



THE DEVELOPMENT OF SPECIAL
ENDURANCE OF YOUNG SWIMMERS BY
THE METHOD OF CIRCULAR TRAINING

Borovaya Valentina, Sherenda Sergey, Molchanov Vitaliy
Educational Establishment «Francisk Skorina Gomel State University»

DOI: 10.32540/2071-1476-2021-3-010

Annotation

Introduction. In order to achieve the tasks set for the development of speed or strength endurance in training, the coach needs to present a system of sports exercises to the trainees in an interesting way. For this purpose, the circular training method is used, which allows young athletes to exercise simultaneously and independently, achieving high motor density. In such lessons, there is a real opportunity to use the maximum amount of various inventory and equipment. The analysis of the special literature showed the absence of recommendations for the development of special endurance in young swimmers by the method of circular training.

The purpose of the study is to develop and experimentally substantiate the methodology for the development of special endurance of young swimmers by the method of circular training. The set of methods used to solve the tasks included: theoretical analysis and synthesis of data from the scientific and methodological literature; pedagogical testing and observation, methods of statistical processing of the material obtained. The study involved swimmers aged 9-10 years, groups of initial training of the second year of study.

The results of the study. To determine the effectiveness of using the circular training method for the development of special endurance of young swimmers, two groups (control and experimental) were compared. The control group was engaged according to the generally accepted training program for swimmers, and the experimental group according to the method developed by us. The effectiveness of the proposed method was determined by the results of changes in the level of physical preparedness, the level of strength endurance and changes in sports results in the control and experimental groups.

Statistical analysis of physical preparedness indicates higher growth rates of boys and girls of the experimental group in endurance exercises. In the tests in the experimental group, a reliably significant change in the parameters was achieved, at $p < 0.05$.

Conclusions. The improvement of the passing of the second half of the competition distance in the experimental group by representatives of both sexes indicates a more effective development of special endurance of young swimmers.

Key words: swimming, young athletes, circular training, method, special endurance.

Анотація

Вступ. Щоб домогтися поставлених завдань з розвитку швидкісної або силової витривалості на тренуванні, тренеру необхідно цікаво піднести систему спортивних вправ тим, які займаються. З цією метою використовують метод кругового тренування, який дозволяє юним спортсменам вправлятися одночасно і самостійно, домагаючись високої моторної щільності. На таких заняттях з'являється реальна можливість використання максимальної кількості різноманітного інвентарю та обладнання. Аналіз спеціальної літератури показав відсутність рекомендацій щодо розвитку спеціальної витривалості у юних плавців методом

кругового тренування.

Мета дослідження – розробити та експериментально обґрунтувати методику розвитку спеціальної витривалості юних плавців методом кругового тренування. Сукупність методів, використовуваних для вирішення поставлених завдань, включала: теоретичний аналіз і узагальнення даних науково-методичної літератури; педагогічне спостереження і тестування, методи статистичної обробки отриманого матеріалу. У дослідженні взяли участь плавці 9-10 років груп початкової підготовки 2-го року навчання.

Результати дослідження. Для визначення ефективності використання кругового методу тренування для розвитку спеціальної витривалості юних плавців було проведено порівняння двох груп (контрольної та експериментальної). Контрольна група займалася за загальноприйнятою програмою підготовки плавців, а експериментальна група за розробленою нами методикою. Ефективність запропонованої методики визначалася за результатами зміни рівня фізичної підготовленості, рівня силової витривалості та зміни спортивного результату в контрольних та експериментальних групах.

Статистичний аналіз фізичної підготовленості свідчить про більш високі темпи приросту хлопчиків і дівчаток експериментальної групи у вправах на витривалість. У тестах в експериментальній групі було досягнуто достовірно значущу зміну параметрів при $p < 0,05$.

Висновки. Поліпшення проходження другої половини змагальної дистанції в експериментальній групі представниками обох статей свідчить про більш ефективний розвиток спеціальної витривалості юних плавців.

Ключові слова: плавання, юні спортсмени, кругове тренування, методика, спеціальна витривалість.

Аннотация

Введение. Чтобы добиться поставленных задач по развитию скоростной или силовой выносливости на тренировке, тренеру необходимо интересно преподнести систему спортивных упражнений занимающимся. В этих целях используют метод круговой тренировки, который позволяет юным спортсменам упражняться одновременно и самостоятельно, добываясь высокой моторной плотности. На таких занятиях появляется реальная возможность использования максимального количества разнообразного инвентаря и оборудования. Анализ специальной литературы показал отсутствие рекомендаций по развитию специальной выносливости у юных пловцов методом круговой тренировки.

