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WAYS TO IMPROVE THE DEVELOPMENT OF STRENGTH ENDURANCE IN GIRLS AND BOYS

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Abstracts

Topicality. The constant decrease in the level of schoolchildren`s physical qualities and physical health development is the main issue of modern Ukraine. Therefore, the involvement of schoolchildren to the new interesting types of health physical culture and the promotion of exercises is the value task for a contemporary PE teacher at secondary schools. ***The Purpose of the Research*** is to substantiate the effectiveness of the implemented Floor Work Methodology for the educational process optimization at PE lessons for senior schoolchildren. ***The Research Organization.*** The study involved high school children of main medical group. The proposed methodology increases the motor and overall density of PE. The use of the power part of Floor Work was introduced into each lesson (at the end of the main part of the lesson), regardless of the topic. ***The Research Results.*** There was an improvement in the results of both experimental groups (EG): pull up strength-endurance – in 2,7 times (males); flexion and extension of the arms at bent-arm leaning rest – in 1,7 (males) and female – in 2,0 times; raising the legs at a 90-degree angle – in 3,1 (males) and female – in 3,8 times; rope skipping – in 3,2 times (males) and female – in 1,5 times. The highest increase in the results of the static strength endurance development is observed performing the following exercises: hanging bent to an angle – in 2,5 times (males); angled position – in 2,5 times (males) and females – in 3,2 times; half squats with feet shoulder-width apart – in 3,3 times (females). The results of the survey indicate the formation of positive motivation of EG high schoolchildren for PE attendance. ***Conclusions.*** Comparison of the results before and after the experiment allowed establishing a positive trend in both EGs with symbolic significance for all indicators of testing, which signifies the effectiveness of the implemented Floor work Methodology into the PE classes.

Key words: boys and girls of 10–11 forms, static and dynamic strength endurance, strength aerobics.

Наталія Корж. Шляхи вдосконалення розвитку силової витривалості в дівчат та юнаків. Постійне зниження рівня розвитку фізичних якостей та фізичного здоров'я школярів є головною проблемою сучасної України. Тому перед сучасним учителем із фізичної культури загальноосвітніх закладів основним питанням є залучення учнівської молоді до нових цікавих видів оздоровчої фізичної культури та популяризація занять фізичними вправами. ***Мета*** – обґрунтувати ефективність упровадженої методики «Floor work» в оптимізації навчального процесу на заняттях з фізичної культури в старших класах. ***Організація дослідження.*** У дослідженні взяли участь учні 10–11 класів, які входили до основної медичної групи. Запропонована методика підвищує загальну та моторну щільність уроку фізичної культури (ФК). Використання силової частини «Floor work» упроваджено на кожному уроці ФК (у кінці основної частини уроку) незалежно від теми занять. ***Результати.*** Відбулося поліпшення результатів в обох експериментальних групах (ЕГ): динамічна силова витривалість «підтягування» – у 2,7 раза (юн.); «згинання й розгинання рук в упорі лежачи» – в 1,7 (юн.) і дів. – у 2 рази; «піднімання ніг у висі до кута 90°» – у 3,1 (юн.) і дів. – 3,8 раза; «стрибки через скакалку» – у 3,2 раза (юн.) та дів. – 1,5 раза. Найвище зростання результатів розвитку статичної силової витривалості спостерігаємо у виконанні вправ: «вис кутом» – у 2,5 раза (юн.); «упор кутом» – у 2,5 (юн.) і дів. – у 3,2 раза; «напівприсід у положенні стійка «ноги нарізно» – у 3,3 раза (дів.). Результати опитування вказують на сформованість позитивної мотивації в учнів-старшокласників ЕГ щодо відвідування занять із ФК. ***Висновки.*** Порівняння результатів до та після експерименту дали змогу встановити позитивну динаміку в обох ЕГ із достовірною значущістю за всіма показниками тестування, що вказує на ефективність упровадженої методики «Floor work» в організаційний процес проведення уроків ФК.

