогічні проблеми фізичної культури (фізична культура і спорт). – 2014.–Вип.3(46). – С. 77-87.

7. Фурман Ю. Н. Современный взгляд на причины близорукости, ее коррекцию и реабилитацию у школьников /Ю. Н. Фурман// Молодіжний науковий вісник Волинського національного університету імені Лесі Українки. – Луцьк, 2014. – Вип. 15. – С. 100-108.

References

1. Alyoshina A.I. Harakteristika spetsialnych fizicheskih uprazhneniy v sisteme fizicheskoy reabilitatsii pri blizorukosti / A. I. Alyoshina // Fizychne vyhovannya, sport i kultura zdlrovya u suchasnomu suspilstvi– Lutsk, 2014.–Vyp. 13. – S. 100-112.

2. Alyoshina A. I. Sovremennyie predstavleniya o kompleksnoy fizicheskoy reabilitatsii shkolnikov s blizorukostyu / A. I. Alyoshina // Molodizhnyi naukovyi visnyk Volynskogo natsionalnogo universytetu Imeni Lesi Ukrayinki. – Lutsk, 2014.– Vyp. №14. – S. 11-17.

3. Afanasyv S. M. Osoblyvosti vplyvu porushennya funktsiy zorovoyi ta sluhovoyi sistem na organizm dutunu i pidlitka / S. M. Afanasev, O. S. Afanaseva // Sportivniy visnik Pridniprovya – 2014. – № 3.– S. 145-148.

4. Bannikova R. Fizichna reabilitatsiya slabozoryh ditey shkilnogo viku z funktsionalnymy porushennyamy oporno-ruhovogo aparatu v umovah spetsializovanogo navchalnogo zakladu / Rimma Bannikova, Ruslan Butov // Molodizhniy naukoviy visnik ShidnoEvropeyskogo natsionalnogo universitetu Imeni Lesi Ukrayinki. Ser.: Fizichne vyhovannya i sport. – 2016. – Vyp. 22 – S. 105–111.

5. Butov R. S. Kompleksnaya programma fizicheskoy reabilitatsii dlya slabovidyaschih detey 13-15 let / R. S. Butov // Innovatsionnyie obrazovatelnyie tehnologii. – Minsk, 2014. – №2. – S. 80-84.

6. Redkovets T. G. O vliyanii programmy fizicheskoy reabilitatsii pri blizorukosti u podrostkov, uchaschihsya obscheobrazovatelnoy shkole, na poliklinicheskom etape / T. G. Redkovets, Haysam Romman Dzh. M. // Naukoviy chasopis NPU Imeni M. P. Dragomanova Seriya 15. Naukovo-pedagogichni problemy fizychnoii kultury (fizichna kultura i sport). – 2014.– Vyp.3(46). – S. 77-87.

7. Furman Yu. N. Sovremennyiy vzglyad na prichiny blizorukosti, ee korrektsiyu i reabilitatsiyu u shkolnikov /Yu. N. Furman// Molodizhniy naukoviy visnyik Volynskogo natsionalnogo universitetu Imeni Lesi Ukrayinki. – Lutsk, 2014. – Vip. 15. – S. 100-108.

UDC 796.012.2–053.5: 616.831
DOI: 10.32626/PASAOPEAPT.2019.66-80

Iedynak Gennadii, Galamandjuk Lesia,
Bodnar Alina, Babiuk Serhii,
Chistyakova Marina, Potapchuk Serhii[5]

RATE OF CHANGE IN MORPHOFUNCTIONAL INDICATORS OF GIRLS WITH CEREBRAL PALSY OVER 7-17 YEARS

Abstract. Relevance of research*: to improve the efficiency of physical education of girls with cerebral palsy, information on the growth rates of their morphofunctional indicators is required.*

Goal and methods of research*: the goal was to establish periods with the highest and lowest rates of morphofunctional maturation of girls with different forms of cerebral palsy in the period of 7-17 years. The study involved 80 girls, namely 20 with each existing form of cerebral palsy. The following methods were used: analysis, pulsometry, sphygmomanometry, dynamometry, spirometry, anthropometry, mathematical statistics.*

Results*: we have received data on changes in morphological and functional parameters of girls with different forms of cerebral palsy over 7-17 years. We have established the values of growth of morphological and functional parameters of girls with different forms of cerebral palsy at each age of 7-17 years. These data were considered in the light of the provisions of the theory of "systemogenesis", "on the reliability of biological systems", "on critical periods of development", "on the various types of structural transformations during morphofunctional maturation of the organism". This contributed to the establishment of the age of girls, during which their morphofunctional maturation occurs at high, medium, low rate or stands at the critical level. This indicated the influence of biological and pedagogical factors on morphofunctional maturation of girls with a certain form of cerebral palsy. The greatest*

[5] Kamianets-Podilskyi National Ivan Ohiienko University (Ukraine), yedinak.g.a@gmail.com

influence of the pedagogical factor, which testifies the necessity to use the maximum amount of physical education means, falls on 10 and 16 years, the influence of the average level - at 7, 9, 12-13 and 15 years.

***Conclusions**: The obtained data set preconditions for the coordinated with biological peculiarities of pedagogical influence on the organism of girls by means of physical culture in order to enhance the process of their development.*

***Key words:** girls, cerebral palsy, maturation, physical education.*

Introduction. At different stages of ontogeny, the morphofunctional maturation of a child occurs in different tempo: the intensive improvement of morphofunctional indicators changes a deferred one, stabilization or even some decline. In this regard, the functional readiness of the organism to influence on it by means and methods of physical education is disparate [15; 19; 20]. Consequently, the latter should be adequate to the peculiarity that is observed at a certain age of the period of 7-17 years during the morphofunctional maturation of a child [22].

At the present point in time, a considerable amount of age-specific characteristics has been accumulated in the dynamics of morphofunctional indicators of physically healthy girls and boys of school age. Such data and account of the positions of the theory of systemogenesis [1; 16], on the reliability of the biological system [11; 22], on critical periods of development [2], on the distinct types of structural transformations (growth and differentiation) in morphofunctional maturation of the organism [14; 20] allow us to consider the use of means and methods of physical education from the perspective of the unity of biological and pedagogical factors in such a process [15; 24]. Such information is very essential for practice, as it creates the preconditions for an objective assessment of the possibilities of each child at a certain age of 7-17 years. Given the available capabilities, the educator finds adequate means and methods of physical education for achieving the maximum effect in improving these opportunities without prejudice to the

development of the organism determined by the appropriate individual program [17; 18; 23-25]. Thereby, forecasting is considered as one of the most significant factors that determines the success of further medical and pedagogical influence on the organism of a child with a disability in consequence of the disease of cerebral palsy (hereinafter referred to as a child with a CP) for the implementation of rehabilitation means, kinesitherapy or (and) ergotherapy [5; 8; 9]. The importance and necessity of obtaining data on morphofunctional maturation of children 7-17 years of age with a CP in part confirms the fact of the development of this issue in oligophrenopedagogy, notably, there are a large number of researches devoted to this issue, both domestic and professionals of the near and far abroad [10, c. 7-8].

We revealed with the help of the conducted analysis of scientific literature that O.V. Guzii (2002) studied the dynamics of morphofunctional indicators of boys with CP at age 13-15 years, at the age 15-17 years - M.S. Kovin'ko (2002), O.A. Merzlikina (2002), S.P. Demchuk (2003). In the meantime, we note that they classified the form of the CP by the methods of K. A. Semenova [9], but it was not taken into account during the processing of data. In the research of N.V. Ganzina (1997), the age of a sample of individuals with the CP was in the range of 17-40 years. A considerable number of researches carried out by specialists from the far abroad coincide with the 60s of the last century, but they are devoted to the study of mainly morphological indicators in the context of growth processes. At a later stage (80th and 90th) the main direction of researches was the study of the relationship between growth processes and metabolism indicators, mental capabilities, some other functional characteristics of children with CP [3; 5].

Hence, existing researches are characterized by fragmentation, the samples are heterogeneous in terms of age, different indicators and methods for setting their values are used. At once, an important and necessary factor is the systematic

(every 10 years) refinement of available data on morphofunctional maturation of children in the period of 7-17 years. The above-noted stipulated the need for the study of the isolated problem.

Goal of research – to establish periods of the largest and the least rates of morphofunctional maturation of girls with the CP at 7-17 years.

Material and methods of research. The study involved 80 girls, namely 20 with spastic diplegia, hemiparesis, hyperkinesis and atonic-astatic forms of CP; with the beginning of the study all girls turned 7 years old. We determined the form of CP by the method of K. A. Semenova [9]. The research was conducted in compliance with the World Medicine Association declaration of Helsinki: Ethical principles for medical research involving human subjects (2013). The study protocol was approved by the Ethical committee of the Lviv State University of Physical Culture. Indicators were determined every year in September-October, namely: length, body weight, encircling dimensions of the chest (EDC), lung capacity (LC), systolic and diastolic arterial pressure (AP), resting heart rate (HR) and wrist strength of the unharmed limb. To determine the LC, we used a water spirometer, to determine the AP - automatic tonometer "VA-330" was used, to determine wrist strength we used the wrist dynamometer DK-90. All tools corresponded to the requirements of standardization, and the technology of obtaining data met the recommendations of special literature [4; 6; 12; 13]. The obtained empirical data was interpreted after the transfer of absolute values of indicators to the scores. To this effect, every age of children was considered from the perspective of the intensity of change in a certain indicator in the period of 7-17 years: the total change (for the whole period) was 100%; annual change - the difference in the values of the indicator (in percentages), which reflected the speed of the process. The values were transferred to the score: high rate of growth of the indicator - 3 scores, average - 2, low - 1, very low - 0 scores. The total score of the three morphological and five

functional indicators testified the general rate of change in a certain age of the period of 7-17 years. For morphological indicators, the scores from 9 to 7 showed a high rate of change, from 6 to 4 - the average rate, from 3 to 1 - the low rate; 0 and less indicated subcritical period in development. For functional indicators, compliance with the rates was assessed accordingly by the scores 15-13; 12-7; 6-1; 0 and less.

Research results. Annually the b o d y l e n g t h of the girls with different forms of CP increased, which led to its augmentation over the period of 7-17 years on 49.6 cm (100 %). The annual change in the value indicated such facts: a high augmentation (28.2 and 48.5% of the total 100%) was observed between 7 and 9, 14 and 16 years ($p < 0,05$); lack of change - other periods except 9 years and 16 years; during which they accounted respectively 5 and 7.9% ($p > 0,05$). B o d y w e i g h t of girls over 7-17 years increased by 31.2 kg (100 %; $p < 0,05$). The high augmentation was only between 7 and 8, 12 and 14, 15 and 16 years, since it was 13.8, 40 and 16.3% respectively ($p < 0.05$), and the average (5.1-5.2%) - between 8 and 10 years ($p < 0,05$); in other periods we noted only the tendency to change, as it was statistically unreliable ($p > 0,05$). E D C has grown in size from 7 to 17 years in average by 29,6 cm ($p < 0,001$). The high augmentation (from 10.6 to 14%) was indicated between 7 and 9, 11 and 13, 14 and 15, 16 and 17 years, the average (9.9%) - only at 15 years ($p < 0,05$); at another age the change was unreliable.

In terms of functional indicators, then the development of the neuromuscular system of girls with different forms of CP according to the data of the wrist dynamometry of the unharmed limb was marked by a certain peculiarity. Thus, in the period of 7-17 years, the indicator of girls with spastic diplegia increased by 20.5 kg, girls with hemiparesis - by 19.2 kg, with hyperkinesis and atonic-astatic forms - by 16.1 and 15.5 kg respectively ($p < 0,05$). At the meantime, we observed a similar tendency, namely, the annual improvement of the indicator and practically the with same

tempo: high (augmentation is 67.7-70.2%) - between 12 and 15 years, the average (8.3-9.9%) - between 16 and 17, low (4.8-7.1%) - between 8 and 9, 10 and 11 years ($p < 0,05$); in other periods there was only a positive tendency. LC between 7 and 17 years has increased by 2355,1±38,3 ml, but the augmentation was uneven: high - only between 14 and 16 years (59.5% of the total), the average - between 10 and 11, 12 and 13, 16 and 17 (by 27.2%) ($p < 0,05$); In another age, the change in the indicator was statistically unreliable. S y s t o l i c A P over 7-17 years has increased by 16,4 mm Hg to 107,1±1,33 mm Hg ($p < 0,001$). But the annual change was marked by such a peculiarity: increase has shifted by a decrease and vice versa; a high rate (28, 57.3 and 29.9%) was found between 7 and 8, 10 and 11, 12 and 13 years respectively, a decrease (by 32.3%) - between 8 and 9 years ($p < 0,05$). D i a s t o l i c A P from 7 to 17 years has increased by 2,1 mm Hg and was consequentially 72,3±0,69 mm Hg ($p > 0,05$). The result was caused by the uneven change in the indicator: in each period, the augmentation was high, with the exception of the age between 15 and 16 years (low augmentation), but reliable between 8 and 12, 13 and 15 years ($p < 0,05$).

Resting H R over 7-17 years has decreased by 31,8 $BPMs^{-1}$, and the definitive value was $BPMs^{-1}$ ($p < 0,05$), which indicated the economical heart function. But between 9 and 10, 11 and 12 years, we detected the negative change in the indicator - HR increased by 37.7% and 5.7% respectively, although it is reliable only in the first case. Between 7 and 9, 10 and 11, 13 and 17 years, the HR of the girls was improving at a fast pace, between 12 and 13 years - at a low pace, but in all cases - by a statistically significant amount ($p < 0,05$).

The obtained data allowed to distinguish the periods during which the functional readiness of an organism to influence by means and methods of physical education is the greatest. That is to say, in such periods the influence of biological factor is decreasing and the influence of pedagogical factor is increasing on

morphofunctional maturation of girls with different forms of CP. At the same time, the change in their indicators is practically no different, except for the wrist strength of the unharmed limb. At every age of the period of 7-17 years, it is significantly greater in spastic diplegia and hemiparesis than in atonic-astatic form and hyperkinesis.

Besides, taking into account the dependence of the change in morphological and functional indicators at the age of 7-17, proposed by L.V. Volkov (1989) and V. I. Lyakh (1989), the following is established: the most (augmentation for one year, 10% or more) intensive growth process is at 7-8 and 14-15 years, and the process of differentiation of structural transformations - at 10 and 16 years. In another age, the intensity of these processes is moderate (7.5-9.9% for one year), low (5-7.4%) or critical (0-4.9%) (Table 1).

Discussion. Heterochrony is a distinctive feature in the development of individual organs and systems at 7-17 years. It provides the adaptive effect of the body to the influence of external factors [1; 14; 22]. Reliability of functioning is one of the criteria of maturation of an organism [11; 22], and a differential peculiarity - high sensitivity to the influence of external factors [2; 20], especially in differentiation of structural changes [14; 19].

Table 1

Score characteristic of morphofunctional changes of girls with different forms of CP during the period between 7 and 17 years

Age period, years	Morphological indicators	Functional indicators
between 7 and 8	9 (h)	9 (a)
between 8 and 9	7 (h)	– 2 (c)
between 9 and 10	4 (a)	3 (l)
between 10 and 11	0 (c)	12 (a)
between 11 and 12	3 (l)	– 7 (c)

between 12 and 13	6 (a)	6 (l)
between 13 and 14	4 (a)	1 (l)
between 14 and 15	8 (h)	5 (l)
between 15 and 16	8 (h)	9 (a)
between 16 and 17	6 (a)	10 (a)

N o t e. It has been marked: «h» – high augmentation intensity, «a» – average, «l» – low, «c» – critical period in development

For this reason, it is justified to consider the latter as favorable (sensitizing) periods for the use of means and methods of physical education in the development of morphofunctional indicators of children at 7-17 years [2; 19]. Favorable periods determines a significant improvement in functional indicators in the absence (slight improvement) of morphological indicators, since the high rate of change in the latter indicates an intensive course of the growth process. It is accompanied by a low sensitivity of the organism to the influence of external factors (in our case - the means and methods of physical education); therefore it is less favorable for morphofunctional maturation.

The obtained data are consistent with the indicated regularities, although they were formulated according to data obtained from physically healthy children, without developmental violations. Partially, they confirm the results that we have obtained at earlier stages of the study of children with CP [3; 4], as well as some other researchers [18; 21] on the peculiarities of development of children with impaired functions due to disease on the CP.

One of the causes for this is the difference in the morphological changes of children of the same age and gender, but with a different nosology or physically healthy. Particularly, we are talking about some delay in the physical development of children with the CP as compared with the latter [6, c. 219-221]. The following cause-and-effect relations are characteristic for pathological changes in the organism: one cause may provoke a

chain of consequences, the emergence of which in the future becomes the cause of new abnormalities, and initiates an accompanying symptoms of the basic pathology [3; 9; 10]. In our case, one of the reasons may be the more intense formation of the accompanying symptoms of children with CP caused by the disease, in particular, less physical activity, more limitation of the display of motor function, etc. In the meantime, the scientific statements of the general pathology are proved true, namely the nature of the unity of structure and function [1; 7; 8; 9]. Thus, active muscular activity is a factor in stimulating a positive change even at the lowest morphological levels; the result of such activity reflects the reaction of the organism in the structures connected with the functions. In particular, none factor of the surroundings can directly affect a certain function of the organism, - it changes the latter only indirectly, particularly by the influence on the structures that perform this function [23-25].

Conclusions. 1. At the present stage there is insufficient empirical data on the age of girls with different forms of CP, which is most favorable for the pedagogical influence on their organism in the period between 7 and 17 years for its maximum development, in view of biologically conditioned natural tendencies and features. 2. The conducted experiment has established age periods with different degree of dependance of morphofunctional maturation of girls with different forms of CP from biological and pedagogical factors. 3. The least influence of the biological factor, and therefore the highest degree of functional readiness of the organism to the influence of such a pedagogical factor as physical load, falls on 10 and 16 years; moderate load will be adequate at 7, 9, 12-13 and 15 years, and low load - at 8, 11 and 14 years.

We see the further research perspectives in the formation of the content of physical activity of girls with different forms of CP, aimed at solving various problems in terms of content and which involves considering the obtained data.

Список використаних джерел:

1. Анохин П. К. Системогенез как общая закономерность развития, подготавливающая врожденную деятельность. Биология и нейрофизиология рефлекса. Москва: Медицина, 1968. С. 76-109.

2. Выготский Л. С. Проблема возрастной периодизации детского развития. Вопросы психологии. 1972. № 2. С. 114-123

3. Єдинак Г. А. Передумови організації та формування змісту рухової діяльності дітей з церебральним паралічем : навч. посіб. Кам'янець-Подільський: ПП Мошак М. І., 2007. 114 с.

4. Єдинак Г. А. Теорія і технологія використання фізичних вправ у реабілітації дітей з церебральним паралічем: навч. посіб. Кам'янець-Подільський: ПП Мошак М. І., 2007. 352 с.

5. Єдинак Г. А. Технологія використання засобів фізичної культури в руховій діяльності дітей з церебральним паралічем у спеціальних навчальних закладах: метод. рекомед. Кам'янець-Подільський: ПП М. І. Мошак, 2007. 96 с.

6. Єдинак Г. А. Фізичне виховання дітей з церебральним паралічем: монографія. Кам'янець-Подільський: ПП О. А. Буйницький, 2009. 394 с.

7. Єдинак Г. А., Мицкан Б. М., Галаманжук Л. Л. Теоретико-методичні основи рухової діяльності дітей з церебральним паралічем у фізичному вихованні. Вісник Прикарпатського у-ту. Фізична культура. 2011. Вип. 13. С. 108-128.

8. Козявкин В. И. Значение прогноза при коррекции двигательных нарушений у детей с детскими церебральными параличами. Укр. Вісник психоневрології. 1994. Вип. 3. С. 24-25.

9. Козявкин В. И., Бабадаглы М. А., Ткаченко С. К.,

Качмар О. А. Детские церебральные параличи: основы клинической реабилитационной диагностики. Львів: Медицина світу, 1999. 295 с.

10. Мамайчук И. И. Психология дизонтогенеза и основы психокоррекции. Санкт-Петербург: Изд-во СПбУ, 2000. 166 с.

11. Маркосян А. А. Развитие человека и надежность биологической системы. Основы морфологии и физиологии организма детей и подростков. Москва, 1961. С. 5-41.

12. Основи діагностичних досліджень у фізичній реабілітації: навч. посіб. Під ред. Т. Бойчук, М. Голубєвої, О. Левандовського, Л. Войчишиної. Львів: ЗУКЦ, 2010. 240 с.

13. Шиян Б. М., Єдинак Г. А., Петришин Ю. В. Наукові дослідження у фізичному виховання та спорті: навч. посібник. 2-е вид., стереот. Кам'янець-Подільський: ТОВ «Друкарня «Рута», 2013. 280 с.

14. Шмальгаузен И. И. Пути и закономерности эволюционного прогресса. Москва-Ленинград: Изд-во АН СССР, 1939. 232 с.

15. Bouchard, C. Malina, R. M., Peruse, L. (1997). Genetics of fitness and physical performance. Champaign, IL: Human Kinetics.

16. Genetic and molecular aspects of sport performance (2011). Edited by Bouchard, C. and Hoffman, E. Oxford: Blackwell Publishing Ltd.

17. Green, K. (2005). Phisical education. Mayer & Mayer Verlag.

18. Hardman, K. (2011). Contemporari issues in phisical education. Mayer & Mayer Verlag.

19. Katzmarzyk, P. T., Silva, M. J. C. (2013). Growth and maturation in human biology and sports. Coimbra: University press.

20. Malina, R. M., Bouchard, C., Bar-Or, O. (2004). Growth maturation and physical activity. Champaing, IL: Human

Kinetics.

21. Reynolds, C. R., Vannest, K. J., Fletcher-Janzen, E. (2014). Encyclopedia of Special Education: A Reference for the Education of Children, Adolescents, and Adults with Disabilities and Other Exceptional Individuals. 4th ed. London: Wiley.

22. Rowland, T. (2005). Children's exercise physiology. 2nd ed. Champaign, IL: Human Kinetics.

23. Iedynak G., Galamandjuk L., Mysiv V., Mazur V., Kljus O., Balatska L., Yurchyshyn Y. Peculiarities of the success achievement motivation display of elite athletes with cerebral palsy when preparing for basic competitions. Journal of Physical Education and Sport. 2017. Vol. 17(3). 2019-2023. DOI:10.7752/jpes.2017.03202

24. Wilmore, J. H., Costill, D. L., Kenney, L. W. (2012). Physiology of sports and exercise, 5th ed. Champaign, IL: Human Kinetics.