Цель исследования – разработать и экспериментально обосновать методику развития специальной выносливости юных пловцов методом круговой тренировки. Совокупность методов, используемых для решения поставленных задач, включала: теоретический анализ и обобщение данных научно-методической литературы; педагогическое наблюдение и тестирование, методы статистической обработки полученного материала. В исследовании приняли участие пловцы 9-10 лет групп начальной подготовки 2-го года обучения.

Результаты исследований. Для определения эффективности использования кругового метода тренировки для развития специальной выносливости юных пловцов было проведено сравнение двух групп (контрольной и экспериментальной). Контрольная группа занималась по общепринятой программе подготовки пловцов, а экспериментальная группа по разработанной нами методике. Эффективность предложенной методики определялась по результатам изменения уровня физической подготовленности, уровня силовой выносливости и изменения спортивного результата в контрольных и экспериментальных группах.

Статистический анализ физической подготовленности свидетельствует о более высоких темпах прироста мальчиков и девочек экспериментальной группы в упражнениях на выносливость. В тестах в экспериментальной группе было достигнуто достоверно значимое изменение параметров при $p < 0,05$.

Выводы. Улучшение прохождения второй половины соревновательной дистанции в экспериментальной группе представителями обоего пола свидетельствует о более эффективном развитии специальной выносливости юных пловцов.

Ключевые слова: плавание, юные спортсмены, круговая тренировка, методика, специальная выносливость.

Introduction. At the present stage of sports development, there are constant transformations that set in motion the mechanisms of regulating physical culture and sports activities, which acts as the basic foundation for the formation of the

health of an individual of different genders and ages [1, 2, 6, 8, 13, 14, 18, 23], because the emergence of new types of sports practices requires innovative solutions in the aspect of finding its effectiveness [7, 15, 21, 22, 24, 25]. Each sport

is characterized by its own specialized functional structure that provides muscle activity of a particular directionality [2, 3, 24, 17, 25, 26]. At the same time, the state of health of the younger generation is of extreme concern, as it reflects the

Table 1

Indicators of physical preparedness at the beginning of the experiment

Tests	Experimental group ($\bar{X}_1 \pm m_1$)	Control group ($\bar{X}_2 \pm m_2$)	T_{emp}	Reliability of differences (p)
Boys				
30 meter sprint test (sec)	5,85±0,11	5,8±0,09	0,35	> 0,05
Shuttle run 3x10 m (sec)	11,32±0,31	11,21±0,25	0,5	> 0,05
Standing long jump (cm)	138,33±9,67	153,86±8,16	2,3	≤ 0,05
Sit-and-reach test (cm)	5,5±2,17	6,43±2,08	0,6	> 0,05
Pull-up on the crossbar (times)	23,17±3,5	23,57±4,37	0,2	> 0,05
6-minute run (m)	1041,67±58,89	1027,14±25,88	0,4	> 0,05
Girls				
30 meter sprint test (sec)	6,08±0,18	5,95±0,10	1,1	> 0,05
Shuttle run 3x10 m (sec)	11,92±0,34	11,45±0,13	2,2	> 0,05
Standing long jump (cm)	136,6±21,92	139,75±12,25	0,2	> 0,05
Sit-and-reach test (cm)	7,0±1,6	8,0±2,5	0,6	> 0,05
Pull-up on the crossbar (times)	19,2±2,64	20,75±3,25	0,7	> 0,05
6-minute run (m)	982,0±54,4	1050±35,0	1,7	> 0,05

level of relationship between the individual and society [8, 10, 23]. There are many programs aimed at solving this problem. Swimming is an excellent means of improving the health of children.