Ключові слова: юнаки та дівчата 10–11 класів, статична та динамічна силова витривалість, силова аеробіка.

Наталья Корж. Пути совершенствования развития силовой выносливости у девушек и юношей. Постоянное снижение уровня развития физических качеств и физического здоровья школьников является главной проблемой современной Украины. Поэтому перед современным учителем физической культуры общеобразовательных учреждений основным вопросом является привлечение учащейся молодежи к новым интересным видам оздоровительной физической культуры и популяризация занятий физическими упражнениями. ***Цель*** – обосновать эффективность внедренной методики «Floor work» в оптимизации учебного процесса на занятиях по физической культуре в старших классах. Организация исследования. В исследовании приняли участие учащиеся 10–11 классов, которые были отнесены к основной медицинской группе. Предложенная методика повышает общую и моторную плотность урока физической культуры (ФК). Использование силовой части «Floor work» был введен на каждом уроке ФК (в конце основной части урока) независимо от темы занятий. ***Результаты.*** Произошло

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улучшение результатов в обеих экспериментальных группах (ЭГ): динамическая силовая выносливость «подтягивания» – в 2,7 раза (юн.) «Сгибание и разгибание рук в упоре лежа» – в 1,7 (юн.) И дев. – в 2 раза; «Поднимание ног в висе до угла 90 °» – в 3,1 (юн.) И дев. – 3,8 раза; «Прыжки через скакалку» – в 3,2 раза (юн.) И дев. – 1,5 раза. Высокий рост результатов развития статической силовой выносливости наблюдается в выполнении упражнений: «выс углом» – в 2,5 раза (юн.) «Упор углом» – в 2,5 (юн.) И дев. – в 3,2 раза; «В пол присест в положении стойка ноги врозь» – в 3,3 раза (см.). Результаты опроса указывают на сформированность положительной мотивации у учащихся-старшеклассников ЭГ по посещению занятий с ФК. ***Выводы.*** Сравнение результатов до и после эксперимента позволили установить, положительную динамику в обеих ЭГ с достоверной значимостью по всем показателям тестирования, указывает на эффективность внедренной методики «Floor work» в организационный процесс проведения уроков ФК.

Ключевые слова: юноши и девушки 10–11 классов, статическая и динамическая силовая выносливость, силовая аэробика.

Introduction. Raising the role of physical culture in strengthening the health of the population is one of the main tasks of modern Ukraine. Physical culture is especially important for high school students, whose high level of health and diverse physical development is the key to the successful implementation of socio-economic transformations of our society [6]. Local and foreign experts in the field of physical education believe that physical activity and a proper level of physical fitness is an important component of students' health, and its improvement is one of the main tasks of physical education at school. [17; 19; 20; 21].

The importance of physical activity and its positive impact not only on both physical and mental health but also on social activity in the modern life of student youth is emphasized in the works of Keeley T. J. H., Fox K. R. and other scientists. [18].

According to T. Baechle, J. Smith, N. Eather, P. Morgan, and other scientists [16, 20], the level of physical fitness in children and adolescents is defined as an important, current and future state of health. Also in the works of the authors, special attention on this issue is paid to girls who are entrusted with the mission of motherhood and the birth of healthy children [13; 21].

Peculiarities of the development of different types of endurance were depicted in the works of many scientists like O. Ivashchenko T. Kravchuk, Baquet G, Berthoin S, etc., [4; 13; 14], who emphasize that the level of stamina is mediated by a large accuracy and indicates the general state of health and functionality of the respiratory and cardiovascular systems. Scientists believe that the priority of the responsibility of PE specialists should be to work on the development of endurance. It should be based on improving performance and health.

In researches of O. Ivashchenko, E. Navrotsky, V. Pantik, and others [4; 5], special attention is paid to the fact that after a certain stabilization of girls' physical fitness points, which is achieved in grades 7 to 8, in the following years there is a tendency to regressive changes. Thus, the level of development of motor skills and functionality in most high school graduates remain low and do not meet the requirements of society.