25. Winnick, J. P. (2004). Adapted physical education and sport. Champaign, IL: Human Kinetics.

References

1. Anokhin, P. K. (1986). Sistemogenez kak obshchaya zakonomernost' razvitiya, podgotavlivayushchaya vrozhdennuyu deyatel'nost'. Biologiya i neyrofiziologiya refleksa. [Systemogenesis as a general pattern of development, preparing congenital activity. Biology and neurophysiology of reflex]. Moscow: Medicine.

2. Vygotsky, L. S. (1972). Problema vozrastnoy pereodizatsiyi detskogo razvitiya. Voprosy psyhologiyi [The problem of age-related periodization of child development. Questions of psychology, N. 2. 114-123.

3. Iedynak, G. A. (2007). Peredumovy orhanizatsiyi ta formuvannya zmistu ruhovoyi diyal'nosti ditey z tserebral'nym paralichem. [Prerequisites for organization and formation of

maintenance of motor activity of children with cerebral palsy]. Kamyanets-Podilsky: PP Moshak M.I.

4. Iedynak, G. A. (2007). Teoriya i tehnolohiya vykorystann'ya fizychnyh vprav u reabilitatsiyi ditey z tserebral'nym paralichem. [Theory and technology of the use of physical exercises in the rehabilitation of children with cerebral palsy]. Kamyanets-Podilsky: PP MoshakM.I.

5. Iedynak, G. A. (2007). Tehnolohiya vykorystann'ya zasobiv fizychnoyi kul'tury v ruhoviy diyal'nosti ditey z tserebral'nym paralichem u spetsial'nyh navchal'nyh zakladah. [Technology of using physical culture means in motor activity of children with cerebral palsy in special educational institutions]. Kamyanets-Podilsky: PP Moshak M.I.

6. Iedynak, G. A. (2009). Fizychne vyhovann'ya ditey z tserebral'nym paralichem: monohrafiya. [Physical education of children with cerebral palsy: monograph]. Kamyanets-Podilsky: PP Buynitsky O. A.

7. Iedynak, G. A., Mitzkan, B. M., Galamanzhuk, L. L. (2011) Teoretyko-metodychni osnovy ruhovoyi diyal′nosti ditey z tserebral′nym paralichem u fizychnomu vyhovanni [Theoretical and methodical bases of motor activity of children with cerebral palsy in physical education]. The Bulletin of the Precarpathian national university. Physical Education, 13,108-128.

8. Kozyavkin, V. I. (1994). Znacheniye prognoza pri korrektsiyi dvigatel'nyh narusheniy u detey s detskimi tserebral'nymi paralichami [The value of the prognosis in the correction of motor disorders in children with infantile cerebral palsy]. Ukrainian bulletin of psychoneurology, 3, 24-25.

9. Kozyavkin, V. I., Babadagly, M. A., Tkachenko, S. K., Kachmar, O. A. (1999). Detskiye tserebral'nye paralichi: osnovy klinicheskoy reabilitatsyonnoy diagnostiki [Children's cerebral palsy: bases of clinical rehabilitation diagnostics]. Lviv: Medicine of the World.

10. Mamaichuk, I. I. (2000). Psyhologiya dizontogeneza I osnovy psyhokorektsyi [Psychology of dysontogenesis and the basis of psychocorrection]. St. Petersburg: Publishing house of SPbU, 2000.

11. Markosyan, A. A. (1961). Razvitiye cheloveka I nadyozhnost' biologicheskoy sistemy. Osnovy morfologii i fiziologii organizma detey i podrostkov [Human development and the reliability of the biological system. Fundamentals of morphology and physiology of the body of children and adolescents]. Moscow.

12. Boychuk, T., Golubeva, M., Levandovsky, O., Voichishina, L. (2010). Osnovy diahnostychnyh doslidzhen' u fizychniy reabilitatsiyi [Fundamentals of diagnostic research in physical rehabilitation]. Lviv: ZUCTS.

13. Shiyan, B. M., Iedynak, G. A., Petryshyn, Y. V. (2013). Naukovi doslidzhenn'ya u fizychnomu vyhovanni ta sporti [Scientific researches in physical education and sport]. Kamenets-Podilsky: LLC "Printing House "Ruta".

14. Shmalhausen, I. I. (1939). Puti i zakonomernosti evol'ytsyonnoho progressa [Ways and patterns of evolutionary progress]. Moscow-Leningrad: Publishing House of the USSR Academy of Sciences.

15. Bouchard, C. Malina, R. M., Peruse, L. (1997). Genetics of fitness and physical performance. Champaign, IL: Human Kinetics.

16. Genetic and molecular aspects of sport performance (2011). Edited by Bouchard, C. and Hoffman, E. Oxford: Blackwell Publishing Ltd.

17. Green, K. (2005). Phisical education. Mayer & Mayer Verlag.

18. Hardman, K. (2011). Contemporari issues in phisical education. Mayer & Mayer Verlag.

19. Katzmarzyk, P. T., Silva, M. J. C. (2013). Growth and maturation in human biology and sports. Coimbra: University

press.

20. Malina, R. M., Bouchard, C., Bar-Or, O. (2004). Growth maturation and physical activity. Champaing, IL: Human Kinetics.

21. Reynolds, C. R., Vannest, K. J., Fletcher-Janzen, E. (2014). Encyclopedia of Special Education: A Reference for the Education of Children, Adolescents, and Adults with Disabilities and Other Exceptional Individuals. 4th ed. London: Wiley.

22. Rowland, T. (2005). Children's exercise physiology. 2nd ed. Champaign, IL: Human Kinetics.

23. Iedynak G., Galamandjuk L., Mysiv V., Mazur V., Kljus O., Balatska L., Yurchyshyn Y. Peculiarities of the success achievement motivation display of elite athletes with cerebral palsy when preparing for basic competitions. Journal of Physical Education and Sport. 2017. Vol. 17(3). 2019-2023. DOI:10.7752/jpes.2017.03202

24. Wilmore, J. H., Costill, D. L., Kenney, L. W. (2012). Physiology of sports and exercise, 5th ed. Champaign, IL: Human Kinetics.

25. Winnick, J. P. (2004). Adapted physical education and sport. Champaign, IL: Human Kinetics.

UDC 796.815/. 853.23.071.2: 612.13
DOI: 10.32626/PASAOPEAPT.2019.81-93

Iedynak Gennadii, Guska Mykhailo,
Kozak Yevhen, Mazur Vasyl, Huska Mariya[6]

CEREBRAL CIRCULATION OF HIGHLY QUALIFIED SUMO AND JUDO WRESTLERS

Abstract. Relevance of research*: increasing the effectiveness of competitive activities of high qualification athletes, whose specialization is sumo and judo wrestling, is impossible without improving the approaches to the formation and implementation of the content of their preparation and restoration.*

Goal and methods of research*: the goal was to establish the peculiarities and state of display of cerebral circulation indicators of highly qualified sumo and judo wrestlers in the period of direct preparation for the main competitions. We studied 20 highly qualified athletes (candidates, masters of sports and masters of sports of international class) from 18 to 26 years, whose specialization is sumo and judo wrestling. During the research, the following methods were used: from the general scientific - the analysis of the information of literary sources, from medical-biological - tonometry, tetrapolar impedance reopeltysmography, reocardiography, reoencephalography; mathematical statistics.*

Results*: Continuous classes of sumo and judo wrestling lead to a pronounced tension in the adaptation of the brain vessels to physical activity, consisting in asymmetry of paired hemodynamic parameters, reduced blood supply to the left hemisphere, significant hypersthenia of the wall of arterioles in the right hemisphere. Cerebral circulation of highly qualified sumo and judo wrestlers is characterized by individual peculiarities, the main of which is the stress in the blood supply of the brain or the violation of the adaptation of vessels to physical activity. We have found a negative trend that is typical for the period of direct*

[6] Kamianets-Podilskyi National Ivan Ohiienko University (Ukraine), yedinak.g.a@gmail.com

preparation of combat athletes for major competitions, and it can be reduced by increasing the duration and variety of recovery tools, as well as adjusting the load parameters to reduce the intensity or volume.

***Conclusions**: The obtained data should be taken into account when forming the content of athletes restorative measures.*

***Key words:** combat athletes, sumo and judo, cerebral circulation, athletic preparation.*

Introduction. The preparation process of highly qualified athletes needs constant improvement [4, c. 8-9]. Athletes of high qualification have one of the perspective directions connected with improvement of their special physical performance, increase of functional state and optimization of restoration measures [2; 10; 11; 21].

At the current stage of the program of improving these indicators of highly qualified athletes, whose specialization is the sumo and judo wrestling, is considered as a complex dynamic system [1; 8; 13]. It is also noted [3; 18] that for the effective management of such a system it is critically important to have detailed information on its current state, the optimal ratio of pedagogical, biomedical resources and a complex of recovery measures. In connection with the latter, the issue connected with the peculiarities of cerebral circulation of the wrestlers of the identified styles becomes very relevant. This is largely due to the fact that insufficient supply of the brain with blood can significantly influence the sporting result; at the same time, it can threaten the life of the athlete altogether [7; 16].

However, at the present stage of the development of sports science in general and related to different kinds of wrestling in particular, the issue of the state of cerebral circulation of highly qualified wrestlers at different power of physical activity remains practically out of the attention of researchers. This stipulates a nessesity to conduct a research in the specified direction.

Goal of research was to establish the peculiarities and state of display of cerebral circulation indicators of the highly qualified

sumo and judo wrestlers during the period of direct preparation for the main competitions.

Material and methods of research. The research was attended by 20 athletes, whose specialization is the sumo and judo wrestling, whose age was within the 18-26 years. All of them belonged to highly qualified athletes, because there were 2 candidates for the master of sport, 11 masters of sport, 7 international masters of sport. The research was conducted in compliance with the World Medicine Association declaration of Helsinki: Ethical principles for medical research involving human subjects (2013). The study protocol was approved by the Ethical committee of the Lviv State University of Physical Culture. At the beginning and at the end of the research, we studied the hemodynamic indicators using tonometry, tetrapolar impedance reopeltysmography, reocardiography and reoencephalography. The method of tonometry was realized using a tonometer "VA-330" and recommendations of special literature [5, p. 129-130]: arterial pressure (AP) was measured in sitting position after rest during 3-5 minutes. The method of tetrapolar impedance reopeltysmography was realized using the device "Reoanalizator RA 5-01" and the computerized analyzer "ReoCom KhAI". The electric current of the "RA-5-01" device was of low amplitude but high frequency, namely at the level of 30-60-150 kHz. Using this method, we determined the main parameters of systemic and regional circulation. The method of reocardiography contributed to the registration of the heart rate (heart rate, $BPMs^{-1}$) by the second standard leads and stroke volume (SV, ml). The method of reoencephalography was used to estimate the magnitude of the tonic tension of arteries walls of different diameters that provide the brain with blood. So the value of the indicator characterizing the time of blood transfusion in the hemisphere (Q-α, ms) showed the state of tonic tension of the wall of the arteries of large diameter. The value of such an indicator as time of reduced filling of vessels with blood (RF, ms), made possible to establish the tone

of arterial vessels of medium diameter. To study the tonic tension of arterial walls, we used the dicrotic index (DCI,%), and the tonic tension of the veins walls - diastolic index (DSI,%). At the meantime, with these indicators, we additionally determined the amount of venous outflow (VO,%).

Research results. The regulation of cerebral circulation to a certain extent is autonomous. Along with this, under certain conditions (hyperventilation, lowering of arterial pressure below 50-60 mm Hg, some others), there may be significant changes in the blood circulation. The study of the state of cerebral hemodynamics of the sumo and judo wrestlers showed the following. Given the average values of the indicators characterizing the level of tonic tension of the magistral arteries, in particular Q-α and RDF, we have found the correspondence of the received data to the lower limit of normative values for 20-30-year-old men. At the same time, it was noted that the level of tonic tension in vessels of medium diameter significantly exceeds the norm, because the RF in the right hemisphere is 150.6 ± 5.2 ms, in the left one - 120.8 ± 8.5 (Table 1).

The venous outflow in the swingeing majority of the examined athletes practically did not differ from the age norm for a physically healthy person, as it was 12.3 ± 7.3% for the vessels of the right and 13.49 ± 8.5% for the vessels of the left hemisphere. Such a character of the dependence of these characteristics provided athletes with a high or sufficient level of blood supply to the cerebral hemispheres. Particularly, the mean value of ARG for vessels of the right hemisphere was 81.5 ± 2.8 y.o., for vessels of the left hemisphere - 64,2 ± 2,9 y.o. In connection with the obtained data we indicated that the studied wrestlers are characterized by a marked increase in the tone of arteries of medium diameter, arterioles and venules.

A more detailed analysis of the obtained data on the state of cerebral circulation contributed to the selection of sample of athletes, whose values of some studied indicators significantly

differed from the normative. Arterioles and venules of such athletes were highly sensitive to the physical activity which they used during training sessions. Thus, 12 out of all 20 athletes who were involved in the study, had the level of tonic tension of arterioles and venules significantly exceeded the upper limit of assessment standards. n particular, the value of VO in the right hemisphere was 12.3 ± 0.7%, in the left

Table 1

The main indicators of cerebral circulation of highly qualified combat athletes

Values	Q-α, ms		RDF, ms		RF, ms		ARG, y.o.		DCI, %		DSI, %		VO, %	
	d	***s***	***d***	***s***	***d***	***s***	***d***	***s***	***d***	***s***	***d***	***s***	***d***	***s***
$\bar{x}$	154,7	163,	39,9	44,6	150,6	120,8	81,5	64,2	94,9	98,2	89,0	67,5	12,3	13,5
m	27,4	27,8	9,2	1,4	5,2	8,5	2,8	2,9	4,6	2,4	6,5	5,6	0,7	0,8

N O T E. It has been marked: d – the right hemisphere of the brain, s – the left hemisphere, ARG – rheogram amplitude, DCI – dicrotic index, DSI – diastolic index, VO – venous outflow, RDF – rapid filling of vessels with blood, RF – reduced filling of vessels with blood, Q-α – blood transmission time in the hemispheres hemisphere - 13,5 ± 0,8%, DCI - respectively 94,9 ± 4,6 and 98,2 ± 2,4%, DSI - 89 ± 6,5 and 67,5 ± 5,6%. At once, we noted the absence of violations of venous outflow despite the increased tone of the magistral vessels supplying the blood to the brain.

It was also revealed that 6 of the examined athletes had a decrease in blood supply to the brain, namely: 5 of them had a one-sidedness blood supply, but it was related to the left hemisphere, 1 of them had twosidedness blood supply. However, there was a distinct individual peculiarity. In some cases, signs of tension or violation of the adaptation of cerebral circulation to physical load resulted in increased tone of arterioles and venules,

which resulted in decreased blood supply. In the other case, in addition to increasing the tonic tension of the walls of arterioles and venules, such a change was also observed in the tone of arteries of medium diameter. Another peculiarity was that the tonic tension of the brain vessels of different diameter did not differ from the normative values, but there was an asymmetry of blood supply to the cerebral hemispheres.

Discussion. Durable use of high-intensity physical exercises during the sessions of the sumo and judo wrestling results in an increased tone of arteries of medium diameter, arterioles and venules, which differs from the established assessment standards for 25-30-year-old men. The values of indicators of the functioning of the brain vessels of different diameter which differ from the established, testify to a certain strain of adaptation processes due to the physical activity that athletes used during training sessions [20; 21].

However, other obtained data indicate the lack of distinctions in the blood supply of the cerebral hemispheres of the vast majority of the athletes under study. One of the reasons for this result is related to the venous outflow that remains for such athletes at the proper level [1; 6]. Regarding the data which reflect the individual peculiarities of adaptive shifts, namely, the tonic tension of the brain vessels of large and medium diameter, then one of the reasons for this result is due to the high capacity of the training load and the specifics of the competitive activity. The latter consists in the frequent display of static stress, which may additionally affect the state of functioning of the brain vessels [1; 18]. It is also marked that asymmetry of blood supply to the cerebral hemispheres which was also found for some athletes, is a feature of incomplete recovery of the body after physical load [16; 21].

Another reason may involve the fact that the athlete faces stress, since stress is also one of the important factors that affects the normal circulation of the cerebral hemispheres [7]. In this

regard, it is noted that not only competitive, but also preparatory activities of athletes of high qualification can lead to emergence of stress, especially during the period of direct preparation for the main competitions [10; 12]. According to some researchers [6] and other data [15; 22] stress is the main reason for overloading the system of blood supply of the right hemisphere of individuals with right orientation of motor asymmetry of hands; the main cause of overload of individuals with another options of such orientation (left orientation, ambidexterity)- increase of tonic tension of arterioles walls, venules, venous outflow disorder [1, c. 158].

Meanwhile, in connection with the above-mentioned, data which evidence the lack of a sustained character in the marked violation of the adaptation of brain vessels to physical activity are significant. Notably, it has been observed that changing the parameters of the latter in the direction of reducing the intensity, volume and diversification of the content of rest, including restoration measures, can positively affect the reduction or even the complete elimination of these violations [9; 19].

Thus, the obtained data indicate that the most sensitive to the special physical loads used by highly qualified sumo and judo wrestlers are the arterioles and venules of these athletes, and their venous outflow is violated insignificantly during the direct preparation for the main competitions. In addition, carrying out of restorative measures and correction of physical loads will lead to decrease of tone of arteries of medium diameter, arterioles and venules, and also increase of cerebral circulation [9; 14; 17].

Conclusions: 1. Continuing sessions of sumo and judo wrestling lead to a pronounced tension in the adaptation of the brain vessels to physical activity, which lies in asymmetry of paired hemodynamic indicators, reduction of blood supply to the left hemisphere, a significant increase in the tone of the wall of arterioles in the right hemisphere. 2. The cerebral circulation of the highly qualified sumo and judo wrestlers is marked by

individual characteristics, the main of which is the stress in the blood supply of the brain or the violation of vascular adaptation to physical activity. 3. The revealed negative tendency is characteristic for the period of direct preparation of combat athletes for the main competitions, but it can be reduced by means of increasing the duration and diversification of the recovery means, as well as adjusting the load parameters in the direction of reducing the intensity or volume.

Further researches should be refered to the development of a program to eliminate the negative tendency in cerebral circulation of highly qualified sumo and judo wrestlers at the stage of direct preparation for major competitions.

Список використаних джерел:

1. Гуска М. Підвищення спеціальної фізичної працездатності та функціонального стану висококваліфікованих єдиноборців у процесі річної підготовки: дис… канд. наук з фіз. виховання та спорту: 24.00.01. Національний педагогічний ун-т імені М. П. Драгоманова. Київ, 2013. 215.

2. Деркач В., Єдинак Г., Гуска М. Періодизація спортивного тренування легкоатлетів із порушеними функціями опорно-рухового апарату. Вісник Прикарпатського у-ту. Фізична культура. 2017. Вип. 25-26. С. 96-103.

3. Платонов В. Н. Спорт высших достижений и подготовка национальных команд к олимпийским играм. Київ: Олімп. л-ра, 2010. 310 с.

4. Платонов В. Н. Периодизация спортивной тренировки. Общая теория и ее практическое применение. Київ: Олімп. літ., 2013. 624 с.

5. Шиян Б. М., Єдинак Г. А., Петришин Ю. В. Наукові дослідження у фізичному вихованні та спорті: навч. посіб. 2-е вид. стеротип. Кам'янець-Подільський: Рута, 2013. 280 с.

6. Ященко А. Г. Вплив тренувальних навантажень на стан системної регіонарної гемодінамики висококваліфікованого спортсмена. Фізіол. журнал. 1998. Т. 44. С. 281-282.

7. Bar-Or, O., Rowland, T. W. (2004). Pediatric Exercise Medicine: from physiologic principles to health care application. Champaign, IL: Human Kinetics.

8. Bompa, T., Haff, G. G.. (2009). Periodization: theory and methodology of training. 5rd ed. Champaign, IL: Human Kinetics.

9. Bouchard, C., Blair, S. N., Haskell, W. L. Physical activity and health. Champaign, IL: Human Kinetics.

10. Derkach, V. N., Iedynak, G. A. (2014). On the question of periodization training content and paralympic athletes with disorders of the musculoskeletal system in the light of the general theory of sports training. Pedagogics, psychology, medical-biological problems of physical training and sports, 5, 13-18. doi:10. 6084/m9.figshare.971026

11. Dick, F. W. (2007). Sports training principles, 5th ed. London: A & C Black.

12. Iedynak, G., Galamandjuk, L., Mysiv, V., Mazur, V., Kljus, O., Balatska, L., Yurchyshyn, Y. (2017). Peculiarities of the success achievement motivation display of elite athletes with cerebral palsy when preparing for basic competitions. Journal of Physical Education and Sport, Vol. 17(3). 2019-2023. doi:10.7752/jpes.2017. 03202

13. Issurin, V. B., Yessis, M. (2008). Block periodization: breakthrough in sport training. Michigan: Ultimate athlete concepts.

14. Get Active ! Physical Education, Physical Activity and Sport for Children and Young People: A Guiding Framework (2012). Published by The Professional Development Service for Teachers and funded by The Teacher Education Section. Roinn: Department of Education and Skills Ireland.

15. Kuhl, J., Kazen, M. (2005). Hemispheric asymmetry: Does power beat wisdom ?. Seattle: Hogrefe and Huber Publishers.

16. Murray, T. D., Eldridge, J., Kohl, H. W. (2017). Foundations of Kinesiology: A Modern Integrated Approach. Champaing, IL: Human Kinetics.

17. Physical education, sport and physical activity strategy for children & young people (2013). Bournemouth & Poole physical education, sport and physical activity strategy. – режим доступу: http://debbie.priest@bournemouth. gov. uk.

18. Rowland, T. (2005). Children's exercise physiology. 2nd ed. Champaign, IL: Human Kinetics.

19. Schmidt, R. A., & Lee, T. (2013). Motor learning and performance: from principles to application. Champaing, IL: Human Kinetics.

20. Thomas, J. R., Nelson, J. K., & Silverman, S. J. (2011). Research methods in physical activity. 6th ed. Champaign, IL: Human Kinetics.

21. Wilmore, J. H., Costill, D. L., Kenney, L. W. (2012). Physiology of sports and exercise, 5th ed. Champaign, IL: Human Kinetics.

22. Yashchenko, A. G., Nader, H. (1996). The influence of training Session on the brain blood circulation. Medizina sportive. Vol. 3. 119-121.

References

1. Guska, M. B. (2013). Pidvyshchennya spetsial′noyi fizychnoyi pratsezdatnosti ta funktsional′noho stanu vysokokvalifikovanykh yedynobortsiv u protsesi richnoyi pidhotovky [Increase of special physical capacity and functional state of highly skilled teammates in the process of annual training] [dysertatsiia]. Kyiv: Nats. ped. un-t named MP Dragjmanova.

2. Derkach, V., Iedynak, G., Guska, M. (2017). Periodyzatsiya sportyvnoho trenuvannya lehkoatletiv iz

porushenymy funktsiyamy oporno-rukhovoho aparatu [Periodization of sports training of athletes with impaired functions of the locomotor apparatus]. Newsletter of Precarpathian University. Physical culture, Vol.25-26, 96-103.

3. Platonov, V. M. (2010). Sport vysshikh dostizheniy i podgotovka natsional'nykh komand k olimpiyskim igram [Sports of the highest achievements and preparation of national teams for the Olympic Games]. Kiyv: Olympic literature.

4. Platonov, V. M. (2013). Periodizatsiya sportivnoy trenirovki. Obshchaya teoriya i yeye prakticheskoye primeneniye [Periodization of sports training. General theory and its practical application]. Kiyv: Olympic literature.

5. Shiyan, B. M., Iedynak, G. A., Petrishyn, Yu. M. (2013). Naukovi doslidzhennya u fizychnomu vykhovannya ta sporti [Scientific research in physical education and sports]. 2nd ed. Kamianets-Podilsky: Ruta.

6. Yashchenko, A. G.. (1998). Vplyv trenuval′nykh navantazhen′ na stan systemnoyi regionarnoyi hemodinamyky vysokokvalifikovanoho sportsmen [Effect of training loads on the condition of systemic regional hemodynamics of a highly skilled athlete]. Physiological journal, Vol.44, 281-282.

7. Bar-Or, O., Rowland, T. W. (2004). Pediatric Exercise Medicine: from physiologic principles to health care application. Champaign, IL: Human Kinetics.

8. Bompa, T., Haff, G. G.. (2009). Periodization: theory and methodology of training. 5rd ed. Champaign, IL: Human Kinetics.

9. Bouchard, C., Blair, S. N., Haskell, W. L. Physical activity and health. Champaign, IL: Human Kinetics.

10. Derkach, V. N., Iedynak, G. A. (2014). On the question of periodization training content and paralympic athletes with disorders of the musculoskeletal system in the light of the general theory of sports training. Pedagogics, psychology, medical-

biological problems of physical training and sports, 5, 13-18. doi:10. 6084/m9.figshare.971026

11. Dick, F. W. (2007). Sports training principles, 5th ed. London: A & C Black.

12. Iedynak, G., Galamandjuk, L., Mysiv, V., Mazur, V., Kljus, O., Balatska, L., Yurchyshyn, Y. (2017). Peculiarities of the success achievement motivation display of elite athletes with cerebral palsy when preparing for basic competitions. Journal of Physical Education and Sport, Vol. 17(3). 2019-2023. doi:10.7752/jpes.2017. 03202

13. Issurin, V. B., Yessis, M. (2008). Block periodization: breakthrough in sport training. Michigan: Ultimate athlete concepts.

14. Get Active ! Physical Education, Physical Activity and Sport for Children and Young People: A Guiding Framework (2012). Published by The Professional Development Service for Teachers and funded by The Teacher Education Section. Roinn: Department of Education and Skills Ireland.

15. Kuhl, J., Kazen, M. (2005). Hemispheric asymmetry: Does power beat wisdom ?. Seattle: Hogrefe and Huber Publishers.

16. Murray, T. D., Eldridge, J., Kohl, H. W. (2017). Foundations of Kinesiology: A Modern Integrated Approach. Champaing, IL: Human Kinetics.

17. Physical education, sport and physical activity strategy for children & young people (2013). Bournemouth & Poole physical education, sport and physical activity strategy. – режим доступу: http://debbie.priest@bournemouth. gov. uk.

18. Rowland, T. (2005). Children's exercise physiology. 2nd ed. Champaign, IL: Human Kinetics.

19. Schmidt, R. A., & Lee, T. (2013). Motor learning and performance: from principles to application. Champaing, IL: Human Kinetics.

20. Thomas, J. R., Nelson, J. K., & Silverman, S. J. (2011). Research methods in physical activity. 6th ed. Champaign, IL: Human Kinetics.

21. Wilmore, J. H., Costill, D. L., Kenney, L. W. (2012). Physiology of sports and exercise, 5th ed. Champaign, IL: Human Kinetics.

22. Yashchenko, A. G.., Nader, H. (1996). The influence of training Session on the brain blood circulation. Medizina sportive. Vol. 3. 119-121.

UDC 373.4.016:796.011.3-055.25
DOI: 10.32626/PASAOPEAPT.2019.94-107

Klyus Olena, Skavronsky Oleksandr,
Koval Oleksandr, Guska Maria,
Iedynak Gennadii, Galamandjuk Lesia[7]

PHYSICAL PREPARATION STRUCTURE OF THE 7-YEAR-OLD GIRLS DURING THE SCHOOL YEAR

Abstract. Relevance of research*: Simulation is one of the leading approaches to improving the content of students' physical exercises and its implementation. In addition, it involves taking into account data on changes in the students' physical state during the school year.*

Goal and methods of research*: in connection with the afore-referenced we conducted the research, the goal of which - to determine the structure of the physical preparation of 7-8-year-old girls using the traditional approach to the organization and implementation of the current content of physical education during the school year. The study involved 60 girls at age 7-8 years who were selected by random sampling and who were engaged in physical exercises in the main medical group. During the research, the following methods were used: analysis, systematization, pedagogical testing, mathematical statistics.*

Results*: During the school year, girls significantly improve all physical qualities, with the exception of the flexibility remaining at the reached level. The structure of physical preparation of these girls at the beginning of the school year by 64%, at the end - by 70% is determined by four statistically independent variables. In the first case, it is muscular strength, the explosive strength of the muscles of the lower extremities, coordination in ballistic movements on maximum range and in cyclic locomotions. In the second case, we identified muscular strength, flexibility, coordination in acrobatic motor activity and speed force.*

Conclusions*: taking into account the obtained data will increase*

[7] Kamianets-Podilskyi National Ivan Ohiienko University (Ukraine), alenakamp@gmail.com

the effectiveness of the content of physical activity classes in improving the physical preparation of 7-8-year-old girls while studying at elementary school and training in the chosen sport.

Key words: *girls, elementary school, physical preparation, dynamics, structure of change.*

Introduction. During the last decade, health and physical preparation indicators of children during studying at general secondary education institutions are deteriorating each year [2; 3; 5; 7; 11; 13]. Such a condition indicates the need to improve approaches, ways of organizing physical education, the formation and implementation of its content in various forms during the study of children, primarily in elementary school. The latter is based on the fact that during this period there is an actualization of desires and abilities in the aspect of their development [1; 5; 6; 10]. In this regard, it is important to inform researchers about improving the effectiveness of the content of physical education of elementary school students in solving various tasks in the case of optimization of the physical preparation indicators, on which it is necessary to make deliberate action during physical exercises in various forms [4; 9; 15; 16]. In the meantime, during the study of materials from literary sources, we found that the available data are fragmented and have some inconsistency. This does not contribute to the successful resolution of the isolated scientific problem, and thus requires further research in the defined direction.

Goal of research – to determine the structure of the physical preparation of 7-8-year-old girls using the traditional approach to the organization and implementation of the current content of physical education during the school year.

Material and methods of research. The study involved 60 girls, who at the beginning of the experiment turned 7 years old; they began to study in the second form of elementary school, and were engaged in physical education in the main medical group. With regard to the above mentioned, the research was conducted

in compliance with the World Medicine Association declaration of Helsinki: Ethical principles for medical research involving human subjects (2013). The study protocol was approved by the Ethical committee of the Kamianets-Podilskyi National Ivan Ohiienko University. During the experiment, we studied the physical preparation of girls, using the data obtained by pedagogical testing. In connection with the latter, and taking into account the recommendations of the researchers, [1; 5; 8] we formed a battery of tests. It made it possible to assess the state of development of the basic conditional qualities and some coordination displays. The formed battery includes tests to determine: coordination in cyclic locomotions (shuttle run 4 x 9 m), acrobatic motor actions (three forward rolls), ballistic motor actions with stance on maximum range (throwing a tennis ball with a leading hand on the range at a run); explosive strength of muscles of the lower extremities (standing long jump), mobility of the lumbar spine (sit and reach) and shoulder joints (dislocation of a measuring rule behind the back), speed (20 m sprint) and absolute muscular (dynamometry of the leading/not leading hand's wrist) strength. Testing was conducted at the beginning and end of the school year. The obtained data corresponded to the normal statistical distribution of individual values in the sample. We worked out the obtained data by adequate methods of mathematical statistics, in particular, by means of which one can determine the basic univariate statistics, as well as the method of factor analysis. We used the formula recommended by the researchers to obtain data on changes in the values in the indicators [3; 7; 8]. Regarding factor analysis, then we used its normalized version: it provided for the separation of the main components and the normalization of data with the help of varimax rotation; with the help of the latter, the number of studied indicators was reduced (data reduction) and the peculiarities of the interconnections between them were determined (classification of variables) [8, p. 184-185].

Research results. At the beginning of the school year, the

development of absolute muscular strength, mobility in the shoulder joints, coordination in cyclic locomotions and ballistic movements on the range was at the low level (Table 1). To the average level corresponded the development of mobility of the lumbar spine, to higher than the average level - the development of explosive and speed force, and to the high level - only the development of coordination in acrobatic motor activity.

At the end of the school year, we found a change in the values in the indicators of girls' physical preparation. In particular, all physical qualities have significantly improved (from p <0,05 to p<0,001), with the exception of mobility of the lumbar

Table 1

Display and change of values in indicators of physical preparation of 7-year-old girls during the school year

Indicator	At the beginning		At the end		Change		*t*
	$\bar{x}$	*m*	$\bar{x}$	*m*	*abs.*	*in %*	
Shuttle run 4 x 9 m/s	13,5	0,22	12,9	0,13	0,6	4,7	2,51*
Throwing on a range with a leading hand, m	6,3	0,31	8,0	0,26	1,7	26,6	4,14***
Three forward rolls, s	6,2	0,19	5,6	0,15	0,6	9,4	2,35*
Standing long jump, sm	104,5	2,40	112,9	2,41	8,4	8,1	2,48*
Sit and reach, sm	5,9	0,59	5,4	1,05	-0,5	- 8,3	0,41
Dislocation of a measuring rule behind the back, sm	58,5	1,17	61,0	1,45	2,5	- 4,2	1,32
20 m sprint, s	5,0	0,11	4,6	0,06	0,4	8,6	3,39**
Dynamometry of the right hand's wrist, kg	4,0	0,44	9,7	0,62	5,7	142,4	7,47***
Dynamometry of the left hand's wrist, kg	3,9	0,47	7,6	0,59	3,7	94,8	4,84***

spine and shoulder joints, since the change here was 8,3 and 4,2% respectively, which indicated merely a negative tendency (*p>0,05*).

Factor analysis of the same values at the beginning of the school year showed that the physical preparation of girls was characterized by four statistically independent factors. The total contribution of these factors to the total variance was 64%; the remaining 36% considered as a contribution of unidentified factors (Table 2).

As for the first factor (contribution to the total variance 22.9%), then the largest factor loads (from 0.930 to 0.943) were the dynamometry of the right and left hands' wrist. Both indicators characterized the same physical quality, and the interrelation between the values of these factor loads was positive. In view of this, the data were interpreted as follows: with the increase in the value of one indicator, the value of the second increases, and the factor must be considered as such reflecting the muscle strength.

The second factor (contribution to the total variance 15 %) was characterized by only one variable with statistically significant value. Such a variable was the standing long jump (factor load (–0,793). Therefore, the factor was considered as reflecting the explosive force of the muscles of the lower extremities.

On the third factor (13,9 %) we found one variable, namely throwing a tennis ball on a range; its factor load (–0,705). The above-mentioned allowed to denote this factor as “coordination in ballistic movements with stance on maximum range”.

Table 2

Factor structure of physical preparation of 7-year-old girls at the beginning of the school year

Variable (physical preparation indicator)	Factor			
	I	II	III	IV
4 x 9 m race	259	025	215	**751**
Standing long jump	-122	**-793**	082	-195
Sit and reach	270	-109	277	**-703**
Throwing a tennis ball in the upright position from the place	-042	-244	**-705**	020

20 m sprint	-284	652	345	-133
Three forward rolls	049	293	-502	012
Dislocation of a measuring rule behind the back	-252	-368	498	122
Dynamometry of the right hand's wrist	**930**	-035	-048	008
Dynamometry of the left hand's wrist	**943**	041	009	019
Accumulated variance	2,058	1,350	1,247	1,131
Contribution to the total variance (total 64%)	***22,9***	***15,0***	***13,9***	***12,6***

N o t e. hereinafter «0» and commas were not put; statistically significant values are highlighted by bold

The fourth factor (12,6 %) was characterized by two statistically significant but independent variables. These variables included shuttle run 4 x 9 m and sit and reach, and their factor loads were respectively
0,751 i (–0,703). These variables reflected coordination in cyclic locomotion and flexibility, but the value of the first was greater than the second. Therefore, this factor was interpreted as "coordination in cyclic locomotions".

At the end of the school year the structure of physical preparation of the same girls to some extent differed from the one established at the beginning of the school year. We identified four statistically independent factors, and their total contribution to the total variance was 70% (Table 3).

On the first factor (contribution to the total variance 21,6 %) the two variables had the largest factor load, namely the dynamometry of the right hand's (0,923) and the left hand's (0,889) wrist. Using the same approach as when interpreting the data of the first factor at the beginning of the school year, we noted the following: the factor reflects the muscular strength.

On the second factor (16,7 %) we identified two variables, namely the sit and reach (factor load (–0,755)) and dislocation of a measuring rule behind the back (0,829). These variables characterized the flexibility, and the negative interrelation

Table 3

Factor structure of physical preparation of 7-year-old girls at the end of the school year

Variable (physical preparation indicator)	Factor			
	I	II	III	IV
4 x 9 m race	-132	133	646	317
Standing long jump	-022	-175	-064	**-723**
Sit and reach	-154	**-755**	255	-084
Throwing a tennis ball in the upright position from the place	452	-429	073	-477
20 m sprint	216	-063	045	**837**
Three forward rolls	089	-037	**840**	-048
Dislocation of a measuring rule behind the back	004	**829**	218	-002
Dynamometry of the right hand's wrist	**923**	043	080	013
Dynamometry of the left hand's wrist	**889**	050	-076	166
Accumulated variance	1,943	1,499	1,260	1,589
Contribution to the total variance (total 70 %)	***21,6***	***16,7***	***14,0***	***17,7***

between their values indicated the following: with the increase of value in one indicator, the value decreases in the other and vice versa. In our case it was positive, as the less result in the dislocation behind the back, and higher result in the sit and reach testify to the best level of mobility in the corresponding joints. In connection with the above, this factor was interpreted as "flexibility".

On the third factor (contribution to the total variance- 14%), only one variable with a statistically significant value of factor load (0.840) was distinguished - namely three forward rolls. Due to this, the factor was interpreted as "coordination in acrobatic motor activity".

On the fourth factor (17,7 %) we found the most factor load in two variables - standing long jump (-0.723) and 20 m sprint (0.837). Taking into account the values of these loads; the fact of a positive shift of the adaptive effect in improving the corresponding to these indicators explosive and speed forces from

exposure to one of them [1; 3; 6]; a negative interrelation between values, which, however, also indicated a positive tendency for changing of both indicators in case of an impact on one of them, this factor was interpreted as the "speed force".

Discussion. Physical preparation is determined by a complex of indicators that reflect the state of development of the basic conditional qualities and different displays of coordination [4; 16]. The change in these qualities of girls is marked by peculiarities that are associated with a large augmentation of a certain indicator at a certain age, display of its value at the reached level or even a significant deterioration; these are sensitive and critical periods of development of a certain physical quality [1; 12; 15]. But the information of professor V. K. Balsevych (2000) indicates that there are differences between the data for the specified periods that were received by different researchers. We considered the data of our study namely in this connection. Particularly, we note that when comparing the structure of physical preparation of girls, obtained at the beginning and end of the school year, significant discrepancies were found between them (Table 4). Thus, in the end, only one quality of the four physical qualities revealed by the factor analysis at the beginning of the study was revealed to be the same, namely the absolute muscle strength, which was determined by the result of the dynamometry of the wrist.

The comparison of factor analysis data (see Table 2 and 3) and the dynamics of these data indicators of physical preparation of girls during the school year (see Table 1) indicated the following. The physical qualities which were highlighted in the beginning have improved significantly in the course of the school year, with the exception of flexibility, which according to the two indicators (sit and reach and dislocation of a measuring rule behind the back) was marked only by the tendency to change, namely, the negative one.

These data do not contradict the results of other researchers

[4; 15; 16] about the development of muscle strength. In particular, these authors state that

Table 4

Comparison of the indicators that determined the structure of physical preparation of 7-year-old girls during the second year of study at the educational institution

Physical preparation indicator	At the beginning	At the end
4x9 m shuttle run	+ (12,6 %)	
Throwing on a range	+ (13,9 %)	
Three forward rolls		+ (14 %)
Standing long jump	+ (15 %)	
Sit and reach		+ (16,7 %)
Dislocation of a measuring rule behind the back		+
20 m sprint		+ (17,7 %)
Dynamometry of the right hand's wrist	+ (22,9 %)	+ (21,6 %)
Dynamometry of the left hand's wrist	+	+

the absolute muscle strength of girls and boys over 7-8 years, as well as in subsequent age periods increases. This happens primarily due to an annual increase in the muscles' mass, as evidenced by such a change in the body weight of children.

Regarding the data on other physical qualities, which were selected by factor analysis at the end of the school year, then they primarily reflected peculiarities of the dynamics of physical preparation indicators of girls. One of the peculiarities was that the qualities that we have isolated, increased significantly during the year. Such data did not contradict the available data in the special literature [1; 4; 5; 7; 10; 11; 15] that the age of 7 years is sensible for the development of various displays of coordination, speed and flexibility.

Some inconformity, which was recorded in our data on flexibility, does not contradict the general concept of its age

dynamics of school age girls. It is notorious that the improvement of the flexibility indicators, due to the specifics of this quality, occurs only with the purposeful impact on it. Within this framework, the obtained result (the display of flexibility at the achieved level) confirmed the above-mentioned, and in addition, it confirmed the need to increase the volume of loads aimed at developing this physical quality during physical education classes.

Conclusions. 1. The physical preparation change of 7-year-old girls during the second year of study in a general secondary education institution largely determines the development of physical qualities, which were distinguished by a factor analysis of data obtained at the end of this period. 2. The data obtained during the experiment give grounds for the assumption of the necessity for the primary impact on the physical qualities, which were distinguished by factor analysis at the end of the school year. 3. In connection with the obtained data, we note the necessity for additional attention of the physical education teacher for the development of such physical qualitity as flexibility of 7-year-old girls.

Further researches should be directed to the development of a methodology for improving the physical preparation of 7-year-old girls in the act of implementation of various forms of physical activity during the second year of study at elementary school.

Список використаних джерел:

1. Ареф'єв В. Г., Єдинак Г. А. Фізична культура в школі (молодому спеціалісту): навч. посібник. 3-е вид. перероб. і доп. Кам'янець-Подільський: ПП Буйницький О. А., 2007.248 с.

2. Галаманжук Л. Л.. Превентивний розвиток рухової активності дітей дошкільного віку: монографія. Кам'янець-Подільський: ПП «Медобори-2006», 2015. 500 с.

3. Герасимчук А. Ю., Галаманжук Л. Л., Єдинак Г. А. Програмування занять фізичними вправами превентивної

спрямованості для 6-річних дітей: навч. посіб. Кам'янець-Подільський: ТОВ «Друкарня Рута», 2014. 180 с.

4. Єдинак Г. А., Зубаль М. В. Мисів В. М. Соматотипи і розвиток фізичних якостей дітей: монографія. Кам'янець-Подільський: ПП Видавництво «Оіюм»», 2011. 280 с.

5. Єдинак Г. А., Мисів В. М., Юрчишин Ю. В. Фізична культура у загальноосвітньому навчальному закладі: навч. посіб. Кам'янець-Подільський: Рута, 2014. 251 с.

6. Клюс О. А,, Галаманжук Л. Л., Єдинак Г. А. Організація і методика корекції психофізичного стану учнів других класів у процесі фізичного виховання: метод. посіб. Кам'янець-Подільський: ТОВ «Друкарня Рута», 2013. 204 с.

7. Слюсарчук В. В., Єдинак Г. А. Покращення фізичного стану дітей 8–10 років у процесі фізичного виховання в загальноосвітньому навчальному закладі: навч.-метод. посіб. Кам'янець-Подільський: ПП Видавництво «Оіюм»», 2011. 148 с.

8. Шиян Б. М., Єдинак Г. А., Петришин Ю. В. Наукові дослідження у фізичному вихованні та спорті: навч. посібник. 2-е вид., стереот. Кам'янець-Подільський: ТОВ «Друкарня «Рута», 2013. 280 с.

9. Galamandjuk, L. (2014). Peculiarities of physical abilities and development of physical features of boys with different orientation of manual motor asymmetry within 4-6 years of life. J. of Health Sciences, 4(9). 89-100.

10. Galamandjuk, L., Prozar, M., Stasjuk, I., Bakhmat, N., Iedynak, G., Kljus, O., Guska, M., Dokuchina, T. (2017). Physiological characteristics and physical fitness of girls at the beginning of classes at the volleyball sports school. J. of Physical Education and Sport,. 17(4). 2467-2471. doi:10.7752/jpes.2017.04276

11. Gerasymchuk, A. Galamandjuk, L. (2014). Efficiency of prevention-targeted curriculum in the correction of children's

physical condition and dynamics of their mental activity during physical exercising. J. of Health Sciences, 4(10). 357-370.

12. Get Active! Physical Education, Physical Activity and Sportfor Children and Young People: A Guiding Framework (2012). Published by The Professional Development Service for Teachers and funded by The Teacher Education Section. Roinn: Department of Education and Skills Ireland.