Whereas one of the most intense periods of strength development in young men is 15–18 years, because during this period muscle mass and puberty develop, increasing the muscle contraction rate to prolonged static tension [9].

Theoretical analysis of scientific and scientific-methodical literature has revealed that there are many different methods and tools for the development of strength and endurance of high school students.

But all the proposed methods indicate that scientists do not have a single opinion on the use or absence of burdens for the development of strength qualities in girls and boys of different school ages.

So in the research of N. M. Sanzharova [6], attention is drawn to the fact that the most effective development of strength is amenable to training, when applied dosed burdens, taking into account the physical capabilities of the individual.

R. E. Cherkashin [11], focuses on the fact that when developing a targeted program of strength training for girls, it should be borne in mind that the anatomical structure and physiological functions of the female body determine a number of limitations, especially in exercises with weights.

All this suggests that the study of the level of high school students' stamina need further consideration. Particularly important is the creation of new ways of physical education, which would not only develop motor skills and functionality of high school students, but also be liked by students, raise interest in classes of physical education, contribute to the spiritual development of schoolchildren.

One of the modern ways of the usage of health fitness according to L. E. Synitsya, U. S. Shevtsiv, T. R. Baechle, R. W. Earle. and others, – is strength aerobics, which is based on the synthesis of the use of strength training: fitness gymnastics, athletic gymnastics and bodybuilding. This type of aerobics is aimed not only at the correction of the figure, but also at increasing the level of physical fitness and motor activity [7; 16].

Unfortunately, numerous scientific studies indicate that the majority of boys and girls in this age group have an unsatisfactory level of strength and endurance [1; 4].

Thus, the study of the level of development of strength endurance of 15–16 y.o. students needs a more detailed study. Therefore, the attention of our study was focused on this problem.

The Purpose of the Study: to substantiate the effectiveness of the implemented methodology «Floor work» in the optimization of the educational process of physical education in senior classes.

Materials and Research Methods:

– *Participants:* The study period lasted 9 months (September 2018 – May 2019), on the basis of the CHP № 90 I–III levels of accreditation, Zaporizhia city. Classes were held according to the basic program of the CHP – twice a week. The study involved girls (n = 25) and boys (n = 23) of 10–11 grades, which were divided into two groups: control – CG and experimental – EG. The division into groups, as well as participation in the experiment, took place at the request of high school students. All students were assigned to the main medical group that meets the requirements of the study.

– *Organization of the Study*

Based on the study of G.V. Bezverzhnia [2], in which it was proved that one of the main reasons for the negative attitude of girls to exercise and physical education lessons is that physical education programs are more focused on boys.

The main differences of our experimental method in the application of this type of health aerobics in the organizational process of PE classes in senior classes are: first – the method was aimed not only at improving physical fitness but also increasing the overall and motor density of physical education (PE). All complexes of warm-up and power part «Floor work» were developed according to the objectives of the lesson; secondly – all exercises were performed exclusively in accordance with the musical rhythm. This has a positive effect on the sense of musical rhythm, the development of coordination, aesthetic performance of physical exercises, as well as increasing the interest and motivation of boys and girls to attend physical education classes and personal attitude to a healthy lifestyle; the next difference is the development of power complexes with the obligatory alternation of exercises of dynamic strength orientation and callonetics (static exercises). Strength exercises were performed according to the tempo of the musical accompaniment. The change, namely the increase in the speed of musical accompaniment, took place according to the dynamics of physical fitness of students; fourth – all strength exercises were performed without weights. This made it possible to perform physical exercises in the form of homework, followed by checking the current or basic testing of the level of strength endurance.

To determine the level of stamina development, we used tests of static and dynamic orientation [9]. The following exercises were used in the testing of static force: hanging on bent arms; height angle; angle emphasis; for half a squat in the position of standing legs apart, hands behind the head. The execution time of the proposed exercises was measured in seconds. In this type of testing for girls and boys, all tests were the same. Testing of dynamic strength endurance took place in the performance of exercises such as: lifting the legs at an 90° angle (30s., times); jumping rope (30s., times); flexion and extension of the arms in the supine position; pull-ups (times) - for boys; rope climbing (m.) – for girls.