13. Iedynak, G., Galamandjuk, L., Ivashchenko, V., Stasjuk, I., Prozar, M., Mazur, V., Sliusarchuk, V. (2017). Psychosocial aspects of improving physical activity of children with chronic diseases. J. of Physical Education and Sport, 17(3). 1186-1891. doi:10.7752/jpes.2017.03183

14. Iedynak, G., Galamandjuk, L., Kyselytsia, O., Balatska, L., Nakonechnyi, I., Mazur, V. (2017). Physiological characteristics of pubertal schoolchildren with chronic diseases. J. of Physical Education and Sport, 17(4). 2462-2466. doi:10.7752/jpes.2017.04275

15. Katzmarzyk, P. T., Silva, M. J. C. (2013). Growth and maturation in human biology and sports. Coimbra: University press.

16. Wilmore, J. H., Costill, D. L., Kenney, L. W. (2012). Physiology of sports and exercise, 5th ed. Champaign, IL: Human Kinetics.

References

1. Arefiev, V. G., Iedynak, G. A. (2014). Fizychna kul′tura v shkoli (molodomu spetsialistu) [Physical Culture at School (for a Young Specialist)]. 3th ed. Kamyanets-Podilsky: Buynytskyi O. A.

2. Galamandjuk, L. L. (2015). Preventyvnyy rozvytok rukhovoyi aktyvnosti ditey doshkil′noho viku [Preventive development of motor activity of children of preschool age]. Kamyanets-Podilsky: Medobory-2006.

3. Gerasimchuk, A. Y., Galamandjuk, L. L., Iedynak, G. A. (2014). Prohramuvannya zanyatʹ fizychnymy vpravamy preventyvnoyi spryamovanosti dlya 6-richnykh ditey [Programming exercises with preventive exercises for 6-year-old children]. Kamyanets-Podilsky: Ruta.

4. Iedynak, G. A., Zubal, M. V., Mysiv, V. N. (2011). Somatotypy i rozvytok fizychnykh yakostey ditey [Somatotypes and development of physical qualities of children]. Kamyanets-Podilsky: Publishing House "Oiyum".

5. Iedynak, G. A., Mysiv, V. N., Yurchyshyn, Y. V. (2014). Fizychna kulʹtura u zahalʹnoosvitnʹomu navchalʹnomu zakladi [Physical Culture in a General Educational Institution]. Kamyanets-Podilsky: Ruta.

6. Klyus, O. A., Galamandjuk, L. L., Iedynak, G. A. (2013). Orhanizatsiya i metodyka korektsiyi psykhofizychnoho stanu uchniv druhykh klasiv u protsesi fizychnoho vykhovannya [Organization and method of correction of the psychophysical state of students of other classes in the process of physical education]. Kamyanets-Podilsky: Ruta.

7. Slyusarchuk, V. V., Iedynak, G. A. (2011). Pokrashchennya fizychnoho stanu ditey 8–10 rokiv u protsesi fizychnoho vykhovannya v zahalʹnoosvitnʹomu navchalʹnomu zakladi [Improvement of the physical condition of children 8-10 years old in the process of physical education in a general educational institution]. Kamyanets-Podilsky: Publishing House "Oiyum".

8. Shiyan, B. M., Iedynak, G. A., Petryshyn, Y. V. (2013). Naukovi doslidzhenn’ya u fizychnomu vyhovanni ta sporti [Scientific researches in physical education and sport]. Kamenets-Podilsky: LLC "Printing House "Ruta".

9. Galamandjuk, L. (2014). Peculiarities of physical abilities and development of physical features of boys with different orientation of manual motor asymmetry within 4-6 years of life. J. of Health Sciences, 4(9). 89-100.

10. Galamandjuk, L., Prozar, M., Stasjuk, I., Bakhmat, N., Iedynak, G., Kljus, O., Guska, M., Dokuchina, T. (2017). Physiological characteristics and physical fitness of girls at the beginning of classes at the volleyball sports school. J. of Physical Education and Sport,. 17(4). 2467-2471. doi:10.7752/jpes.2017.04276

11. Gerasymchuk, A. Galamandjuk, L. (2014). Efficiency of prevention-targeted curriculum in the correction of children's physical condition and dynamics of their mental activity during physical exercising. J. of Health Sciences, 4(10). 357-370.

12. Get Active! Physical Education, Physical Activity and Sportfor Children and Young People: A Guiding Framework (2012). Published by The Professional Development Service for Teachers and funded by The Teacher Education Section. Roinn: Department of Education and Skills Ireland.

13. Iedynak, G., Galamandjuk, L., Ivashchenko, V., Stasjuk, I., Prozar, M., Mazur, V., Sliusarchuk, V. (2017). Psychosocial aspects of improving physical activity of children with chronic diseases. J. of Physical Education and Sport, 17(3). 1186-1891. doi:10.7752/jpes.2017.03183

14. Iedynak, G., Galamandjuk, L., Kyselytsia, O., Balatska, L., Nakonechnyi, I., Mazur, V. (2017). Physiological characteristics of pubertal schoolchildren with chronic diseases. J. of Physical Education and Sport, 17(4). 2462-2466. doi:10.7752/jpes.2017.04275

15. Katzmarzyk, P. T., Silva, M. J. C. (2013). Growth and maturation in human biology and sports. Coimbra: University press.

16. Wilmore, J. H., Costill, D. L., Kenney, L. W. (2012). Physiology of sports and exercise, 5th ed. Champaign, IL: Human Kinetics.

UDC 615.825:582 (437.6)
DOI: 10.32626/PASAOPEAPT.2019.108-118

Peter Kutiš, Marina Kolarová[8], Mária Lehotská[8a]

PREOPERATIVE REHABILITATION CARE IN TOTAL HIP JOINT REPLACEMENT BY RAPID RECOVERY APPROACH IN SLOVAKIA

Abstract. Relevance of research*: Hip fractures and arthrosis are currently one of the serious illnesses presenting as a serious health problem faced by the aging population. The health problem is not just the wound itself or arthrotic changes accompanied by severe pains and difficulties to get up and walk on the affected lower limb, but also the risk of inadequate healing after surgery. Also, significant disability and reduced ADL performance may continue despite the immense advances in surgical techniques, nursing care and rehabilitation.Nowadays, which is primarily aimed at reducing the cost of health care, it is necessary to ensure that this reduction in costs is not at the expense of the quality of health care and future medical success. In general, physiotherapy for total hip joint replacement is considered to be a routine matter that deals mainly with mobility training, increased muscular strength, and basic day-to-day activities such as bed-to-chair transition, standing and walking. In addition to these attributes, physiotherapists also need the patient's own experiences and psychological responses such as anxiety and fear.*

Goal and methods of research*: The aim of the thesis is to point out the importance of preoperative preparation of the patient for total replacement of the hip joint and its impact on the reduction of recovery after surgery. As a method, a case study of the 33 year patient indicated for total hip replacement was selected. The patient underwent a*

[8] Full time PhD student, Department of Physiotherapy, Faculty of Health, Catholic University in Ružomberok, (Slovakia)

[8a] Department of Nursing, Faculty of Health, Catholic University in Ružomberok, (Slovakia) peter.kutis@gmail.com

comprehensive preoperative three-month preoperative treatment (from the moment of indication to surgery to performance itself) and subsequent post-operative rehabilitation treatment of three and a half months.

Results: *A comprehensive rehabilitation program was developed taking into account the patient's health and Rapid recovery recommendations in preoperative and postoperative care. During the preparatory phase of the operation, the patient was modified by motor stereotype walking, strengthened lower limb muscles, especially musculus quadratus femoris and pelvis stabilizers. Lower limb circumference values increased by 2 cm, hip muscle strength increased from grade 3 to grade 4 of the Janda muscle tests, and shortened muscles iliopsos were released on the affected side. Taking into account the operational complications and subsequent comprehensive care according to Rapid Recovery recommendations, the stay in the hospital was reduced from 12 days to 5 and the patient returned to normal working life from 6 months to 4 months.*

Conclusion: *Rapid recovery program requires the development of a new culture not only in normal orthopedic outpatient clinics but also in hospitals. In the past, and nowadays in some regions of the world, slow recovery with extended acute hospitalization for several weeks has been thought to be the best way for patients to recover and achieve a good result after complete replacement of either the hip or knee joint. The results of total hip joint surgery studies showed a significant reduction in hospital stay without increasing the remission rate. Subsequently, patient satisfaction increased, accompanied by a reduction in health care costs and a faster return to normal daily life.*

Key words: *total joint replacement, peri operative physiotherapy, rapid recovery, physical therapy*

Introduction. Nowadays, which is primarily aimed at reducing the cost of health care, it is necessary to ensure that this reduction in costs is not at the expense of the quality of health care and future medical success. In general, physiotherapy after total hip joint replacement is considered to be a routine matter that deals mainly with mobility training, increased muscle strength, and basic day-to-day activities such as bed-to-chair transition,

standing and walking. In addition to these attributes, physiotherapists also need the patient's own experiences and psychological responses such as anxiety and fear. The long-term effects of physiotherapy interventions have not been sufficiently evaluated, leading to doubts about which physiotherapy method is best. Moreover, the constantly negative effects on the daily life of the patient point to the shortcomings of today's routine physiotherapy treatment.

Operational performance is just the beginning of the entire healing process. Postoperative rehabilitation is aimed at verticizing the patient, walking, and restoring the correct functioning of the hip joint. An inalienable part is to include rehabilitation before the operation itself. For the patient, it is much easier to rehabilitate after surgery, which can then lead to a faster release of the patient from the hospital to the home environment (Dungl, 2005). Within the critical approach, Cavanna et al. (2009) adds that the most optimal approach to therapy has not yet been established.

As part of patient rehabilitation, it is important to remember the basic principle. The movement itself has a maintenance and repair effect on the structure and function of the locomotor system. This influence is also transferred to the function of other organs of the human body, including the infrastructure and human psyche. The primitive peoples were already aware of the positive impact of human movement on human health and therefore, for example, to fight with dance. The task was to improve physical fitness and to motivate psychological motivation to improve combat performance (Véle, 2006).

The Rapid Revoy concept involves introducing well-described procedures for this concept, which often requires a review of these procedures. Therefore, multimodal methods have been proposed and adopted, and established by dedicated centers (Ibrahim, Khan, Nizam, et al., 2003).

According to Lombard, Berend, Adams (2010), a rapid

recovery program begins before the surgery itself and determines the patient's suitability for surgery. An important introductory part is an adequate assessment of the patient's health by appropriate orthopedic examination and determination of suitability for the operation itself. The professional team headed by orthopedics must motivate the patient and ensure that the expectation of the patient, the patient's family and the surgeon are aligned.

As stated by Lombardi, Viacava, Berend, (2006) in their study, changing the approach and thinking of the whole team involved in patient care, and simplifying operational protocols, nursing protocols, and physiotherapeutic approaches, they have enabled patients to recover more quickly and safely the affected structures and a fuller return of the patient to normal daily life.

Goal of research – the aim of the thesis is to point out the importance of preoperative preparation of the patient for total replacement of the hip joint and its impact on the reduction of recovery after surgery.

Material and methods of research. The aim of the thesis is to point out the importance of preoperative preparation of the patient for total replacement of the hip joint and its impact on the reduction of recovery after surgery. As a method, a case study of the 33 year patient indicated for total hip replacement was selected.

Patient indicated for total hip joint endoprosthesis in October 2017. After the orthopedic decision to indicate patient to surgery, the patient was subsequently examined by a physiotherapist and included in the rapid recovery program. In the initial examination, the patient's overall posture, muscles function and power of muscles of the hip, shortened musculus iliopsoas, thigh circumference and leg lengths were evaluated.

A Janda functional muscular test was used to assess the muscular force of the patient, distributing muscle strength to six degrees of muscle strength (Tab 1).

Muscle strength	Description of Muscle Function
0 (zero)	when trying to move the muscle can not show even the smallest

	flashes.
1 – T (trace)	the muscle can perform approximately 10% of the muscular force compared to the normal muscle, which is a bump when attempting to move.
2 – P (poor)	muscle represents 25% of the muscle strength compared to the normal muscle. Although the muscle can move within the range of motion, it can not overcome the force of gravity. Therefore, the conditions for testing should be modified to exclude the effect of gravity on as large a measure as possible.
3 – F (fair)	muscle represents 50% of muscle strength versus normal muscle. The muscle can make movement in the whole range of movement with overcoming gravity.
4 – G (good)	muscle corresponds to 75% of normal muscle strength. This means that the muscle can easily move within the entire range of movement and can overcome the moderately large external resistance
5 – N (normal)	muscle strength corresponds to the normal muscle, respectively muscle with very good function. The muscle is able to overcome considerable external resistance at full motion. Therefore, it corresponds to 100% of normal.

Tab 1 Functional Muscle Test (Janda, 2004)

A Janda´s functional muscular test for the evaluation of shortened muscle groups (Tab 2) was used to assess the musculus iliopsoas muscle shortness.

Degree of shortened muscle	Description
0 - Unshortened muscle	the thigh in the horizontal without deviations, the pre-kneeling slips at the relaxed knee vertically to the ground, the sash is slightly displaced laterally
1 - Little shortened uscle	in the hip joint is a light, slight grip, when the abdominal musculus iliopsoas predisposes slightly obliquely forward
2 - Great shortened muscle	in the hip joint there is a pronounced fleeting position, the pressure on the distal surface of the thigh towards the hyperextension can not be achieved by the horizontal position of the thigh, the pre-ellipse faces obliquely forward, the patella is pulled upwards

Tab 2. Functional Muscle Test for Shortened Muscles (Janda, 2004)

The values of the thighs were compared to each other

against the healthy lower limb and subsequent progress in rehabilitation. Measurement of the thighs was performed according to Janikova (1998) at a height of 10 cm above the patella (where we measured muscle weakness of the musculi vasti) and 15 cm above the patella (where we evaluated the musculus quadratus femoris).

The pre-operative preparation of the patient consisted of individual exercise designed to increase muscle strength, relaxation exercises focused on musculus iliopsoas and training of mobility in common daily activities. Common day-to-day activities included bed-rehearsal practice, sessions and stand-ups, walking training for two forearms crutches on various terrains, and dressing training. Also, the psychological preparation of the patient for surgery and consultation with the surgeon with a detailed description of the on-going surgical performance was included.

Research results. A 33-year-old patient sent for physiotherapeutic examination by orthopaedics after an indication of total left hip joint endoprosthesis. Planned operation for 60 days. As part of the aspect examination, we observe flaton with significant impact on the outer edge of the left foot during walking. The left musculature of the lower limb is significantly hypotrophic (Tab 3), the pelvis is slightly skewed, the paravertebral muscles are slightly hypertonic, the head is in the central position. An antalgic posture with significant left leg lowering. Walking is disproportionate with attacking more to the right side, the step of the left lower leg shortened. Walking on the toes painful, after the heels could not be investigated.

Lower extremity		**The the day of the indication for operation**	**2 months after (1 day prior operation)**
Right	10 cm	40 cm	40 cm
	15 cm	45 cm	45 cm
Left (affected)	10 cm	37 cm	39 cm
	15 cm	39 cm	41 cm

Tab 3 Lower Extremities Circuits

When comparing the anatomical length (from trochanter maior to malleolus lateralis) of the lower limbs, we observe the symmetry (Table 4). Slope of the pelvis observed at the initial examination is attributed to the truncated musculus iliopsoas, as described in Table 5.

Lower extremity	**The the day of the indication for operation**	**2 months after (1 day prior operation)**
Right	86 cm	86 cm
Left (affected)	86 cm	86 cm

Tab 4 Lower Extremities Length

Lower extremity musculus iliopsas	**The the day of the indication for operation**	**2 months after (1 day prior operation)**
Right	0	0
Left (affected)	2	1

Tab 5 Shortened musculus iliopsoas

When examining the muscle strength of each muscular group according to the Janda test (Tab 6) we observe a significant weakening of the muscular force in the left lower limb. In the case of abduction, external and internal rotation, we can describe a strong weakening of the muscular force that causes the patient secondary pain in standing and walking.

Lower extremity	**Motion**	**The the day of the indication for operation**	**2 months after (1 day prior operation)**
Right	**Abduction**	5	5
	Adduction	5	5
	Flexion	5	5
	Extension	5	5
	Internal Rotation	4	4
	External Rotation	4	4

Left (affected)	**Abduction**	2	3
	Adduction	3	4
	Flexion	3	4
	Extension	3	4
	Internal Rotation	2	3
	External Rotation	2	3

Tab 6 Muscles Strength

The patient was subsequently examined on the planned day of hospitalization after completing the 60-day preparation. When comparing the measured values with the values on the first day of the rehabilitation exercise, we can see improvements in all the observed stages. The thigh circumference values were improved by about 10% in the observed plane 10 cm above the patella and approximately 5% in the reference plane 15 cm above the patella. The musculus quadratus femoris itself was more marked and optically resembled muscle on a healthy limb. By releasing exercises we have been able to reduce the muscular iliopsoas tension by one degree and by strengthening exercises to increase muscle strength in all the muscles monitored by one degree. The exercise itself was limited by pain in the hip joint area, which greatly reduced the patient's comfort either during exercise or during day-to-day activities. To prevent the undesirable pain effect, analgesics in tablet form were indicated every 12 hours, and infiltrative analgesic therapy was given approximately 1 hour before exercise. After exercise, elements of negative thermotherapy were used to relieve swelling, reduce pain and also to support blood flow in the affected area.

The values of the lengths of the lower limbs have not changed, but when examining the view we can observe the adjustment of the position of the pelvis in one plane. This was mainly due to the release of the abdominal musculus iliopsoas.

Discusion. The main task of the lower limbs is to provide locomotor, postural activity and support of the whole movement

system (Véle, 2006). The muscles of the hip joint forms a large mass that is designed to ensure joint strength. They act on the position of the pelvis and the spine, thus ensuring the upright holding of the body (Janda, 2004). As reported by Dylevsky (2009) and Véle (2006), musculus iliopsas flects and adheres to the hip joint. In his unilateral contraction, he rotates the pelvis to the opposite side, and thus slips the position of the pelvis that affects the entire hold of the body. In the initial examination, the patient has oblique pelvis. It was influenced by the unilateral abdominal musculus iliopsoas. With its partial release (from stage 2 to stage 1), we achieved pelvic balancing, influenced the position of the spine, reduced the pain radiating to the spine, and maintained a reasonable range of movement in the affected joint, as Hromadková (2002) points out in her recommendations.

Hromádková (2002) further recommends focusing on improving the overall condition of the patient. It is necessary to focus on strengthening the muscles of the lower limbs in two phases. In the first phase, he describes the isometric contraction practice m. quadriceps femoris and mm. glutei. In the second phase, engage the resistance of the lower limbs to strengthen the overall muscular force. In our case study, the two phases were progressing in the patient. At the beginning of the exercise unit we did the isometric contraction practice m. quadriceps femoris and mm. glutei. Subsequently, the patient practiced resistance exercises with the help of tools. This resulted in an increase in Janda test muscle strength by an average of one degree, and an increase in the thigh muscle circuits averaging 7.5% in both measured circuits.

According to the authors Uchytil, Jandačka and Foldyna (2010), preoperative rehabilitation and patient preparation have been hurting many negative factors. The most important factor is pain and thus the patient's interest in exercise. This is confirmed by the team of Gupta, Garg and Gupta (2014) and describes pain management not only in preoperative but also postoperative pain

as one of the biggest challenges. In our patient, we performed a local infiltration analgesia in the preoperative period as recommended by Gupta, Garg and Gupta (2014), which contained a combination a large volume of dilute solution of a long acting local anaesthetic agent in combination with NSAID.

Conclusion. As part of patient rehabilitation, it is important to remember the basic principle. The movement itself has a maintenance and repair effect on the structure and function of the locomotory system. This influence is also transferred to the function of other organs of the human body, including the infrastructure and human psyche. It is necessary to be aware and not to forget the pre-operative education of the patient, which is also pointed out by the authors Berend, Lombardi, Mallory (2004) in their study. They mark it as one of the easiest and safest ways to increase the effect of an ongoing operation waiting for the patient. The authors evaluated the effect of an individual rehabilitation program on patients. This rehabilitation program and pre-operative education include information on hospital stay, planned performance, and early release into home care. The authors point to the fact that patients who underwent this pre-operative rehabilitation were released into home care much sooner (approximately 5.4 days versus 8 days).

References

1. Dungel, P, 2005. Ortopedie. 1. vydanie. Praha: Grada Publishing.

2. Dylevský, Ivan, 2009. Kineziologie. Základy strukturální kineziologie. Praha: Triton. ISBN 978-80-7387-324-0

3. Dylevský, Ivan, 2009. Speciální kineziologie. Praha: Grada Publishing. ISBN 978-80-247-1648-0

4. Hromádková, Jana a kol., 2002. Fyzioterapie. Jinočany: Nakladatelství H & H Vyšehradská. ISBN 80-86022-45-5

5. Ibrahim, S. Mazin, Khan, A. Muhammad, Nizam, Ikram, et al., 2003. Peri-operative interventions producing better

functional outcomes and enhanced recovery following total hip and knee arthroplasty: an evidence-based review. In: BMC Medicine, Roč. 37, č. 11. ISSN 1741 – 7015

6. Janda, Vladimír a kol., 2004. Svalové funkční testy. Praha: Grada Publishing. ISBN 80-247-0722-5

7. Janíková, Danica, 1998. Fyzioterapia. Funkčná diagnostika lokomočného systému. Martin: Osveta.

8. Lombardi, A. V., Berend, K. R., Adams, J. B., 2010. A Rapid Recovery Program: Early Home and Pain Free. In: Orthopedics. Roč. 33, č. 9. ISSN 1938 – 2367

9. Lombardi, A. V., Viacava, A. J., Berend, K. R., 2006. Rapid recovery protocols and minimally invasive surgery help achieve high knee flextion. In: Clinical Orthopaedics and Reslated Research., č. 452, s. 117-122. ISSN 1528 – 1132

10. Tushar, Gupta, Nidhi, Garg, Mayank, Gupta, 2014. Local infiltracion analgesia following total hip replacement: a review of current literature. In: Chinese Journal of Traumatology., roč. 17, č. 5, s. 293 – 297, ISSN 1008-1275

11. Uchytil, J., D. Jandačka, and K. Foldyna., 2010. Reakční síla působící při chůzi na končetinu po totální náhradě kyčelního kloubu: Dodržují pacienti doporučení o zatěžování?. Rehabilitácia, Roč. 47, č. 4, ISSN 0375-0922.

12. Véle, František, 2006. Kineziologie. Přehled klinické kineziologie a patokineziologie pro diagnostiku a terapii poruch pohybové soustavy. Praha: Triton. ISBN 80-7254-837-9

UDC 37:316.77(438)"20"
DOI: 10.32626/PASAOPEAPT.2019.119-128

Marek Paluch[9]

THE NEW STRATEGY OF EDUCATION IN THE PERIOD OF A SOCIAL CHANGE IN POLAND. SELECTED STANDARDS AND DEMANDS

Abstract. ***Relevance of research****: the social change in Poland has a significant impact on the development of the education system, including its reforms.*

Goal of research*: thus the search for new and more perfect forms and methods in the process of education and upbringing of the young generation. The general concept of the reform of the education system in Poland is based on considerations of social transformation.*

Results*: Objectives and conditions for their realization will depend on the implementation and adaptation skills of both teachers and pupils as well as the whole society.*

Keywords*: education, social change, educational demands, a reform of education.*

Introduction. Social changes that took place in Poland in 1989 determine the development of a modern human. Due to those changes the man has to build a new system of values as well as improve the existing ones. In 2004, Poland became a member of the European Union. The whole process of social transformation brings about challenges and expectations. Undoubtedly, the current period is the time of breakthroughs in political, economic and spiritual area.. The old social and theoretical structures decline or lose credibility. The new ones do not satisfy human needs, aspirations and hopes. Consequently chaos in the hierarchy of values, ideas and information as well as disperse attitudes occur. Some of the changes which we have

[9] University of Rzeszow (Poland), paluch.m@onet.eu

witnessed in various areas of life are dynamic, the others are slow or there is lack of them. Often the political reality causes frustration, discouragement and pessimism of the young generation, and all this weakens the enthusiasm and energy to tbe proactive. It should be emphasized that the Polish accession to the European Union is an important factor of transformations in all areas of life, including the reconstruction of education. A new educational strategy is being created with critical and creative doctrines of teaching that also change reality.

Material and methods of research. The transition from a centrally planned economy to a market economy forces changes in the preparation of graduates from all types of schools. It is necessary to have developed educational and self-creation competence. The picture of an innovative man, who has acquired knowledge about the world and about himself in the course of education and self-education, is becoming indispensable need for the proper functioning in the society. Undoubtedly, approaching Europe in economic, technological or legal terms is a controllable process carried out gradually and deliberately whereas issues relating to the wider cultural layer do not have the proper rank and projection. It is necessary to create a multi-dimensional educational strategy based on a profound reform of the educational system in Poland. This strategy has created conditions for educational activities in order to enable the full individual development. This can be accomplished through simultaneous educational activities in the field of mental, moral, social, aesthetic education and education to culture. Social integration brings many positive elements, but also many risks such as insecurity, backsliding, unemployment and poverty in the society. Hence there is a need to prevent these forms of threats by creating a new educational strategy.

Contemporary educational transformations. The concepts of reforms in Poland.

Education is most often understood as a broad upbringing

and educational process a kind of impact of the older generation on the younger. The purpose of this action is to change people who live in certain social conditions, shaping attitudes to the educational ideals and goals, which in a given society are worth implementing and valued by the society. The basis of a new education philosophy has become a critical and creative doctrine according to which the task of education is to prepare the younger generation to contribute to civilization, stimulate innovation, creativity, changes in the surrounding world[1]. An important dimension of this doctrine is the subjectivity of people engaging in educational activities. The concepts of education focus on creating conditions for unrestrained development of the psyche, taking into account individual needs of a man, and the acceptance of universal values that a society supports and accepts. Education should serve a man and a society in which he lives. This understanding of education should provide opportunities for the comprehensive development of the individual. The purpose of all educational institutions is to assist and support individuals in achieving and recognizing their life goals.

The educational reform pays special attention to the quality of education and upbringing, the proper selection of the content of programs tailored to the requirements of a modern economy and society. Of important significance is the teaching staff which must be open to new developments and methods of education. Nimiec J. writes that the quality of life of the society in the early twenty-first century bears clear signs of a deep and multilateral crisis. Applied too quickly development Activities supporting the development of capitalist principles of functioning of the economy which have been applied too quickly as well as the absence of relevant experience and competence, has led to mistakes and consequently to uncontrolled enrichment of some

[1] A. Bogaj, S. M. Kwiatkowski, M. Szymański, *System edukacji w Polsce*, JEB, Warszawa 1995, p.118.

people and the impoverishment of others[2] certainly raises inequalities in education. The primary purpose of education is to help each individual to develop their skills [...]. Acquisition of skills and competencies must be accompanied by the formation of a character, cultural openness and stimulation of social responsibility[3].

In the report Education - there's a hidden treasure prepared for the International Commission on Education of the twenty-first century (the committee set up at the initiative of UNESCO - chaired by J. Delors consisted of 14 personalities from different parts of the world) presented the main principles of education, that direct the human to learn the world, other people and himself[4].

Learning in order to live in a community – one should broaden their knowledge about others, about their history, traditions, and religions, learn to co-exist in the community, a peaceful settlement of conflicts.

Learning in order to know how to acquire specific knowledge – a modern man should have a profound general knowledge base. He should also be able to use the tools to acquire new knowledge.

Learning in order to operate – it is a competence of each person described as technical and vocational skills, ability to cope with difficult and new situations.

Learning to be present and active in life – education is responsible for the development of a critical thinking ability among all the people, the ability of judgment and decision

---

[2] J. Niemiec, *Edukacja wobec realiów, tendencji i reformy [in] Edukacyjne tendencje XXI wieku* (edited) A. Karpińska, Białystok, 2005, p.418.

[3] *Biała Księga kształcenia i doskonalenia nauczania i uczenia się. Na drodze do uczącego się społeczeństwa.* Komisja Europejska ds. Wychowania, Kształcenia i Młodzieży, Warszawa, 1997, p.26.

[4] W. Rabczuk, *Strategiczne cele edukacji w świetle raportu Delorsa J., Biała Księga Unii Europejskiej [in]Realia i perspektywy reform oświatowych*, (red) Bogaj A., IBE,Warszawa 1997, p.62

making, creativity, understanding of phenomena and processes[5].

The basis for determining the educational goals is a system of values recognized by the society.

Values as the base for educational activities.

As it is known, originally the concept of „values" was used in the economy; a value is the price of something „it is how much something is worth in material terms; a feature which can be expressed in the money equivalent or other means of payment[6]. And the category of a value was introduced to philosophy by RH Lotze (1817-1881). The work by C.H. von Ehrenfels „System der werttheorie" written in 1893 is considered to be the first study in the field of axiology[4]. In contrast, all education, if it should serve the social and moral development cannot disregard the values, i.e. everything that is considered valuable, important and valuable to the individual and the society.

The new educational strategy requires a reference to values in the education of children and adolescents in particular. Education, through which pupils are not introduced to the world of values, is generally hemi education not effective, and often thoughtless and socially harmful. This is because it does not prepare enough to distinguish good from evil, and thus to make life decisions consistent with the fundamental principles of morality[5]. Contemporary Polish educator Denek K. says that, 'The values are the driving force. Occur in human life as a compass, which sets the direction of the actions[6].

---

[5] Compare: A. Krauz, Ag. Krauz, M. Paluch, *Edukacja w okresie współczesnych przemian. Wybrane zagadnienia,* Rzeszów, 2011, p.14-15.

[6] S. Dziamski, *Aksjologia. Wstęp do filozofii wartości*, Poznań 1997, p.8.

[4] W. Tatarkiewicz, *Pojęcie wartości, czyli co historyk filozofii ma do zakomunikowania historykowi sztuki[in] Pisma z etyki i teorii szczęścia*, Wrocław 1992, p.75.

[5] M. Łobocki, *Pedagogika – nauka o wychowaniu [in] Pedagogika podręcznik dla szkół medycznych* (edited) W. Ciechaniewicz, Warszawa 2000, p.26-27.

[6] K. Denek, *Uniwersalne wartości edukacji szkolnej [in] Dziecko w świetle rodziny. Szkice o wychowaniu*.(edited) Dymory B., Kraków 1998, p.20

It should be emphasized that the values in the educational process are not able to prevent all forms of evil in the life of the individual and social life of people, but without them, their behavior and moral attitude would be even less desirable. The new education strategy should use values that are not in doubt, i.e. the universal, timeless also called basic values and common.

The authors of the elaboration "Main directions of improving the education system in Poland"[7] cite the strategy of educational reform presented by one of the world's leading experts of education - Husen T. Here are some of them:

- smooth, controlled rate of reform requires a central control, but above all a harmonious cooperation between the authorities, teachers and pedagogical supervision;
- educational reform may be successful only as a part of a socio-economic reform and not its substitute as politicians want it;
- the necessary condition for reforming the school system is mobilizing adequate financial resources and appropriate staff training- teachers and educational administration for correct implementation of the reform;
- prerequisite for the success of the reform is the creation of research centers, which through their empirical and diagnostics research results will introduce reform plans and assess the impact of changes caused by introduced solutions;
- effective implementation of the reform must take a long time: it requires a systematic and gradual introduction of the desired changes, appropriate pilot studies and follow-up effects.

The man as a subject to educational activities.

One of the most important elements of the new strategy of education is to prepare people for the ability to acquire knowledge through education and self-education. Self-directed learning is the process of formation of a modern man. The man is a free

[7] Główne kierunki doskonalenia systemu edukacji w Polsce, 1994.

individual, autonomous and sovereign towards himself and others. He is a human person developing through a lifetime. The individuality is the life mechanism emerging in the separate mode of existence. It is in every human person uniting all his personal features[8]. The man has the possibility for creating values that make up his biography. Thanks to this the man becomes a carrier of the values. An important element of the learning competencies of a modern man is self-education. The ability to self-educate is an indispensable element of an adult human figure exceeding the age limits. Learning is a factor which supports development. It helps to strengthen personal competences and create new ones. Learning also enhances and modifies the interpersonal, social, and organizational competences as well as contributes to the modification and development of new executive competences.

Research results. The new self-study educational strategy can be seen as a creative process involving the creation of oneself, self-discovery, self-assessment of the activities in the perspective of undertaken purposes. The essential condition for the self-education is the development of certain personality features that are conducive to the development of the individual. Courageous personal attitude is one of them. It is worth noting that apart from the properties enabling self-directed learning, self-education workshop is also important[9]. It should also be emphasized that the changes in education are aimed at:

- equalization of educational opportunities,
- raising the level of education of the society by promoting education and higher education,
- meeting the educational aspirations of the society,
- promoting the improvement of the quality of education which is understood as an integral process of education and training,

[8] J. Szczepański, *O indywidualności*, Warszawa 1988

[9] Compare: M. Paluch, *Człowiek w zmieniającym się społeczeństwie*, Sanok, 2007, p.39-43

- rational use of resources allocated to education,
- linking vocational education system to the labor market.

The task of education today is to prepare an active, mobile and effectively acting man in the new conditions of a social change. The new education strategy consists of many elements due to the large scope of this issue. At the end of this work I will discuss the basic directions of the discourse on the contemporary national and European educational teleology, which may focus on the following issues:

- stimulating the intellectual, psychological and mental readiness to accept the (learning) of cultural otherness, multiculturalism and ethical, religious ideological and moral diversity;
- exposing the cognitive euro-cultural or geo-cultural content, overcoming accumulated national regional, local and historical prejudices which are irrational from the point of view of the contemporary social phenomena as well as political, cultural and civilizational processes in Europe;
- developing interests, organizing meetings and discussions for adolescents to teach the different cultures, customs and traditions associated with them as well as contemporary forms of social life. This allows to inspire the attitudes of tolerance, openness to other cultures and expressing willingness to dialogue and consensus over the own scale of values;
- reduction of xenophobia, stereotypes and all forms of ideological and religious fundamentalism;
- development of a balanced, critical and rational empathy for the problems of the evolution of customs and cultural rules of social life, understanding the cognitive and emotional distance to their own experience and learning the systems of values of other nations[10].

[10] Compare: K. Szmyd, *Edukacja w perspektywie wielokulturowej. Tradycje, rzeczywistość, postulaty wychowawcze,*[in:] M. Paluch, A. Horbowski, K.

Conclusions. The presented thesis on the concept of the reform of the educational system in Poland is due to significant changes in all areas of life. The necessity of these reforms and changes in a way of thinking results from circumstances which are brought by Polish presence in the European Union. For polish society to keep up with the rapidly changing conditions of the labor market in all work professions, there is an urgent need to implement in Poland, the European Union Council Resolution dated 28.05.2004 on lifelong guidance and education. Today, education is to prepare not only the younger generation, but every human being to life, to the ever-changing social reality. However, financial constraints can become a threat to the full implementation of the idea of educational reforms. A reform requires additional expenditures for investments and organizational changes. The financial obstacles and economic realities of the country should be taken into account. Poland in order not to remain the periphery of the EU[11] must implement educational reforms to change the people, the country and Europe. It is also important to conduct systematic research that will determine how established strategies, educational reforms are implemented, and what results they bring.

References

1. Bogaj A., Kwiatkowski S.M., Szymański M., System edukacji w Polsce, IBE, Warszawa 1995.

2. Biała Księga kształcenia i doskonalenia nauczania i uczenia się. Na drodze do uczącego się społeczeństwa. Komisja Europejska ds. Wychowania, Kształcenia i Młodzieży, Warszawa 1997.

Szmyd, *Kultura elementem nowej strategii edukacyjnej. Rozprawy i szkice,* Kraków, 1999,p.26-46

[11] M. Paluch, *System wartości polskiej i słowackiej młodzieży akademickiej w kontekście tożsamości europejskiej,,* Sanok,2007

3. Denek K., Uniwersalne wartości edukacji szkolnej [w] B. Dymara (ed.), Dziecko w świetle rodziny. Szkice o wychowaniu, Kraków 1998.
4. Dziamski S., Aksjologia. Wstęp do filozofii wartości, Poznań 1997.
5. Główne kierunki doskonalenia systemu edukacji w Polsce, 1994.
6. Krauz A., Krauz Ag., Paluch M., Edukacja w okresie współczesnych przemian. Wybrane zagadnienia, Rzeszów 2011.
7. Łobocki M., Pedagogika – nauka o wychowaniu [in] W. Ciechaniewicz (ed.), Pedagogika podręcznik dla szkół medycznych, Warszawa 2000.
8. Niemiec J., Edukacja wobec realiów, tendencji i reformy [in] A. Karpińska (ed.), Edukacyjne tendencje XXI wieku, Białystok 2005.
9. Paluch M., System wartości polskiej i słowackiej młodzieży akademickiej w kontekście tożsamości europejskiej, Sanok 2007.
10. Paluch M., Człowiek w zmieniającym się społeczeństwie, Sanok 2007.
11. Rabczuk W., Strategiczne cele edukacji w świetle raportu Delorsa J., Biała Księga Unii Europejskiej [in] A. Bogaj (ed.), Realia i perspektywy reform oświatowych, IBE, Warszawa 1997.
12. Szczepański J., O indywidualności, Warszawa 1988.
13. Szmyd K., Edukacja w perspektywie wielokulturowej. Tradycje, rzeczywistość, postulaty wychowawcze, [in] M. Paluch, A. Horbowski, K. Szmyd, Kultura elementem nowej strategii edukacyjnej. Rozprawy i szkice, Kraków 1999.
14. Tatarkiewicz W., Pojęcie wartości, czyli co historyk filozofii ma do zakomunikowania historykowi sztuki [in] Pisma z etyki i teorii szczęścia, Wrocław 1992.

UDC 378.4(477.43-25):796.015.8
DOI: 10.32626/PASAOPEAPT.2019.129-142

Prozar Mykola, Petrov Andriy,
Stasiuk Vadim, Avinov Vitaly, Bila Mariya[10]

PECULIARITIES OF PHYSICAL PERFORMANCE INDICATORS' DISPLAY OF 1st-2nd YEAR YOUTHS OF THE PHYSICAL EDUCATION DEPARTMENT

Abstract. Relevance of research*: in the current conditions in Ukraine there is a crucial "rejuvenation" of a significant majority of chronic diseases, primarily cardiovascular, which negatively affects both the state of health and the total life expectancy - an integral indicator of the state welfare. Physical performance as one of the components of the physical state, reflects the potential ability of the body to perform physical effort without reducing the specified level of functioning of the organism, but primarily its cardiovascular and respiratory systems. The conducted research is intended to determine the level of functioning of the cardiovascular system of 1st-2nd year youths of the Physical Education Department on the graduated exercise due to the results of the Harvard step-test.*

Goal of research: *to discover the state of functioning of the cardiovascular system of 1st-2nd year youths of the Physical Education Department due to the results of their reaction to graduated exercise.*

Research methods: *during the study, we used the following methods: pedagogical, biomedical, statistical analysis.*

Results*: indicate, that the level of physical performance of the majority of 1st-2nd year youths of the Physical Education Department is low or lower than average. A comparison of the two groups of studied youths engaged in cyclic and acyclic sports revealed, that according to the studied indicators of the Harvard step-test there were no statistically significant relationships among them, taking into account the fact that the study samples met the established requirements. The low level of*

[10] Kamianets-Podilskyi National Ivan Ohiienko University (Ukraine), prozar_nikolas@kpnu.edu.ua

functioning of the cardiovascular system on the graduated exercise of 1st-2nd year youths of the Physical Education Department, above all, is connected with the poor mechanism of regenerative processes, in working with such students more attention should be paid to training classes of aerobic nature, primarily, for the overall endurance development.

Key words: *cardiovascular system, graduated exercise, Harvard step-test index, functional test.*

Introduction. The analysis of recent researches in scientific literature [8; 11] indicates that in Ukraine, according to the Law of Ukraine "On Higher Education" [5], "On Physical Education and Sports" [6], considerable attention is paid to physical perfection and self-improvement of higher education applicants. Formation of students' positive attitude towards physical education, recreational physical education and sports in general will positively affect, in particular, their physical state.

Physical performance is an integrated expression of functional and physical abilities of a person and is characterized by such objective factors as: body build and anthropometric indicators, power and efficiency of providing mechanisms of energy supply, strength and endurance of muscles, the state of the locomotor system, intermuscular coordination, neuroendocrine regulation of a mental state [2].

Some scholars mainly focus their attention on the study of physical performance (as one of the components of physical state) of only competitive sportsmen. Thus, Kovpak S.V. [3] deals with a subject of assessing the special working ability of free-style wrestlers, Raspitin V. I. [7] considers psychological means for increasing the athletic performance of weightlifters. Berezhanskyi O. O. [1] studied the issues of improving the physical performance and functional state of biathlonists at the stage of preliminary basic preparation.

Regarding the researches, which consider the functioning of the cardiopulmonary system as a result of the graduated exercise

of 18-19-year-old students [10], then they are primarily intended to highlight the state of functioning of the blood supply system, external respiration and physical health of students during Step aerobics sessions.

Researches of students' physical health indicators due to the characteristics of physical performance, aerobic and anaerobic productivity of their body reveal the issues on the effect of running training of aerobic and anaerobic focus on physical performance, aerobic and anaerobic performance of the body of 21-23-year students. [9].

Studies that would be related to the display of physical performance of 1st-2nd year higher education applicants of the Physical Education Departments were not identified or conducted. Given the fact that each student of the Physical Education Department at the beginning of studies chooses a particular sport, in which he will be engaged in throughout the course of study, it would be appropriate to know the level of functioning of his cardiovascular system during the graduated exercise: according to the results of the functional test - Harvard step-test index.

On the other hand, this study will also be important for lecturers-trainers, as they will be able to get acquainted with research materials that are relevant to their students.

Goal of research – to discover the state of functioning of the cardiovascular system of 1st-2nd year youths of the Physical Education Department due to the results of their reaction to graduated exercise.

Material and methods of research. The study was attended by 1st-2nd year higher education applicants of the bachelor's degree of the Physical Education Department of the Kamianets-Podilskyi National Ivan Ohiienko University of Speciality 014.11 Secondary Education (Physical Education) and 017 Physical Education and Sports - a total of 53 youths. At the time of the study 23 young men turned 18 years old, 30 - 19 years old.

The research was conducted in compliance with the World

Medicine Association declaration of Helsinki: Ethical principles for medical research involving human subjects, 2013. The study protocol was approved by the Ethical committee of the Kamianets-Podilskyi National Ivan Ohiienko University.

At the initial stage of the study, we received permission from the management of the Physical Education Department of the Kamianets-Podilskyi National Ivan Ohiienko University. At the next stage, we received consent from each student and their parents.

The research was conducted during February-March 2018. We determined the morphological and physical performance indicators (cardiovascular system response to graduated exercise) of the above-mentioned higher education applicants.

*Pedagogical methods of research***.** During the study, pedagogical observation was used to ensure the exact performance of the proposed functional test and to assess the reaction of students to the proposed physical load.

Among the biomedical methods of research, we used anthropometry, pulsometry and functional test - the Harvard step-test index.

The Anthropometry was used to determine the height of the step for testing the Harvard step-test index with the following definition of the body surface area, which was determined according to the Du Bois formula. On the abscissa we found the corresponding mass of the body, and on the ordinate - the length of the body. The point of intersection of the lines perpendicular to the abscissa axis and the ordinate axis on the curve indicated the area of the surface of the body of the studied young man.

Pulsometry was used during the Harvard step-test index. We performed measurements by palpation on the radial artery. At the same time, the arm of the studied young man was lying freely so that the tension of the muscles and tendons did not interfere the palpation. The wrist was freely grasped by the right arm in the area of the radial carpal joint, the thumb was placed on the back

side of the forearm, and the rest of the fingers - on the front of its surface. Having found a pulsating artery, we pressed it to the inner side of the radius with moderate force so that the pulse wave did not disappear, and then carried out measurements.

Harvard step-test index. Physical load was given in the form of climbing on a bench (pedestal). The height of the bench (pedestal) was chosen depending on the age and body surface of the test participant. The ascent rate was set by the metronome (120 beats per minute). In other words, each movement corresponded to the blow of the metronome (one blow - the rise of one leg on the platform, the second blow-the subject stands on the platform with both legs, gaining a vertical position, the third blow - the subject puts the leg on the floor from which he began to ascend, the fourth blow - he lowers the second leg on the floor).

The Harvard step-test index was determined by the formula (1):

$$\text{Harvard step-test index} = \frac{tx100}{(f1 + f2 + f3)x2}$$

where t – total test run time;

f_1, f_2, f_3, – measurement data for 2nd, 3rd and 4th minute rest. Starting from the second minute, the heart rate is measured within 30 seconds and 30 seconds is not measured, etc.

To determine the height of 1st-2nd year youths, we used the RP 200 height gage, body weight was measured using the Xiaomi Smart Scale 2 Whit scales, the heart rate was measured using the Select Stop Watch Pro stop watch, also we used the Cherub WSM-330RD metronome to determine the ascent rate on the pedestal.