The participants of the experiment were interviewed throughout the study period. The survey was social in nature, which made it possible to coordinate the substitutions of some physical exercises according to the interests of both boys and girls. The survey also revealed changes in the formation of interest and motivation of boys and girls in grades of 10–11 to attend PE classes, school sports clubs, and personal attitudes towards a healthy lifestyle.

– *Statistical Analysis.* In order to determine the indicators of the development of stamina (dynamic and static) in boys and girls, we selected tests in accordance with the standards of physical fitness of the population of Ukraine, including high school students. Assessment in points was carried out according to the standard evaluation system (on a 12-point scale).

The use of mathematical statistics allowed us to conclude that at the beginning of the experiment the difference between the results of testing the development of strength endurance between control and experimental groups was significant ($p<0,05$), which indicates the homogeneity of groups and meets the requirements of the study.

Mathematical and statistical processing of factual material was carried out in order to interpret the results of pedagogical experiments using a package of standard programs (Excel – 7; Statistica – 6; SPSS – 2.0).

Results of the Research. The introduction of the experimental method «Floor work» in the organizational process of PE lessons for boys and girls of 10–11 grades and comparison of the results allowed confirming the effectiveness of the proposed method.

The obtained experimental data of strength endurance testing showed that a significant number of boys and girls at the beginning of the experiment corresponded to low and below average levels of strength development. Therefore, based on the analysis of the results we have introduced the use of strength aerobics exercises – «Floor Work» in physical education classes in the educational process.

At the beginning of the experiment, we conducted a sociological survey of 10th and 11th grade students for interest in attending PE lessons. The survey showed that the vast majority of 69,1 % – girls as opposed to 47,3 % – boys have almost no interest in attending classes. The main reason is that the methods and means of conducting lessons are more focused on young boys. It was also found that 79,7 % of them believe that all types of health aerobics are a fitness area for girls.

Identifying knowledge about physical exercises that can be performed for the development of physical qualities, the general majority – 89,4 % of students mentioned only dynamic exercises. Neither boys nor girls could remember performing static exercises to increase the level of physical fitness.

All this indicates the ignorance of students in the field of physical culture and the uniformity of the use of methods and tools in physical education lessons. This is confirmed by the results of static endurance testing: no girl was able to perform the thrust at an angle at the beginning of the experiment, and the best result for boys is 2,2 s. (tables 2, 3). Indicators of speed endurance (jumping rope 30sec., times); confirm the fact that most students do not know how to jump rope (tables 1, 4). Students first became acquainted with skipping rope in primary school, but in middle and senior classes, skipping rope was unfortunately not used in physical education classes. In the course of the survey, we also found that the majority of boys and girls – 78,4 % are willing to attend classes for any reason than to actively attend PE lessons.

It was the results of the survey that prompted us to develop such a technique that would have a positive impact not only on improving physical fitness, but also on the formation of lasting interest and positive motivation in high school students to attend PE lessons, school sports clubs, proper and aesthetic exercise, leading a healthy lifestyle, etc.

The physical fitness of high school students was determined by the results of pedagogical tests, which were selected and used at the beginning and after the experiment.

The dynamics of changes in the level of development of dynamic strength endurance of young men before and after the experiment are presented in table 1.

Table 1

Dynamics of Changes in the Level of Development of Dynamic Strength Endurance of Young Men before and after the Experiment (n = 23)

Exercises	Groups	N	Before Experiment	After Experiment	*P*
			$\bar{x} \pm m$	$\bar{x} \pm m$	
Raising legs at the height at an 90° angle (30 sec., times)	EG	12	9,47±0,33	28,79±0,06	<0,001
	CG	11	8,53±0,29	12,17±0,07	>0,05
Rope jumping (30 sec., times)	EG	12	21,21±0,23	67,16±0,97	<0,001
	CG	11	29,23±0,39	54,41±0,37	>0,05
Pull-ups, times	EG	12	6,63±2,99	17,98±0,06	<0,001
	CG	11	6,91±2,23	10,13±0,35	>0,05
Flexion and extension of the arms in a supine position	EG	12	21,77±4,31	37,88±0,39	<0,001
	CG	11	22,62±4,50	25,33±0,19	>0,05