Statistical analysis. All statistical analyses were performed using SPSS Version 21**;** for each characteristic, we determined the mean value and its error, the standard deviation, the coefficient of variation, the Student's t-test for unpaired samples. The 0,05, 0,01, 0,001 levels of probability were used to indicate statistical

significance.

Research results. We studied the issues for a comparative description of the correspondence of physical performance indicators and the effectiveness of training sessions on sports and pedagogical improvement (in cyclic and acyclic sports), the effectiveness of conducting practical classes on the subjects of vocational training of higher education applicants of 1st-2nd courses of the Physical Education Department.

The next stage of the study involved receiving information on the sports specialization selected by 1st-2nd year youths. We received it in the faculty dean's office. The cyclic types of sports that students under study engage in, and those cultivated at the Physical Education Department include: track and field athletics, powerlifting and weightlifting, acyclic sports include accordingly: football, volleyball, basketball, handball, boxing, Tae Kwon Do, free-style wrestling, table tennis.

The results obtained during the study were as follows: 24.5% of students engage in cyclic and 75.5% respectively - acyclic sports.

Homogeneity of samples. Studying the indicators of the reaction of the cardiovascular system on the graduated exercise of 1st-2nd year youths of the Physical Education Department, it was concluded that according to these indicators the formed samples were homogeneous.

The conclusion was based on the obtained data on the coefficient of variation - V, which was not more than 20%, and according to the data of the special literature [8] this indicates the homogeneity of the samples formed in accordance with the studied parameters. Specifying the obtained data we note that youths who were students of 1-2 courses and engaged in cyclic sports, the values of V were at the level 4.49% - body length, 11.88% - body weight, in acyclic, respectively, 4.42% - body length, 11.79% - body weight.

Functional indicators had a slightly higher value of the

coefficient of variation, but all within normal limits, except for one indicator. Thus, the studied parameters of the coefficient of variation (V) of the Harvard step-test index had the following values. The heart rate starting from a 30 second of the second minute's rest for 30 seconds for youths engaged in cyclic and acyclic sports was 16.11% and 16.17% respectively. The heart rate value starting from a 30 second of the third minute's rest for 30 seconds was 14.42% for youths who are engaged in cyclic and 14.69% - who are engaged in acyclic sports. The heart rate starting from a 30 second of the fourth minute's rest for 30 seconds, respectively, for those engaged in cyclic sports was 21.45%, and for those engaged in acyclic sports - 14.44%.

The coefficient of variation of the Harvard Step-Test index of 1st-2nd year youths of the Physical Education Department was 17.38% (cyclic sports) and 14.92% (acyclic sports).

Based on the the above-mentioned we can make a conclusion, that the formed samples were homogeneous in terms of the studied indicators, which, in turn, allowed us to study the obtained data using a traditional mathematical and statistical apparatus.

The next stage of the research was to carry out a comparative analysis of the Harvard step-test index with the existing standards and norms. We made it on the basis of Table 1, in which the results of the test are presented for persons engaged in cyclic and acyclic sports respectively.

Youths of 1st-2nd year of the Physical Education Department who are engaged in cyclic sports have such grades due to the results of the Harvard step-test index: low - 23.1%, below average - 30.8%, average - 15.4%, higher than the average - 23,1%, high - 7,6%.

Youths who are engaged in acyclic sports have the following grades: low - 12.5%, lower than average - 45%, average - 22.5%, higher than average - 15%, high - 5%.

Table 1

Evaluation criteria of the Harvard step-test index [8]

Levels	Healthy individuals	Individuals engaged in cyclic sports	Individuals engaged in acyclic sports
Low	Less than 56	Less than 71	Less than 61
Lower than average	From 56 to 65	From 71 to 80	From 61 to 70
Average	From 66 to 70	From 81 to 90	From 71 to 80
Higher than average	From 71 to 80	From 91 to 100	From 81 to 90
High	From 81 to 90	From 101 to 110	From 91 to 100

Functional indicators. One of the objectives of the research was to compare the Harvard Step-Test index indicators among higher education applicants who are engaged in cyclic and acyclic sports by the results of a functional test. These data are presented in Table 2.

Table 2

The state of functioning of the cardiovascular and respiratory systems after the graduated exercise of 1st-2nd year youths of the Physical Education Department

Indicators	1st-2nd year youths of the Physical Education Department				Change ($\Delta \bar{X}$)		t ($\bar{X}_1$-$\bar{X}_2$)
	Cyclic		Acyclic		*abs.*	*in %*	
	$\bar{X}_1$	m_1	$\bar{X}_2$	m_2			
The heart rate starting from a 30 second of the second minute's rest for 30 seconds, BPMs $^{-1}$	63,5	2,83	63,8	1,53	0,3	0,5	0,09
The heart rate starting from a 30 second of the third minute's rest for 30 seconds, BPMs $^{-1}$	58,5	2,37	54,8	1,27	-3,7	6,3	1,38
The heart rate starting from a 30 second of the	50,4	2,99	50,5	1,15	0,1	0,2	0,03

fourth minute's rest for 30 seconds, BPMs $^{-1}$							
Harvard step-test index	71,5	3,44	72,3	1,71	0,8	1,1	0,21

The heart rate staring from a 30 second of the second minute's rest for 30 seconds for the representatives of cyclic sports was 63,5±2,83 BPMs^{-1}, for the representatives of acyclic sports it was 63,8±1,53 BPMs $^{-1}$, the change was 0.5%. The heart rate starting from a 30 second of the third minute's rest, respectively, for the cyclic sports representatives was 58,5±2,37 BPMs^{-1}, for acyclic sports representatives − 54,8±1,27 BPMs $^{-1}$, the change was 6,3 %. Representatives of cyclic sports had a heart rate starting from a 30 second of the fourth minute's rest 50,4±2,99 BPMs $^{-1}$, and representatives of acyclic sports – 50,5±1,15 BPMs $^{-1}$ with the change 1,1 %. And, respectively, the Harvard step-test index value for the representatives of cyclic sports was 71,5±3,44 BPMs $^{-1}$, while for representatives of acyclic sports it was 72,3±1,71 BPMs $^{-1}$, the change was 1,1 %.

It should also be mentioned that in any of the above studied indicators of the Harvard step-test index (including itself), the value of the Student's t-criterion was not statistically significant ($p > 0.05$).

Discussion. The preparation of a highly trained professional in physical education and sport is a long-term process. Given that higher education in Ukraine is lately undergoing considerable changes, it becomes even more complicated. Most assuredly, a person who teaches physical education in a secondary school or works as a coach at a children-youth's sports school must possess not only all the necessary knowledge, skills and abilities, but also be physically, mentally healthy.

One of the health criteria is an excellent physical state, which is viewed as an individual's personality characteristic, his health, bodybuild and constitution, functional capacity, physical performance and preparedness [11].

Taking into account that the goal of our research was to find

out the state of functioning of the cardiovascular system of 1st-2nd year youths of the Physical Education Department according to the results of their reaction to the graduated exercise, then for this purpose we used a functional test - the Harvard step-test index.

Having divided the youths of 1st-2nd courses by the kinds of sports, two groups of subjects were formed: those engaged in cyclic and acyclic sports. Assessment of the results of the Harvard step-test index was differentiated for each of the studied groups.

According to the results of the functional test, we found somewhat lower indicators of physical performance than expected, it should be noted that higher education applicants of 1st-2nd courses are engaged in sports and pedagogical improvement groups at least three times a week, where actually all types of preparedness should be improved (physical, technical, tactical, psychological, integral), but the basis should be the functional readiness of students for the implementation of tasks from other types of preparation. Besides of that, applicants for higher education of a "Bachelor" educational degree study normative educational disciplines while studying at the Physical Education Department: "The theory and teaching methodology of sports games", "The theory and teaching methodology of gymnastics", "The theory and teaching methodology of athletics", "Theory and teaching methodology of swimming", that is, disciplines, which by their specificity also carry some physical and functional load.

The obtained results of our research indicate an insufficient level of physical performance development: the reaction of the cardiovascular system on the graduated exersice of the majority of 1st-2nd year youths of the Physical Education Department. This fact is confirmed by other data. Such authors as Kuzmynchuk A.P., Hradusov V.O. [4] determined and evaluated the physical performance of students-basketballers. In their conclusions they marked that the level of physical performance of the studied

subjects was satisfactory.

Taking into account the general provisions of the theory of adaptation to physical activity in the training process of 1st-2nd year youths of the Physical Education Department will contribute to their more effective functional preparedness.

Conclusions. The obtained results of the research indicate a lack of functioning of the cardiovascular system during the graduated exercise. Only 30.7% of youths engaged in cyclic sports due to the results of the Harvard step-test index have high and higher than average levels. Consequently, more than half of the subjects, 53.9%, have low and lower than average levels. As for youths engaged in acyclic sports, 20% of them have high and higher than average levels, and 57.5% have lower than average and low level.

Comparative analysis of the studied groups showed that they practically do not differ from each other in all the studied indicators - we evidenced this fact using a traditional mathematical and statistical apparatus.

The main reason for the unsatisfactory reaction of the cardiovascular system to the graduated exercise of 1st-2nd year youths of the Physical Education Department may be a number of provisions:

- lack of functional training before the study at the Physical Education Department (in the first year there are students who did not engage in sports at all while studying at secondary schools, but for some reason they chose to study at the Physical Education Department);
- based on the first assumption, there are also such students in the second course, but for 1.5 years their functional status has not improved;
- three-time training sessions in groups of sports and pedagogical improvement during one week (students of the third and second athletic title) do not cause any functional changes in the body.

The further research perspectives include an indication of the physical performance level of higher education applicants of the 3rd-4th year of the Physical Education Department of the "Bachelor" educational degree, and 1st-2nd year higher education applicants of "Master" educational degree.

Список використаних джерел:

1. Бережанський О. О. Вдосконалення фізичної працездатності та функціонального стану лижників-двоборців на етапі попередньої базової підготовки. Педагогіка, психологія та медико-біологічні проблеми фізичного виховання і спорту. 2010. Випуск 2. С. 18-23.
2. Карпман В. Л., Белоцерковский З. Б., Гудков И. А. Тестирование в спортивной медицине: учебное пособие. Москва: Физическая культура и спорт, 1988. С. 131-134.
3. Ковпак С. В. Методика оценки специальной работоспособности борцов вольного стиля. Педагогіка, психологія та медико-біологічні проблеми фізичного виховання і спорту. 2008. Випуск 2. С. 69-75.
4. Кузьминчук А. П., Градусов В. О. Визначення та оцінка фізичної працездатності студентів-баскетболістів. Слобожанський науково-спортивний вісник. 2016. Випуск 2 (52). С. 61-64.
5. Про вищу освіту: Закон станом на 01.07.2014. Голос України від 6.08.2014. № 148.
6. Про фізичну культуру і спорт: Закон станом на 24.12.1993. Голос України від 29.01.1994 № 18
7. Распітін В. І. Психологічні засоби підвищення спортивної працездатності важкоатлетів. Педагогіка, психологія та медико-біологічні проблеми фізичного виховання і спорту. 2008. Випуск 1. С. 135-137.
8. Сергієнко Л. П. Спортивна метрологія: теорія і практичні аспекти: Підручник. Київ: КНТ, 2010. С. 239-240.

9. Серорез Т. Б. Визначення показників фізичного здоров'я студентів за характеристиками фізичної працездатності, аеробної та анаеробної продуктивності їх організму. Педагогіка, психологія та медико-біологічні проблеми фізичного виховання і спорту. 2014. Випуск 9. С. 54-59.

10. Соколова О. В. Использование дозированных физических нагрузок в повышении физического здоровья и функционального состояния кардиореспираторной системы организма студентов 18-19 лет. Педагогіка, психологія та медико-біологічні проблеми фізичного виховання і спорту. 2010. Випуск 3. С 86-89.

11. Теорія і методика фізичного виховання. Загальні основи теорії та методики фізичного виховання: підручник [в 2-х томах / за ред. Т. Ю. Круцевич]. Київ: Олімпійська література, 2008. – Т. 1. С. 221-222.

References

1. Berezhanskyi, O. (2010). Improvement of physical working capacity and functional condition of skier bikers at the stage of preliminary basic training. Journal of Pedagogy, psychology and medical-biological problems of physical education and sports, 10(2), pp. 18-23.

2. Karpman, V., Belotserkovskyi, Z., Hudkov, Y. (1988). Testing in sports medicine: a study guide. Physical Education and Sport, pp. 131-134.

3. Kovpak, S. (2008). Method for assessing the special performance of freestyle wrestlers. Journal of Pedagogy, psychology and medical-biological problems of physical education and sports, 08(2), pp. 69-75.

4. Kuzmynchuk, A., Hradusov, V. (2016). Determination and assessment of physical fitness of students-basketball players. Slobozhansky scientific and sports newsletter, 16(2(52)), pp. 61-64.

5. About Higher Education (2014). Act as of July 1, 2014. Newspaper of Voice of Ukraine, 14(148).

6. About Physical Education and Sports (1994). Act as of December 24, 1993. Newspaper of Voice of Ukraine, 94(18).

7. Raspitin, V. (2008). Psychological means of improving the athletic performance of weightlifters. Journal of Pedagogy, psychology and medical-biological problems of physical education and sports, 08(1), pp. 135-137.

8. Serhiienko, L. (2010). Sports Metrology: Theory and Practical Aspects. CST, pp. 239-240.

9. Serorez, T. (2014). Determination of indicators of physical health of students on the characteristics of physical capacity, aerobic and anaerobic performance of their organism. Journal of Pedagogy, psychology and medical-biological problems of physical education and sports, 14(9), pp. 54-59.

10. Sokolova, O. (2010). The use of metered physical loads in increasing the physical health and functional state of the cardiorespiratory system of the body of students 18-19 years. Journal of Pedagogy, psychology and medical-biological problems of physical education and sports, 10(3), pp. 86-89.

11. Krutsevych, T. (2008). Theory and methods of physical education. General Fundamentals of Theory and Methodology of Physical Education: Textbook. Olympic literature. T. 1., pp. 221-222.

UDC 378.172
DOI: 10.32626/PASAOPEAPT.2019.143-152

Solopchuk Dmytro, Bodnar Alina,
Stasiuk Ivan, Kuzhel Mykola,
Valeriy Odaynyk, Serhiy Riabtsev[11]

KINAESTHETIC ACTIVITY OF STUDENTS OF HIGHER EDUCATION INSTITUTIONS IN THE LEARNING PERIOD

Abstract. Relevance of research*: ehe relevance of the research topic. Reduced physical activity is considered currently as the most important risk factor for many diseases, experimental and clinical studies have found that insufficient physical activity causes adverse changes in all the organs and systems of the human body. Note that in Ukraine in recent years there is a steady trend to reduce the hours of physical education in high school until the complete absence in the curriculum and their replacement with the educational work, which leads to a decrease in the volume of kinaesthetic /motor activity for an additional 2-4 hours a week in 18-20-year-old youth. This study is intended to determine the weekly amount of physical activity of medium and high intensity of the first and second courses students of the faculties of the OPENING ei. I. Ogienko in modern conditions of training during the term and session.*

Goal of research: *is to analyze the volume, shape and to determine the level of physical activity of moderate and high intensity of students of high education institutions in the educational and session period on the example of students of CPNU named after Ivan Ogienko.*

Research methods: *ehe study used the following methods: analysis of scientific literature on the study of motor activity of students, survey, measurement, statistical analysis, comparative analysis.*

Results*: indicate that more than half of 1-2 courses students have low or below average level of motor activity during the term, and during*

[11] Kamianets-Podilskyi National Ivan Ohiienko University (Ukraine), solopchuk.dmytro@kpnu.edu.ua

the session it is further reduced in every 9 out of 10 people. Despite the fact that motor activity and exercises of medium intensity are the effective means of health promotion and prevention of chronic diseases, in the conditions of reducing the hours of physical education in high education institutions, an important condition for increasing physical activity among students is popularization of kinaesthetic/motor activity as one of the main components of a healthy lifestyle.

Key words: *healthy lifestyle, educational process, kinaesthetic activity, students, youth, health, hypokinesia.*

Introduction. Improving, supporting and maintaining the health of young people is one of the priorities of the State and the education system. The Bulletin of the World Health Organization (WHO) [3] and a number of researchers [4, 6, 7, 8] indicates that human health depends on the way of life, one of the most important factors of which is the satisfaction of the biological characteristics of the body - the need for movement. Therefore, the education of a healthy lifestyle and the maintenance of kinaesthetic/motor activity of adolescents is an urgent problem of modern pedagogical theory and practice. No wonder the world health organization, scientists and researchers point to the norms of motor activity, which should provide the necessary level of health. Motor activity is closely related to three aspects of physical, mental and social health and plays a different role in a person's life. In childhood, it determines the normal growth and development of the body and the most complete realization of the genetic potential, increases resistance to diseases during growth. In adults, physical activity throughout life supports the normal functional state of the body, its performance and physiological reserves. Accordingly, student age is the age when there is a gradual transition from rapid growth and development of systems and functions of the body to the age where the main task is to maintain the functional state of the body, and health, and which is essential to develop and maintain health beliefs, attitudes, skills, which directly depends on the activity, performance, quality of

adult life.

All this necessitates the development of practical measures to prevent and overcome hypokinesia, the most important of which is to stimulate motor activity.

The issue of physical activity of students is being considered in the studies of G. P. Griban, T. V. Voatavo, V. Romanenko, G. A. Kharlamova, A. I. Shiyan, etc. [4, 6, 7, 8]. Researchers identify the minimum, optimal and maximum levels of motor activity; the minimum level allows a person to maintain a normal functional state of the body, with the optimal achieved the highest level of functionality and functioning of the body, the maximum limits determine excessive stress, which can lead to fatigue, overtraining, a sharp decrease in working capacity.

WHO defines physical activity as any movement of the body that is driven by skeletal muscles that requires energy consumption, including activity during work, play, homework, travel and recreational activities [2].

The minimum amount of motor activity recommended by WHO over the age of 18 years is 150 minutes of average intensity per week or 25 minutes of average intensity daily. Many researchers consider recommended volume by WHO too low and suggest that the optimal weekly volume of motor activity should include 6-7 hours of high-intensity physical activity or 12-14 hours of medium intensity.

Physical activity of both moderate and high intensity is beneficial to health. To physical activity of moderate intensity include exercises that require moderate effort and noticeably accelerates the heart rate such as brisk walking, cycling, recreational sports and physical culture, dancing, gardening, traditional hunting and harvesting, move, or carry objects of moderate severity (less than 20 kilograms). High-intensity physical activity includes exercises that require a lot of effort and lead to a significant increase in heart rate, such as vigorous running, climbing, fast cycling, aerobics, fast swimming, sports

and games, vigorous work with a shovel, carry or move the weight more than 20 kilograms [3].

Among the main facts about the lack of physical activity, WHO indicates the following [2]:

- the lack of physical activity is the fourth most important risk factor for death in the world;
- the lack of physical activity is one of the main risk factors for infectious diseases such as cardiovascular disease, cancer and diabetes;
- physical activity has important health benefits and contributes to the prevention of infectious diseases;
- every third person in the world is not active enough;
- WHO members have agreed to reduce the prevalence of physical inactivity by 10% by 2025.

Goal of research – is to analyze the volume, shape and to determine the level of physical activity of moderate and high intensity of students of high education institutions in the educational and session period on the example of students of CPNU named after Ivan Ogienko.

Material and methods of research. Participants. The study was conducted in the autumn term of the 2017-2018 academic year in November-December among 18-20-year-olds. 231 students of I-II courses of full-time education of all the faculties of the Kamyanets-Podilskyi national University named after Ivan Ogienko except the faculty of Physical Culture (through the specific features of the week manual activity), who voluntarily gave their consent to participate in it, among them 138 girls and 93 boys, took part in this experiment.

Organization of research. The international questionnaire of physical activity GPAQ (Global Physical Activity Questionnaire) [1] was used to assess physical activity, which takes into account physical activity over the last week, and we developed an anonymous questionnaire on the attitude of students to physical education, a section which was devoted to the types and forms of

physical activity, which are engaged in the respondents during the week and their volumes. The number of steps taken per day was measured using the smartphone application, which was necessarily calibrated before the measurement. The duration of studies of various forms of motor activity was measured by watches.

Research result. The results of the study (Table 1) showed that 11.7% of students, sometimes 27.7% of them, do morning exercises during the academic term, 60.6% of respondents don't do them.

Sports clubs are regularly visited by 16.5% of students, sometimes 16%; 67.5% of students don't attend them.

27.3% of those who took part in the survey, from time to time - 43.7%, 29% are not engaged in physical activity with the intensity of medium and high level (this item includes in addition to independent activities at home and on the yard sports grounds also cycling, swimming, outdoor and sports games).

8000 or more steps a day are run by 26.4% of the students, 51.1% of them occasionally do it, 22.5% of the students don't run the steps.

Table 1.

Forms of motor activities and the number of students involved in them

	Constantly	%	Sometimes	%	Never	%
Morning exercises	27	11,7	64	27,7	140	60,6
Sports club, section	38	16,5	37	16	156	67,5
Do yourself	63	27,3	101	43,7	67	29
>8000 steps every day	61	26,4	118	51,1	52	22,5

It is worth noting that to a large extent the results of the answers overlap, that is, a person who attends the sports section, at the same time engaged in independently and performs exercises and Vice versa, there are a significant number of students who are not engaged in any of these forms of physical activity.

The general distribution of students by levels of weekly motor activity (Table 2) and distribution by level of weekly motor activity according to sex (Table 3) showed that the level of motor activity during the term more than half of the students of 1-2 courses is low or below average, and in girls on average it is worse than expectations compared to boys.

Table 2.

Distribution of students by levels of weekly motor activity

Level	Number of people	% of the total number
High	54	23,4
Sufficient	61	26,4
Insufficient	63	27,3
Low	53	22,9

If we add the two hours of practical physical education classes available in the schedule for a week, the overall high level of physical activity is observed in 23.4 percent of students, sufficient - in 26.4 percent of the respondents, insufficient - in 27.3% of students, low-in 22.9 percent of students. It should be taken into account that 87.3% indicated that during the examination session their level of motor activity decreases, physical activity becomes irregular or episodic.

Table 3.

Distribution of students by levels of weekly motor activity depending on gender

	Boys		Girls	
Level	People	%	People	%
High	29	31,2	25	18,1
Sufficient	27	29,0	34	24,7
Insufficient	22	23,7	41	29,7
Low	15	16,1	38	27,5

Discussion. Scientific and technological progress and the development of society gradually displaces physical activity from human life at the same time increasing the nervous, continuously increasing the share of mental work in the overall balance of

working time. The limitation of muscle effort concerns the life of modern man. According to various estimates, the share of intellectual work among students of higher educational institutions is 85-90%, besides there is a steady trend towards its growth. During the examination sessions, an already small proportion of physical activity is reduced further two or three times, only a small number of students continue to observe a sufficient amount of motor activity.

In the latest version of the Law on Higher Education [5] physical education has lost the status of a mandatory discipline, only its importance is indicated. The decision about the volume and forms of training in physical education was entrusted to the leadership of each institution of higher education that, combined with the lack of funding led to the lack of educational discipline "Physical Education" in a number of institutions; a large number of first-year students have only two hours of Physical Education per week, the undergraduate don't have such a discipline as "Physical Education".

The combination of all these factors has increased the negative trends in necessary level of students ' motor activity.

The results of this study indicate that more than half of the students have a low or below average level of weekly motor activity during the term, and among the girls the proportion of such persons is greater. In addition, 87.3% indicated that during the examination session they do not have enough time for motor activity and exercise, nervous tension, apathy and irritability.

Despite the fact that during the training students for a long time involved in the performance of low-level work, reducing hours of physical education, this situation is of concern, because the health of the younger generation is one of the greatest values of the state, a factor in the preservation of the nation and requires a comprehensive coordinated approach in its solution.

Conclusions. In the conditions of reduction of hours of physical education in higher educational institutions to maintain

students ' rational level of motor activity, it is necessary to focus on the formation of a positive image of a healthy lifestyle, motor activity and the formation of sustainable institutions for health savings. In our opinion the solutions to these tasks are combined to complex measures, such as the research interests of students regarding forms and types of physical activity with the purpose of adapting the curriculum in physical education, recreational groups and sections of the second half of the day according to those interests and the conditions of the present; expansion of Wellness programs of mass sports activities to promote active leisure; enhancing educational work in the classroom for Physical Education. Additional attention and research needs in the session period, for the fact that during the session the intensity of educational work is increased almost twice, which causes a change in the life of students - increases the time spent by students in a state of hypodynamia, due to the increase of intellectual and neuro-emotional stress changes in emotional state and fatigue.

Список використаних джерел:

1. Global Physical Activity Questionnaire (GPAQ) [Електронний ресурс] / Опитувальник. Режим доступу: http://www.who.int/ncds/surveillance/steps/resources/GPAQ_Analysis_Guide.pdf (дата звернення: 23.04.2018).

2. World Health Organisation [Електронний ресурс] / Physical activity. Fact sheet. Updated february 2018. Режим доступу: http://www.who.int/mediacentre/factsheets/fs385/en/ (дата звернення: 25.04.2018).

3. World Health Organisation [Електронний ресурс] / Global Strategy on Diet, Physical Activity and Health. Режим доступу: http://www.who.int/dietphysicalactivity/physical_activity_intensity/en/ (дата звернення: 25.04.2018).

4. Грибан, Г.П. Життєдіяльність та рухова активність студентів. Житомир : Рута, 2009. 592 с.

5. Закон України Про вищу освіту. Відомості Верховної Ради (ВВР), 2014, № 37-38, ст. 2004).

6. Івчатова, Тетяна Віталіївна. Здоровий спосіб життя та рухова активність студентів : навч. посіб. Т. В. Івчатова, І. Б. Карпова, М. В. Дудко. Київ : КНЕУ, 2013. 109 с.

7. Маланюк Л.Б. Рухова активність чоловіків молодіжного віку з різним рівнем фізичного здоров'я : навч. посіб. Івано-Франківськ : Прикарпат. нац. ун-т ім. В. Стефаника, 2011. - 79 с.

8. Ремзі І.В. Рухова активність студентів ВНЗ педагогічних спеціальностей у сучасних умовах навчання. Проблеми інж.-пед. Освіти. 2011. №30/31. С. 252-255.

References

1. Global Physical Activity Questionnaire (GPAQ) [Електронний ресурс] / Опитувальник. Режим доступу: http://www.who.int/ncds/surveillance/steps/resources/GPAQ_Analysis_Guide.pdf (дата звернення: 23.04.2018).

2. World Health Organisation [Elektronnyi resurs] / Physical activity. Fact sheet. Updated february 2018. Rezhym dostupu: http://www.who.int/mediacentre/factsheets/fs385/en/ (data zvernennia: 25.04.2018).

3. World Health Organisation [Elektronnyi resurs] / Global Strategy on Diet, Physical Activity and Health. Rezhym dostupu: http://www.who.int/dietphysicalactivity/physical_activity_intensity/en/ (data zvernennia: 25.04.2018).

4. Hryban, H.P. Zhyttiediialnist ta rukhova aktyvnist studentiv. Zhytomyr : Ruta, 2009. 592 s.

5. Zakon Ukrainy Pro vyshchu osvitu. Vidomosti Verkhovnoi Rady (VVR), 2014, № 37-38, st. 2004).

6. Ivchatova, Tetiana Vitaliivna. Zdorovyi sposib zhyttia ta rukhova aktyvnist studentiv : navch. posib. Kyiv : KNEU, 2013. 109 s.

7. Malaniuk L.B. Rukhova aktyvnist cholovikiv molodizhnoho viku z riznym rivnem fizychnoho zdorovia : navch. posib. Ivano-Frankivsk : Prykarpat. nats. un-t im. V. Stefanyka, 2011. - 79 c.

8. Remzi I.V. Rukhova aktyvnist studentiv VNZ pedahohichnykh spetsialnostei u suchasnykh umovakh navchannia. Problemy inzh.-ped. Osvity. 2011. №30/31. S. 252-255.

UDC 378.016:796
DOI: 10.32626/PASAOPEAPT.2019.153-163

Yurchyshyn Yurii, Mysiv Volodymyr,
Pogrebnyak Tatyana, Marchuk Volodymyr, Marchuk Danil[12]

INTERRELATION OF THE LEVEL OF PHYSICAL ACTIVITY WITH THE MOTIVATIONAL SPHERE OF STUDENT YOUTH

Abstract. Relevance of research*: in this article was studied the state of youth motivation for improving of motor activity and future directions of process improving of physical education for the task of motivation strengthening. The vast majority of the studied shows low motivation level. According to the scientific literature a promising direction to solve this problem was identified, which takes into consideration the theory of self-determination during students physical education. The process should lead to the achievement by students' appropriate internal motivation, achieved adequate actions of teacher towards meeting the psychological needs of students: independence, competence, cooperation in the team.*

Goal of research: *to determine the condition of students motivation to health oriented motor activity and synthesis of modern conceptual ideas and provisions for its strengthening.*

Research methods: *analysis, systematization, generalization of documentary materials and data of scientific literature. Also used questionnaire method, according to our questionnaire we have studied the condition of formation of the youth motivation to health oriented physical activity. Worked on the results using methods of mathematical statistics.*

Results*: promising in solving the problem of the formation and strengthening of motivation of young people to recreational motor activity is the theory of self-determination, which requires reaching of internal motivation through appropriate actions of a teacher in physical*

[12] Kamianets-Podilskyi National Ivan Ohiienko University (Ukraine), yuriyyurchyshyn@kpnu.edu.ua

education procss toward satisfying of psychological needs - independence, competence, collaboration in the team.

Key words: *youth, recreational physical activity, physical education, motivation and self-determination.*

Introduction. Health-care physical activity combined with a balanced diet and other measures of a healthy lifestyle is the most effective tool that exceeds the capacity of traditional medicine in health improvement, prevention of common diseases and contributes to solving complex important tasks, especially related to improving the quality of professional activities and a full rest [6]. At present the utmost importance of health of students recognized as one of the most important factors for successful development of society in different spheres of life. Effectiveness of this task is impossible without the proper organizational and meaningful supply of both educational process in high schools (universities) and leisure of students outside the classroom. It is primarily for systematic physical activity of students with optimal parameters, because it is the most effective means of successfully solving of determined tasks [2; 6].

Health-motor activity today is provided primarily by mandatory classes of physical education in high school. However, this number even under optimal parameters of physical activity in each class does not provide needful health achievements, and especially developmental effects [4].

Another direction of physical education in high schools, the implementation of which eliminates the deficiency of physical activity of students – it's physical exercises in out of classes time, especially in the sports sections functioning at school. [6] It should be noted that the visiting of such sections is voluntary, and therefore provides for the students' respective will, as well as doing other forms of exercises in out of school time - independent or amateur group. Taking into account the priorities of students - homework, various interests that are not related to health oriented physical activity - the reality of systematic implementation by

students is determined exclusively by motivation itself. That's why strengthening of such motivation of students is an actual task today. However, such studies are rare [8; 10] and studies, which are aimed to solve appointed tasks in physical education of first and second year students, taking into consideration the specificity of the educational process in domestic universities – don't exist.

Goal of research: to determine the condition of students motivation to health oriented motor activity and synthesis of modern conceptual ideas and provisions for its strengthening.

The objectives of the study was to determine the condition of students motivation to health oriented motor activity and synthesis of modern conceptual ideas and provisions for its strengthening.

The study was conducted using general scientific **methods** such as analysis, systematization, generalization of documentary materials and data of scientific literature. Also used questionnaire method, according to our questionnaire we have studied the condition of formation of the youth motivation to health oriented physical activity. Worked on the results using methods of mathematical statistics.

Research results and discussion. At present moment there are accumulated a significant amount of empirical data regarding standards and optimal parameters of physical activity of young people to achieve health effect. It should be noted that this issue was studied by domestic science in the late nineteenth century. Particularly prominent local scientist O.D. Butovskii [2] had noted that the activity that involves exercises should last at least 1.5 hours daily and priority (especially at lower conditioning) should be given to the number of reps, not the intensity of exercise. Recent results of national researchers give more detailed parameters [3; 4; 6], let's say the best for school students are 3-4 exercise sessions per week, each lasting at least 30-45 minutes, with an intensity exercise at a level that provides oxygen

consumption within 55-60% out of maximum, which corresponds to 140-160 heart rate.

Accordingly to R.S. Paffenbarh [3] The daily rate of physical activity of girls 17-22 years is 3,6-4,8 hours, guys - 4,8-5,8, and weekly - 7-12 hours with daily energy level respectively 3000 and 3500-4300 kcal / day or number of locomotions within 20-25 and 25-30 thousand.

These parameters are optimal for maintaining and recreational physical activity. To achieve the developing effect they will be first of all longer and with preferred physical activities that promote anaerobic capacity of the body [1]. Accordingly to mentioned, parameters of physical activity girls and boys should provide several levels: I level (maintaining health) - motor-hygienic minimum of physical activity - involves a daily morning exercises, tempering and walk before bedtime; II (harmonious development) – motor and comprehensive preparational minimum, includes excersises of first level and leisure 30-60 minutes using exercise; III (sports activities) – comprehensive preperational optimum - includes exercises of II level and 3-6 hours of exercise per week. [6]

A bit different conclusion does O. Bar-Or and T. Rowland [1] amount of exercise a week should be between 2.3 to daily, each lasting 35-45 minutes; the intensity of load - 60-70% of maximum oxygen consumption, heart rate corresponding to the level of 150-170 Sk. / min-1; duration of such supporting and training programs - 6-8 weeks.

So at the present level parameters of physical activity for students are determined with high accuracy, regular use of which allows to improve and maintain the functionality of the body at a level that ensures high rates of health.

At the same time, the results of our research which was was aimed at studying the state of the physical activity of students have shown the following. According to the questionnaire, systematically carries out this activity in their daily lives only

33% of students of first and fourth years of study, occasionally - 25% weekly duration of the first or second year students is 1.3 hours, in the third or fourth year students - only 0, 54 hours [5]. The main reason for such a result in the first of these groups is the lack of necessary conditions (22-26%) or financial difficulties (24-26%) in the second group - the lack of interest (23-33%) and financial difficulties (21%).

So the amount of health oriented weekly physical activity of most today's students (girls and boys) of national universities is much lower than the minimum required, and against the background of weakening over the years, learning their interest in this activity.

In view of this conclusion we have systematized data on physical activity of students in developed countries of Europe and the United States. The need for such a study was associated with a very active attitude and practical actions of these countries in attracting young people to health oriented physical activity, the result of which may be higher motivation for its implementation. The data showed that systematically with the parameters of at least 30 minutes five or more times a week, mentioned activity do only 15-20% of students [8; 10], occasionally without following health parameters - 50-55%, and the remaining 30% do not pay any attention to it. However, there is an additional problem: out of those who had started systematic physical exercise the most have quit in the first year [9].

So these data allow us to make several conclusions. First, government actions to strengthen the motivation of young people to exercise only partially contribute to solving this problem, but marked almost zero effect in maintaining it at that level for a long time. Secondly, the problem of lack of physical activity of many young people is global, and one of the real ways of its solution - the formation of their motivations and ensuring its manifestation as long as possible for individual life.

In connection with this accordinlgy to accessible literature sources we have analyzed information related to the modern conceptual ideas and provisions for the formation (gaining) of motivation of students to helth oriented physical activity. Special studies [6] found that the majority of local researchers prefer proper education of students, updating reasons related motives to the implementation of physical activity of health orientation. Until recent times, the same was the position of the majority of foreign experts and their studies were based on the concept of public education for physically active lifestyle [9; 10]. However, the lack of effectiveness of such methods in the US [9] and Europe [8] led to searching for other ways to solve the abovementioned problems. In this regard, the modern psychology of motivation in physical activity gained leading positions of the theory of self-determination, in the most general form are as follows.

Practical physical exercise and adequate action of the teacher (the organization of classes, interaction student with other team members) are crucial in meeting the psychological needs of those who are involved, which is the basis of updating their motivation to the highest level - by definition of the author of the theory of self- determination E.L. Deci [7] - "an independent individual behavior." Achieving of such a behavior occurs in stages, and each stage is inherent in some type of motivation from the lack of motivation through the outer to the inner motivation. The latter provides the student activity due to reasons that go from inside (from the student directly) or associated with the activity itself, while the external type - student activity due to causes coming from outside (from the teacher, circumstances).

It is experimentally proved [6] that dependence of motivation level on the actual degree of implementation of the psychological needs - increasing of which boosts, while reducing the opposite - reduces internal and external motivation increases up to possible lack of motivation. Psychological needs, which meet the highest levels of self-learner (ie, internal motivation) are:

independence, competence, interaction with other members of a collective action. In the case of external motivation actions of teacher will be driving, which depending on the student's self-determination, will involve the use of a particular type of regulation of its activity: external, defined and integrated [9]. The last type of regulation of student activity is rare, and meaning of others is as following: external regulation - teacher offers students various incentives for achieving them; defined regulation - teacher focuses on students under feeling of guilt and importance (necessity) of implementation of the proposed exercise.

At this stage identified three types of internal motivation of students to physical activity of health orientation, which are associated with understanding the need (like exercise), willing of achievement (satisfaction from improving results) and playback stimulating effect (satisfaction from emotional recovery that occurs during time activity) [10].

Another study [8] found an relation between the understanding of the importance of physical education and motivating force adolescents to appropriate physical activity: pedagogical actions should be aimed at meeting their psychological needs that will strengthen internal motivation, ie. achieving of self-determination on health oriented physical activity. Teachers actions here might be: to meet the needs of independence - give students the right to choose types of exercise, stimulate participation in the conducting of these exercises (evaluation, encouragement) to improve your body, take into account the opinion of students in certain matters of class curriculum, give task to prepare for classes. [9] To meet the needs of students in teacher competence action should provide: the lack of emphasis on comparing of their achievements; moderate complexity individual tasks; awareness of the ability to reach the goal, but with some extra efforts [6].

To address the need for collaboration with other team members (students class) at the joint activities may offer teachers

regarding assignments, performance of which requires collective efforts and stimulating of this desire of students [5].

Thus, the involvement of youth in health oriented physical activity and securing of proper motivation for further actions should conducted by teacher (trainer), especially in physical education, taking into account the theory of self-determination and be aimed at achieving of student intenal motivation for physical activity.

Conclusions. 1. The problem of strengthening of students motivation to health oriented physical activity, which is mainly caused by lack of it's establishment during studying at school, remained unsolved at this moment.

2. Formation of motivation for health oriented motor activity is defined by complex of actualised motives and situational factors that motivate the individual person to its implementation and it is relatively constant and changing formation. Solution to this problem is one a major tasks of physical education in high school.

3. Promising in solving the problem of the formation and strengthening of motivation of young people to recreational motor activity is the theory of self-determination, which requires reaching of internal motivation through appropriate actions of a teacher in physical education procss toward satisfying of psychological needs - independence, competence, collaboration in the team.

Further researches should be directed to the development of technologies to enhance students' motivation to systematic physical activity in out of classes time, which takes into account the theory of self-determination and is implemented during physical education process in high school.

Список використаних джерел:

1. Бар-Ор О., Роуланд Т. Здоровье детей и двигательная активность : от физиологических основ до практического

применения (пер. с англ. И. Андреев). Киев: Олимпийская литературара. 2009. 528 с.

2. Бутовский А. Д. Собрание сочинений : в 4-х томах Киев: Олимпийская литературара. 2009. Т. 3. 360 с.

3. Паффенбаргер Р., Ольсен Э. Здоровый образ жизни. Киев. 1999. 320 с.

4. Пильненький В. В., Леонова В. А. Методичні основи підвищення фізичної підготовленості і фізичного здоров'я студентів методом оздоровчого тренування: метод. рекомендації. Миколаїв: Деловая информация. 2004. 91 с.

5. Романова В. І., Леонова В. А. Методика підвищення фізичної підготовленості студенток вищих навчальних закладів на основі різних режимів фізичної активності: метод. рекомендації. Рівне: ППДМ, 2009. 165 с.

6. Юрчишин Ю. В. Стан та особливості мотивації студентів до рухової активності оздоровчої спрямованості на сучасному етапі реалізації фізичного виховання у ВНЗ. Педагогіка, психологія та медико-біологічні проблеми фізичного виховання і спорту. 2012. Випуск 4. С. 118-123.

7. Deci E. L., Ryan R. M. A motivational of approach to self : integration in personality. Perspectives on motivation: Nebraska symposium on motivation. Lincoln: University of Nebraska Press. 1991. Vol. 38. P. 237–288.

8. Kilpatrick M., Hebert E., Jacobsen D. Physical activity motivation: a practitioner's guide to self-determination theory. International Journal of Sport Psychol. Roma. 2002. № 73(4). P. 36-41.

9. Theobald M. A. Increasing student motivation : strategies for middle and high school teachers. California: Corwin Press, 2005. 145 p.

10. Yli-Piipari S., Watt A., Jaakkola T., Liukkonen J., Nurmi J.-E. Relationships between physical education students motivational profiles, enjoyment, state anxiety, and self-reported

physical activity. Journal of Sports Science and Medicine. 2009. № 8. P. 327–336.

References

1. Bar-Or O., Rouland T. (2009). Children's health and physical activity: from physiological bases to practical application. Olympic literature. 528 p.
2. Butovsky A. D. (2009). Collection of works. Olympic literature. T. 3., 360 p.
3. Paffenbarger Ralph, Olsen Eric. (1999). Healthy life style. Kyiv. 320 p.
4. Pylnenky V. V., Leonova V. A. (2004). Methodical bases of increase of physical preparedness and physical health of students by the method of health training. Business information. 91 p.
5. Romanova V. I., Leonova V. A. (2009). Method of increasing physical fitness of students of higher educational institutions on the basis of different modes of physical activity: method. recommendations. Rivne: PPDM. 165 p.
6. Yurchyshyn Y. V. (2012). Status and peculiarities of students' motivation to motor activity of health improving at the present stage of realization of physical education in higher educational institutions. *Journal of Pedagogy, psychology and medical-biological problems of physical education and sports, 04,* pp. 118-123.
7. Deci E. L., Ryan R. M. A motivational of approach to self : integration in personality. Perspectives on motivation: Nebraska symposium on motivation. Lincoln: University of Nebraska Press. 1991. Vol. 38. P. 237–288.
8. Kilpatrick M., Hebert E., Jacobsen D. Physical activity motivation: a practitioner’s guide to self-determination theory. International Journal of Sport Psychol. Roma. 2002. № 73 (4). P. 36–41.

9. Theobald M. A. Increasing student motivation : strategies for middle and high school teachers. California: Corwin Press, 2005. 145 p.

10. Yli-Piipari S., Watt A., Jaakkola T., Liukkonen J., Nurmi J.-E. Relationships between physical education students motivational profiles, enjoyment, state anxiety, and self-reported physical activity. Journal of Sports Science and Medicine. 2009. № 8. P. 327–336.

UDC 796.011.3:612.217
DOI: 10.32626/PASAOPEAPT.2019.163-174

Zaikin Andriy, Chaplinsky Rostyslav,
Zdanyuk Vadym, Mykhalskyi Anatoliy[13]

PHYSICAL REHABILITATION AS A MEANS OF MUSCULOSKELETAL SYSTEM CORRECTION IN SPORTSMEN

Abstract. Relevance of research*: the article is dedicated to the study of functional ability of spine and joints in students-athletes and pupils of different sports schools. Positive changes in the motor skills of the subjects under rehabilitation measures have been revealed, namely, the improvement of bending movements in the shoulder joint was observed in volleyball players and gymnasts, extensible movements – in wrestlers, track-and-field athletes and gymnasts. The motor abilities of ankle joints due to the bending movements have increased in the football players, and extensible movements – in athletes, wrestlers and gymnasts.*

Goal and methods of research: *to ground the effective use of physical rehabilitation facilities for functional disorders of spine and joints in schoolchildren and athletes involved in various sports. During the study, we used the following methods: pedagogical, pulsometry, statistical analysis.*

Results: *in the course of our study, the index of normal posture has improved among students-football players, athletes and wrestlers due to the stooping decrease. Talking about gymnasts, we should mention, that the percentage of students with normal posture remained at the level of output data. The shoulder index as a sign of the stooping development has undergone positive changes in volley-ball players and students who go in for Taekwondo. After rehabilitation measures, in the course of our experiment, the mobility of shoulder and ankle joints in students-athletes has improved: in terms of bending movements – in*

[13] Kamianets-Podilskyi National Ivan Ohiienko University (Ukraine),zdanyuk.vadym@kpnu.edu.ua

football players and gymnasts, and extensional movements – athletes, wrestlers and taekwondists.There have been revealed certain positive changes in the motor function of spine and joints in athletes of various sports specialization in the process of complex rehabilitation measures (physical exercises, massage), which confirms the need for their use to prevent degenerative changes in bone tissue in athletes and schoolchildren in sports schools and health preservation and strengthening as well.