Comparison of the obtained results of testing dynamic endurance shows that the boys from EG had positive changes in the performance of all exercises with significant significance: pull-ups before the experiment 6,63±2,99, after 17,98±0,06; raising the legs at the height before 9,47±0,33 and after 28,9±0,06; flexion and extension of the arms in the supine position before the experiment 21,77±4,31, after the experiment 37,88±0,39; rope jumping to 21,21±0,23 after 67,16±0,97 ($p<0,001$). We also note that the results of pull-ups increased more than 2.7 times (CG – 1,4 times); flexion and extension of the arms in the supine position – 1,7 times (KG – 1,1 times); raising the legs at an angle to an angle of 90° – 3,1 times; Jumping rope – 3,2 times in CG – 1,4 and 1,8 times, respectively.

In table 2 the dynamics of the development of static strength endurance of young men before and after the experiment is presented.

The results of testing the stamina of young men after the experiment indicate that the improvement with substantial significance occurred in all indicators: hanging on bent arms before 23,65±2,99, after 61,90±0,06;

hanging at an angle before the experiment 5,61±4,50 after the experiment 15,73±0,98; emphasis at an angle before 2,17±12,96, after 7,64±0,39; half squats with legs apart, hands behind the head before the experiment 21,01±3,05 and at the end of it 83,60±0,04 ($p<0,001$).

Table 2

Dynamics of Changes in the Level of Development of Static Strength Endurance of Young Men before and after the Experiment (n = 23)

Exercises	Groups	N	Before Experiment	After Experiment	*P*
			$\bar{x} \pm m$	$\bar{x} \pm m$	
Hanging on bent arms, *sec*	EG	12	23,65±2,99	61,90±0,06	<0,001
	CG	11	23,61±2,73	27,21±0,03	>0,05
Hanging at an angle, *sec*	EG	12	5,61±4,50	15,73±0,98	<0,001
	CG	11	5,66±4,54	8,36±0,21	>0,05
Emphasis at an angle	EG	12	2,17±12,96	7,64±0,39	<0,001
	CG	11	2,19±11,99	4,18±0,33	>0,05
Half squats with legs apart, hands behind the head, *sec*	EG	12	21,01±3,05	83,60±0,04	<0,001
	CG	11	21,07±3,12	67,23±0,02	<0,001

In the young men of the experimental group, the results that require the manifestation of static force increased more than 2,5 times in most aspects. The boys of the CG and EG groups showed the best performance in the exercise «half squats with legs apart, hands behind the head» and the results improved in EG – by 3,9 times, in CG – 3,1 times. This is the only exercise that does not have a significant difference between groups after the experiment and corresponds to ($p<0,05$).

Significant differences between groups of young men in most indicators of testing dynamic and static strength endurance corresponds ($p<0,01$), which indicates the effectiveness of the proposed method.

Examining the level of girls' stamina, we found that girls with CG and EG, as well as boys, have low and below average levels. And no girl was able to perform such a static exercise as an emphasis at an angle.

Tables 3 and 4 present data on the development of static and dynamic strength endurance, which were obtained at the beginning and after the experiment.

Table 3

Dynamics of Changes in the Level of Development of Static Strength Endurance of Girls before and after the Experiment (n = 25)

Exercises	Group	N	Before Experiment	After Experiment	*P*
			$\bar{x} \pm m$	$\bar{x} \pm m$	
Hanging on bent arms, *sec*	EG	13	8,31±0,99	19,39±0,91	<0,01
	CG	12	8,29±0,73	11,12±0,87	>0,05
Hanging at an angle, *sec*	EG	13	2,51±3,21	7,24±0,98	<0,001
	CG	12	2,49±4,24	3,52±0,24	>0,05
Emphasis at an angle	EG	13	Not performed	3,21±0,39	<0,001
	CG	12	Not performed	Not performed	<0,05
Half squat with legs apart, hands behind the head, *sec*	EG	13	21,12±3,05	69,66±0,04	<0,001
	CG	12	21,16±3,12	47,79±3,12	<0,05

The introduction of the experimental method «Floor work» in the organizational process of PE lessons for boys and girls of 10–11 grades and comparison of the results allowed confirming the effectiveness of the proposed method.

According to the results of studies, in girls of EG statistically significant differences were found in the performance of all physical exercises of dynamic and static orientation ($p<0,05$; $p<0,01$; $p<0,01$).

We would like to draw your attention to the fact that at the beginning of the experiment it was very difficult for the girls to perform such an exercise as «emphasis at an angle»; no high school student was able to perform this exercise. After the experiment in EG, all the girls were able to perform the proposed exercise. When, on the other hand, in the CG no girl was able to perform this exercise.

EG girls, as well as boys of both groups, also have a disproportion of results in performing such an exercise as emphasis at an angle. This confirms the difficulty of performing and the lack of use of this

exercise in the complex process of developing static strength endurance of the muscles of the abdomen, back and arms.

Table 4

Indicators of the Level of Development of Dynamic Strength Endurance Girls 15–16 Years before and after the Experiment (n = 25)

Exercises	Groups	N	Before Experiment	After Experiment	P
			$\overline{x} \pm m$	$\overline{x} \pm m$	
Raising legs at a 90° angle (30sec., times)	EG	12	6,7±0,33	25,9±0,06	<0,05
	CG	13	6,5±0,29	10,1±0,07	>0,05
Rope jumping (30 sec., times)	EG	12	44,61±0,35	73,6±0,98	<0,05
	CG	13	46,28±0,49	57,41±0,37	>0,05
Flexion and extension of the arms in the supine position (times)	EG	12	11,77±0,43	23,64±0,79	<0,05
	CG	13	10,16±0,39	15,63±0,35	<0,05
Rope climbing (min.)	EG	12	1,70±0,11	3,80±0,24	<0,05
	CG	13	1,60±0,06	2,80±0,09	>0,05

The greatest improvement in the results of testing stamina occurred in the exercise of lifting the legs at a 90° angle – 3,8 times (before 6,7±0,33 after 25,9±0,06). Rope jumping and rope climbing the results improved – 1,5 times (before 44,61±0,35, after 73,6±0,98; and before 1,70±0,11, after 3,80±0,24 respectively); flexion and extension of the arms at rest lying down 2 times (before 11,77±0,43, after 23,64±0,79).

The results of the experiment show that the introduction of strength aerobics – «Floor Work» in the organizational process of physical education classes has a positive effect on the development of strength qualities, including strength endurance of static and dynamic orientation.

Discussion. Nowadays, lessening of health among young students is an essential social problem in modern society. Recently, almost 90 % of children, pupils and students have health problems, more than 60 % – poor physical fitness, and poor physical health. And the recession in physical activity is observed in all age groups of the population of Ukraine [1].

Based on scientific research, we agree with the opinion of leading scientists, who point out that the question of the effectiveness of various methods of teaching physical education is extremely important. This would encourage young students not only to regularly attend PE classes but they have a positive impact on the formation of sustainable motivation, interest in various forms of physical education (classroom, sectional, independent in fitness clubs, etc.). As well as to lead a healthy lifestyle and promote physical culture and sports among boys and girls [1; 17].

Unfortunately, not all methods can be implemented in secondary education. This is due to the fact that many effective and innovative methods are simply not possible to implement in secondary schools. This is because 70 % of educational institutions do not have adequate material and technical base by cause of their difficult funding [3]. This indicates that physical education classes are used with outdated tools and teaching methods, which in turn reduce the interest of young students to attend PE classes, school sports clubs and lead a healthy lifestyle.