Key words: *sports specialization, mobility, rehabilitation measures, spine.*

Introduction. Degenerative-dystrophic lesions of the musculoskeletal system are the subject of great interest to researchers, sports physicians, and masseurs, since today there is a tendency to an increasing number of patients among sportsmen, which may cause a cessation in the training process. Analysis of the functions' violations in the musculoskeletal system indicates that they are frequent due to lack of preventive measures, underestimation of restoration treatment with the use of various means of physical rehabilitation.

Painful sensations in spine are familiar to almost every adult, and in adulthood (from 35-40 years) spine pains can cause especially many troubles and permanent disablity. Despite the existing measures of prevention there is a steady tendency to rejuvenate the contingent of patients, to encumbrance of the desease forms and disco-hernial complications.

However, in terms of modern sports training (daily and even two-time trainings per day for 3 hours each), various elements of spine are subjected to constant injury and unfavorable actions of sports posts. As a result, there are specific lesions, diseases and abnormalities in spine formation, characteristic of certain types of sports. So, there often occurs a stop in the increase of sports results, their reduction or even loss of efficiency.

Spine damages and troubles in sportsmen make up from 10 to 11.5% of all pathology of the locomotor system: impaired

posture, scoliosis, osteochondrosis, spondylosis, deforming arthrosis of the spine joints, ligamentosis, tears of joint-muscular system, injuries of the spine soft tissues, etc. These diseases and damages often occur in those athletes, who have certain spine disorders (abnormal posture, scoliosis of the initial stage, anomalies in development) [9].

Frequently, impaired posture, spine curvature and scoliosis arise during long-term trainings in particular kinds of sports, when training sessions are conducted without taking into account the anatomical and physiological features of the body and using a large number of monotonous physical activity [3].

The current situation emphasizes the seriousness of the problem and the inadequacy of medical preventive theories, as well as the lack of knowledge in the athletes, trainers, and medical staff in the physical training sphere about the risks, which deseases of musculoskeletal system bring. Thus, it should be highlighted, that the preventive theory of the "muscular corset" formation does not meet the demands of modern sport practice and poorly stands together with the theory of degeneration of the intervertebral disc.

Having analyzed numerous fundamental and applied researches in the field of physiology, pathomorphology, and biomechanics, we drew attention to the fact that modern physicians and rehabilitation specialists consider motor therapy, in particular, exercise therapy [5], as effective prophylactic means for the development of the spine. In addition, it is easily combined with other means of physical rehabilitation, such as: therapeutic massage, physiotherapy and hydrotherapy.

Goal of research – to ground the effective use of physical rehabilitation facilities for functional disorders of spine and joints in schoolchildren and athletes involved in various sports.

Material and methods of research. Pedagogical methods of research. During the study, pedagogical observation was used to ensure the exact performance of the proposed functional test

and to assess the reaction of students to the proposed physical load.

Among the biomedical methods of research, we used anthropometry andpulsometry.

Pulsometry was used during the palpation on the radial artery. At the same time, the arm of the studied young man was lying freely so that the tension of the muscles and tendons did not interfere the palpation. The wrist was freely grasped by the right arm in the area of the radial carpal joint, the thumb was placed on the back side of the forearm, and the rest of the fingers - on the front of its surface. Having found a pulsating artery, we pressed it to the inner side of the radius with moderate force so that the pulse wave did not disappear, and then carried out measurements.

Statistical analysis. Mathematical data processing was done by means of MS Excel XP (Microsoft, the USA), Statistica 6.0 (StatSoft, the USA).

The scientific work was being carried out during 2015-2017. The experiment was attended by undergraduate students of the Physical Training Department of Kamianets-Podilsky Ivan Ohienko National University, by pupils of secondary schools №6, №2 and pupils of the sport schools №1, №2 in Kamianets-Podilsky, who permanently go in for various sports.

Research organization. At the first stage of the study, there were 2 groups, organized out of the 9-11 grades pupils (control and experimental) with impaired postures and an objective assessment of the functional capacity of different spine divisions was being conducted. In course of our experiment, the control group was engaged in motor activity within the school curriculum, and experimental group – in addition, was doing exercise therapy, specially designed for such children.

During the second stage of the experiment, the functional capacity of the spine and joints in the sport schools pupils, going in for various sports, was being investigated. According to their specialization, both exercise therapy and massage were applied.

The next stage of investigation was testing the functional state of locomotor apparatus and mobility of spine and joints in students using physical means of rehabilitation. Along with functional indicators, morphological data of sportsmen (type of body proportions, somatotype, shoulder (brachial) index, posture type) were also studied.

After receiving the initial data on the functional state of locomotor apparatus and geodynamics, schoolchildren in secondary schools of control and experimental groups performed physical exercises according to different programs.

Children in the experimental group performed exercises in isotonic and isometric regimes, which effectively influence the internal body systems, improve the functional state of the joints, contribute to correction of the relations between the segments of the spine and reduce contracture. At the end of the experiment, there was a re-testing of the locomotor apparatus condition for the schoolchildren of both groups. The indicators of the general functional state of musculoskeletal system (motor abilities of the spine and muscle of the back) showed that the initial data were rather low: in the experimental group 29 ± 1.8 points, in the control group - 31.1 ± 2.0 points. As a result of lengthy physical rehabilitation exercises, the functional status of the locomotor apparatus in the experimental group increased to 35.8 ± 2.1 points (improvement by 6.0 points), and in control group – up to 34.3 ± 2.1 points (improvement by 3.2 points).

Yet, changes in the state of hemodynamics were more prominent. In particular, children in the experimental group, after exercising, got the heart rate increased by 14.2 ± 2.1 s / min, and in the control group – by 21 ± 2.4 s / min. The data on average blood pressure, which in children of the first group has increased after physical activity from 53,03 ± 0,45 to 55,54 ± 0,66 mmHg, turned out quite indicative, whereas in the examined control group it increased by 32 % compared to 10.5% in experimental group of children.

The next stage of our research was to estimate the functional state of spine and motor ability of joints in the students of the Physical Training Department, going in for different kinds of sport (football, gymnastics, track-and-field events, volleyball, wrestling, taekwondo).

To determine the level of functional state of spine and joints in athletes, we selected nine groups of students of different sports specialization. During the year, the students under investigation performed a set of physical exercises, developed in accordance to the requirements of therapeutic physical training and their sports specialization. The functional capacity of the cervical and thoracic spine, muscle of the back, shoulder and elbow joints was determined by method of functional-motor tests.

According to the data, the highest flexibility index in the cervical unit was observed in sportsmen of sambo and gymnasts (16 ± 2 points). In the thoracic department, the highest flexibility indexes according to the results of motor tests were performed by wrestlers and gymnasts, and the lowest ones – by sambists and boxers (respectively, 4.8 ± 0.14 points and 5.1 ± 0.13 points). Extremely high mobility of the joints of the upper limb was shown by boxers (6.3 ± 0.14 balls). Athletes of other sports demonstrated a rather low level of functional state of joints of the upper limb (3.2 ± 0.09 points – 3.6 ± 0.12 points).

It should be noted, that the highest total amount of points obtained when testing the functional capacity of spine and joints is among volleyball players, gymnasts and wrestlers. One of the main methods for assessing motor capabilities by various diseases, injuries and deformities of the musculoskeletal system is a method of measuring the movements of joints, which we used to control the functional capacity of joints and spine. The amplitude of movements was measured by an angle meter.

Receiving initial data on the mobility of the shoulder and ankle joints, athletes of different sports specialization performed a set of physical exercises to improve mobility in their joints during

the experiment. It should be noted, that exercises corresponded to sports specialization and were not therapeutic. The repeated testing of the students under investigation has revealed an improvement of bending movements in the shoulder joint of volleyball players, gymnasts and wrestlers.

Extensional movements have increased in gymnasts, wrestlers and athletes. The suppleness of the ankle joints have improved with respect to the flexing movements in football players and gymnasts, and extensional movements – in gymnasts, athletes, wrestlers and taekwondists.

Similar tests on the mobility of joints were conducted with school-sportsmen in 9-10 grades, as well. It turned out that the mobility of the shoulder joint of volleyball players is lower than that of the students by 14%. During this annual experiment, rehabilitation measures (a set of physical exercises and massage) contributed to the increased abilities of bending and extensional movements of the shoulder joint in volleyball players and aikido sportsmen. In terms of our experiment, there has been no positive changes in mobility of ankle joint, performed by schoolchildren-athletes.

Nowadays, there is no doubt that the determining factor in many manifestations of the body vital functions is its morphological expression –somatotype. Therefore, in the course of our experiment, we carried out the study of adaptive changes in some morphological indicators in athletes of various sports. One of the morphological parameters of spine is posture, which is being formed in the process of growth, development and children upbringing and has both aesthetic and functional significance.

Upright posture is the important indicator of health and physical development of any child. Due to a significant increase in the number of children (15-47%) with different posture impairments in recent years, there have been made certain attempts to correct posture by means and methods of physical education [2]. Posture depends on a number of anatomical,

physiological and social factors. The anatomical factors determining the posture of the child include the shape of the spine, its location relative to the anterior medial axis of the body, the severity of the physiological curves, the deformations, and muscle development. The latter is considered to be the leading one. The physiological factors affecting posture include the pace and nature of the individual development of motor and static reactions, the use of special physical exercises for posture and the systematic use of them [1]. The posture of a child may change, despite the relative stability of anatomical factors, since it is a dynamic stereotype. It can improve in the process of special physical training classes, but it may get worse when a stereotype is violated, for example, when changing the regime on entering the school, or during puberty.

Research results. Discussion. In terms of our experiment, the students football players improved the normal posture by 5% through the decrease of a stooping index. Changes in the type of posture in gymnasts have not been observed (before and after the experiment: 90% - normal posture, 10% – stooping). The violation of posture and the development of stooping posture in the body is indicated by a shoulder index, which is defined by the ratio of shoulder width to shoulder arch. The shoulder value of less than 80% indicates stooping. In footballers and volleyball players, this index has improved after the experiment: in volleyball players from 88% to 95%, football players from 85% to 89%. The shoulder index of the gymnasts (81%), which has become 84% after the experiment, indicates the stooping posture in the subjects under investigation (10%). Wrestlers and Taekwondo sportsmen are fully consistent with indicators as to body proportions and somatotypes. While in athletes, the percentage of people with the upright posture has increased due to reduction of straightened posture. The most significant positive changes in morphological indices after the use of physical rehabilitation facilities are being observed in sportsmen who go in for football, trach-and-field

events and wrestling. Consequently, morphological data are consistent with the functional ability of joints and spine in athletes and wrestlers.

Conclusions. Posture is an important indicator of the human spine condition. In the course of our study, the index of normal posture has improved among students-football players, athletes and wrestlers due to the stooping decrease. Talking about gymnasts, we should mention, that the percentage of students with normal posture remained at the level of output data. The shoulder index as a sign of the stooping development has undergone positive changes in volley-ball players and students who go in for Taekwondo.

After rehabilitation measures, in the course of our experiment, the mobility of shoulder and ankle joints in students-athletes has improved: in terms of bending movements – in football players and gymnasts, and extensional movements – athletes, wrestlers and taekwondists.

There have been revealed certain positive changes in the motor function of spine and joints in athletes of various sports specialization in the process of complex rehabilitation measures (physical exercises, massage), which confirms the need for their use to prevent degenerative changes in bone tissue in athletes and schoolchildren in sports schools and health preservation and strengthening as well.

Список використаних джерел:

1. Васильев О.С. Вопросы коррекции нарушения осанки // Физкультура в профилактике, лечении и реабилитации. 2007. №4. С. 45-51.

2. Дорохов Р.Н. Основы и перспективы возрастного соматотипирования // Теория и практика физической культуры. 2000. №9. С. 10-12.

3. Егорова С.А., Шумаков Н.Ю., Егоров Н.А. Лечебная артгимнастика в комплексной реабилитации остеохондроза // Адаптивная физическая культура. 2005. №9. С. 13-20.

4. Жарова І.В. Динаміка стану кісткової тканини у хворих остеохондрозом і плоскостопістю при проведенні курсу фізичної реабілітації // Теорія і методика фізичного виховання і спорту. 2005. №9. С. 70-74.

5. Літовка І.П. Корекція змін стану кісткової тканини при дефіциті фізичних навантажень // Фізіологічний журнал. 2010. Т.56. №3. С. 41-47.

6. Миронов С.П., Бурлакова Г.М., Крупаткин А.И. Поясничные боли у спортсменов и артистов балета: патология межпозвоночных дисков // Ортопедия, травматология и протезирование. 2005. №4. С. 23-31.

7. Паліздра А.А. Взаємозв'язок функціональних порушень постави і фізичної підготовленості школярів // Теорія і методика фізичного виховання. 2005. №2. С. 38-41.

8. Физическая реабилитация детей с нарушениями функций опорно-двигательного апарата: (учеб. пособие): под ред. Н.А. Гросс. М.: Советский спорт, 2000. 224 с.

9. Челноков В.А. К разработке концепции профилактики и лечения основных болезней позвоночника в спорте высших достижений // Физкультура в профилактике, лечении и реабилитации. 2007. №1. С. 46-49.

References:

1. Vasiliev O. S. Voprosy correctsii narusheniya // Fizkultura v profilaktike, lechenii i reabilitatsii. 2007. № 4. S. 45-51.

2. Galizdra A. A. Vzayemozviazok funktsionalnyh porushen postavy i fizychnoyi pidgotovlenosti shkoliariv // Teoriya i metodyka fizychnogo vyhovannia. 2005. №2. S. 38-41.

3. Dorohov R. N. Osnovy i perspektivy vozrastnogo somatotipirovaniya // Teoriya i praktika fizicheskoy kultury. 2000. № 9. S. 10-12.

4. Yegorova S.A. Shumakov N.Yu., Yegorov N.A. Lechebnaya artgimnastika v kompleksnoy reabilitatsii osteohondroza // Adaptivnaya fizicheskaya kultura. 2005. № 9. S. 13-20.

5. Zharova I. V. Dynamika stanu kistkovoyi tkanyny u hvoryh osteohondrozom i ploskostopistiu pry provedenni kursu fizychnoyi reabilitatsii // Teoriya i metodyka fizychnogo vyhovannia i sportu. 2005. №9. S. 70-74.

6. Litovka I. P. Korektsiya zmin stanu kistkovoyi tkanyny pry defitsyti fizychnyh navantazhen // Fiziologichnyi zhurnal. 2010. T.56. № 3. S. 41-47.

7. Mironov S.P. Burlakov G.M., Krupatkin A.I. Poyasnichnye boli u sportsmenov i artistov baleta : patologiya mezhpozvonochnyh diskov // Ortopediya, travmatologiya i protezirovaniye. 2005. № 4. S. 23-31.

8. Fizicheskaya reabilitatsiya detei s narusheniyami funktsiy oporno-dvigatelnogo aparata (ucheb.posobiye) : pod red. N. A. Gross. M. : Sovetskiy sport, 2000. 224 s.

9. Chelnokov V. A. K razrabotke kontseptsii profilaktiki I lecheniya osnovnyh boleznei pozvonochnika v sporte vysshyh dostizheniy // Fizkultura v profilaktike, lechenii i reabilitatsii. 2007. № 1. S. 46-49.

OUR AUTHORS

Alieksieiev Oleksandr – Ph.D. in Pedagogics, Lecturer of the Department of Sports and Sport Games in Kamianets-Podilskyi National University named after Ivan Ohiienko, Kamianets-Podilskyi, Ukraine.

Aftimichuk Olga – PhD in Pedagogy, Associate Professor, State University of Physical Education and Sports, Chisinau, Moldova.

Avinov Vitaly – Lecturer at the Department of Sports and Sports Games of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Bila Mariya – Lecturer at the Department of Sports and Sports Games of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Bodnar Alina – PhD in pedagogical sciences, senior lecturer of Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Butov Ruslan – Candidate of Science of Physical Education and Sport, Lecturer of the physical rehabilitation and biomedical basis of physical education department of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Chaplinsky Rostyslav – PhD in Medical associate Professor of Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Galamandjuk Lesia – Doctor of Pedagogic Sciences, Associate Professor, Professor at the Department of Theory and Methodology of Preschool Education, Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Gruca-Miąsik Urszula – PhD, adjunct of Care Pedagogy Department, Pedagogical Faculty, University

of Rzeszów, Poland.

Guska Mariya – instructor, physical Education Subdepartament, Kamianets-Podilsky Ivan Ohienko National University, (Ukraine).

Guska Mykhailo – Candidate of Science of Physical Education and Sport, Associate Professor at the Department of Sports and Sports Games of the Kamianets-Podilskyi National Ivan Ohiienko University (Ukraine).

Hrystych Tamara – Doctor of Medical, Professor of the physical rehabilitation and biomedical basis of physical education department of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Iedynak Gennadii – Doctor of Science of Physical Education and Sport, Full Professor, Professor at the Department of Theory and Methodology of Physical Education, Kamianets-Podilskyi National Ivan Ohiienko University, (Ukraine).

Klyus Olena – Candidate of Science of Physical Education and Sport, Senior Lecturer at the Department of Physical Education, Kamianets-Podilskyi National Ivan Ohiienko University, (Ukraine).

Kolarová Marina – Full time PhD student, Department of Physiotherapy, Faculty of Health, Catholic University in Ružomberok, Slovakia.

Kozak Yevhen – Candidate of Pedagogic Sciences, Associate Professor, Associate Professor at the Department of Sports and Sports Games of the Kamianets-Podilskyi National Ivan Ohiienko University (Ukraine).

Kutiš Peter – Full time PhD student, Department of Physiotherapy, Faculty of Health,

Catholic University in Ružomberok, Slovakia.

Kuzhel Mykola – PhD in psychological Sciences, associate Professor of Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Lehotská Mária – Department of Nursing, Faculty of Health, Catholic University in Ružomberok, Slovakia.

Marchuk Danil – Lecturer of Physical Education and Sport, Associate Professor at the Department of Theory and Methods of Physical Education of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Marchuk Volodymyr – Lecturer of Physical Education and Sport, Associate Professor at the Department of Theory and Methods of Physical Education of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Mazur Vasyl – instructor, Sports and Sport Games Subdepartament, Kamianets-Podilsky Ivan Ohienko National University (Ukraine).

Molev Valeriy – PhD of Medical, Associate Professor of the physical rehabilitation and biomedical basis of physical education department of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Mykhalskyi Anatoliy – PhD in Medical associate Professor of Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Mysiv Volodymyr – Ph.D. in Physical Education and Sport, Associate Professor at the Department of Theory and Methods of Physical Education of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Odaynyk Valeriy – lecture of Kamianets-

Podilskyi National Ivan Ohiienko University, Ukraine.

Paluch Marek – PhD with habilitation, Professor of the Faculty of Education, University of Rzeszów, Poland.

Petrov Andriy – Candidate of Pedagogic Sciences, Lecturer at the Department of Sports and Sports Games of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Pogrebnyak Tatyana – Lecturer of Physical Education and Sport, Associate Professor at the Department of Theory and Methods of Physical Education of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Prozar Mykola – Candidate of Science of Physical Education and Sport, Associate Professor at the Department of Sports and Sports Games of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Raitarovska Iryna – Senior Lecturer of the Department of Sports and Sport Games in Kamianets-Podilskyi National University named after Ivan Ohiienko, Kamianets-Podilskyi, Ukraine.

Riabtsev Serhiy – lecture of Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Shyshkin Oleksandr – Associate Professor of the Department of Sports and Sport games in Kamianets-Podilskyi National University named after Ivan Ohiienko, Kamianets-Podilskyi, Ukraine.

Skavronsky Oleksandr – Candidate of Science of Physical Education and Sport, Associate Professor, Associate Professor at the Department of Physical Education, Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Solopchuk Dmytro – PhD in pedagogical

sciences, associate Professor of Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Sovtysik Dmytro– PhD of Biology, Associate Professor of the physical rehabilitation and biomedical basis of physical education department of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Stasiuk Ivan – PhD in physical education and sport, associate Professor (Kamianets-Podilskyi National Ivan Ohiienko University).

Stasiuk Vadim – Lecturer at the Department of Sports and Sports Games of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Yurchyshyn Yurii – Ph.D. in Physical Education and Sport, Associate Professor at the Department of Theory and Methods of Physical Education of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Zaikin Andriy – PhD in pedagogical sciences, associate Professor of Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Zdanyuk Vadym – PhD in pedagogical sciences, associate Professor of Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Zhyguliova Evelina – PhD of Biology, Associate Professor of the physical rehabilitation and biomedical basis of physical education department of the Kamianets-Podilskyi National Ivan Ohiienko University, Ukraine.

Zubal Maya – Ph.D. in Physical Education and Sport, Associate Professor of the Department of Sports and Sport Games, Ukraine.

CONTENTS / ЗМІСТ

Міністерство освіти і науки України
The Ministry of Education and Science of Ukraine,
Кам'янець-Подільський національний університет
імені Івана Огієнка (Україна)
Kamianets-Podilskyi National Ivan Ohiienko University
(Kamianets-Podilskyi, Ukraine),
Академія імені Яна Длугоша в Ченстохові (Республіка Польща)
Academy of Jan Dlugosz in Czestochowa (Poland),
Католицький університет в Ружомбероку (Словаччина)
The Catholic University of Ruzomberok (Slovakia),
Університет Градец Кралове (Чехія)
University Of Hradec Králové (Czech Republic),
Державний університет фізичного виховання і спорту
(Республіки Молдова)
The State University Of Physical Education And Sport
(Republica Moldova)

ПЕДАГОГІЧНІ ТА СОЦІАЛЬНІ АСПЕКТИ ФІЗИЧНОГО ВИХОВАННЯ ТА ФІЗИЧНОЇ ТЕРАПІЇ

PEDAGOGICAL AND SOCIAL ASPECTS OF PHYSICAL EDUCATION AND PHYSICAL THERAPY

ЖУРНАЛ
КАМ'ЯНЕЦЬ-ПОДІЛЬСЬКОГО НАЦІОНАЛЬНОГО
УНІВЕРСИТЕТУ ІМЕНІ ІВАНА ОГІЄНКА
ФАКУЛЬТЕТ ФІЗИЧНОЇ КУЛЬТУРИ

MAGAZINE OF
KAMIANETS-PODILSKYI NATIONAL IVAN OHIIENKO
FACULTY OF PHYSICAL EDUCATION

ВИПУСК 1 / VOLUME 1

Здано в набір 30.11.2018 р. Підписано до друку 05.03.2019 р.
Формат 60x84/16. Гарнітура Times. Умов. друк. арк. 10,57
Обл. вид. арк. 7,8. Папір офсетний. Тираж 100 прим.