Analyzing the indicators of physical fitness of boys and girls at the beginning of the experiment, Tables 1–4 should be the main starting point for creating new, modern and appropriate working conditions for PE teachers to increase in the level of student youth theoretical knowledge as well as achieving high levels of physical development, physical fitness and self-education in the field of physical culture.

One of the best options for improving the educational process of physical education in high school is the introduction of modern methods that allow rational organization of the educational process, aiming at comprehensive development of students, optimization of physical activity and the formation of physical self-improvement [1; 10].

In our opinion, an important step in the development of motor skills, in particular strength endurance of girls and boys of senior school age in PE classes may be the introduction of a new type of motor activity such as strength aerobics – «Floor Work».

The relationship between different types of force (static and dynamic) is important, because the specifics of each type of physical activity determine the requirements for certain strength qualities. Therefore, the task of the study was not only to determine the level of dynamic stamina, but also to pay attention to the level of development of static strength of high school students.

Taking into consideration the results of the survey, the level of physical fitness of high school students and the material and technical base of the school, we have developed and implemented strength aerobics «Floor Work» into the organizational process of the PE lesson. It includes dance moves, mandatory strength exercises and stretching exercises. Sections of our experimental methodology can be used in classes on any topic of the lesson: preparatory part – dance moves; performed in aerobic mode, the main part (end of the main part) – strength exercises and stretching. According to the program, the theme is «Gymnastics» – complexes are performed throughout the lesson. Also, musical accompaniment is an element of increasing interest, motivation, sense of rhythm in girls and boys to attend PE classes, as well as the general and motor density of the lesson. According to the dynamics of physical fitness of high school students, we took into account a certain sequence of complications of power complexes and changes in musical rhythm.

The use of the method of pedagogical control during the experiment made it possible to determine that at the beginning of the study high school students of both groups had the same level of dynamic and static force, i.e. were homogeneous, which met the requirements of the experiment.

Positive changes in the indicators of physical fitness of high school students (tables 1–4) indicate the effectiveness of the experimental methodology, which was developed and implemented in the organizational process of physical education classes in senior classes. We note that the improvement of the results of dynamic endurance of boys from EG is observed in the performance of exercises: raising legs at a 90° angle – 3,1 times and jumping rope – 3,2 times in CG – 1,4 and 1,8 times, respectively. Girls from EG – raising legs at a 90° angle – an improvement of 3,8 times in CG – 1,5 times.

The results of static endurance in the girls and boys from EG are also more expressed than in CG. For most indicators, the improvement was more than 2,5 times for most indexes. And the implementation of the exercise emphasis at an angle for girls from CG was impossible, both at the beginning and at the end of the experiment.

We emphasize the fact that in the performance of such exercises as hanging at an angle and emphasis at an angle, despite the improvement of the results, the disproportion of the results remained. This indicates that the exercise «emphasis at an angle» for most boys and girls from EG remains more difficult and a non-standard type of exercise.

We have confirmed and supplemented the scientific data [6; 10].

Thus, the results of the experiment showed positive changes in increasing the level of boys' and girls' stamina, which in turn indicates the effectiveness of the use of strength aerobics exercises «Floor work» during PE lessons in senior classes.

Conclusions. Revealing the problem of our study, strength aerobics «Floor Work» was developed and implemented in the organization of the educational process of conducting PE lessons in senior classes. The orientation of our methodology corresponded to the purpose and objectives: optimization of the educational process of PE classes in high school; determining the level of dynamic and static strength endurance of high school students.

The survey found that the vast majority of boys and girls in grades 10–11 have a poor level of personal physical education. This is due to the fact that the role of physical education is taken to the last stage of the educational process, even in Health classes.

The results of physical fitness confirm the effectiveness of the implemented technique. For most indicators, the improvement was statistically significant.

The analysis of the obtained results indicates the effectiveness of the implemented methodology for: optimization of the educational process of PE classes in high school; increasing the level of physical fitness for 15-16 year old boys and girls, in particular stamina (static, dynamic).

Conflict of Interest. The authors state that there is no conflict of interest.

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