In children, endurance should

be developed very carefully. When training with young swimmers of 9-10 years old, there is no need to plan special endurance exercises, because this can lead to a loss of interest in training [9, 17, 21]. In order to achieve the tasks set for the

development of speed or strength endurance in training, the coach needs to present a system of sports exercises to the trainees in an interesting way [9, 16]. For this purpose, the circular training method is used, and it is very popular. This method

Table 2

Indicators of the level of special strength endurance at the beginning of the experiment

Tests	Experimental group ($\bar{X}_1 \pm m_1$)	Control group ($\bar{X}_2 \pm m_2$)	T_{emp}	Reliability of differences (p)
Boys				
Sit-ups from the prone position (times)	36,67±5,44	34,86±4,17	0,5	> 0,05
Squats for 1 minute (times)	45,83±1,50	45,29±2,33	0,4	> 0,05
Push-ups in the prone position (times)	24,0±4,00	26,57±3,22	0,9	> 0,05
Holding the body in the hang (sec)	12,5±5,50	15,57±3,18	1,0	> 0,05
The plank exercise (min, sec)	1.54,50± 19,83	1.40,71±23,39	0,9	> 0,05
The 30-second endurance jump (times)	22,83±4,17	25,57±1,63	1,3	> 0,05
Girls				
Sit-ups from the prone position (times)	24,4±2,08	26,25±4,24	0,7	> 0,05
Squats for 1 minute (times)	46,8±1,36	44,25±1,75	1,8	> 0,05
Push-ups in the prone position (times)	12,6±8,32	17,75±7,63	0,7	> 0,05
Holding the body in the hang (sec)	22,2±10,24	28,25±10,25	0,7	> 0,05
The plank exercise (min, sec)	2.14,6±35,68	2.09,5±29,0	0,2	> 0,05
6-minute run (m)	982,0±54,4	1050±35,0	1,7	> 0,05
The 30-second endurance jump (times)	25,2±2,24	27,5±4,00	0,8	> 0,05

Table 3

Dynamics of indicators of physical preparedness of boys during the experiment

Tests	Experimental group ($\bar{X}_1 \pm m_1$)	Control group ($\bar{X}_2 \pm m_2$)	T_{emp}	Reliability of differences (p)
Experimental group				
30 meter sprint test (sec)	5,85±0,11	5,72±0,09	1,4	> 0,05
Shuttle run 3x10 m (sec)	11,32±0,31	11,12±0,26	1,0	> 0,05
Standing long jump (cm)	138,33±9,67	146,33±10,56	1,1	> 0,05
Sit-and-reach test (cm)	5,5±2,17	7,0±1,33	1,0	> 0,05
Pull-up on the crossbar (times)	23,17±3,5	31,5±3,83	3,1	≤ 0,05
6-minute run (m)	1041,67±58,89	1173,33±74,44	2,4	≤ 0,05
Control group				
30 meter sprint test (sec)	5,8±0,09	5,7±0,87	1,4	> 0,05
Shuttle run 3x10 m (sec)	11,21±0,25	11,06±0,23	1,0	> 0,05
Standing long jump (cm)	153,86±8,16	160,0±6,00	1,2	> 0,05
Sit-and-reach test (cm)	6,43±2,08	7,57±1,22	1,0	> 0,05
Pull-up on the crossbar (times)	23,57±4,37	25,86±4,41	0,8	> 0,05
6-minute run (m)	1027,14±25,88	1062,86±22,45	2,0	> 0,05

allows young athletes to exercise simultaneously and independently, achieving high motor density. In such classes, there is a real opportunity to use the maximum amount of various inventory and equipment.

The analysis of the special litera-

ture showed the absence of recommendations for the development of special endurance in young swimmers by the method of circular training.

Hypothesis. Before the start of the study, it was assumed that the

use of an innovative method would improve the results of passing the second half of the distance for swimmers, which would indicate an increase in special strength endurance.

The purpose of the study is to

Table 4

Dynamics of indicators of physical preparedness of girls during the experiment

Tests	Experimental group ($\bar{X}_1 \pm m_1$)	Control group ($\bar{X}_2 \pm m_2$)	T_{emp}	Reliability of differences (p)
Experimental group				
30 meter sprint test (sec)	6,08±0,18	5,84±0,15	1,8	> 0,05
Shuttle run 3x10 m (sec)	11,92±0,34	11,60±0,36	1,2	> 0,05
Standing long jump (cm)	136,6±21,92	147,2±16,64	0,7	> 0,05
Sit-and-reach test. (cm)	7,0±1,6	7,6±1,28	0,5	> 0,05
Pull-up on the crossbar (times)	19,2±2,64	29,6±2,72	5,1	≤ 0,01
6-minute run (m)	982,0±54,4	1126±79,2	2,8	≤ 0,05
Control group				
30 meter sprint test (sec)	5,95±0,10	5,85±0,05	1,4	> 0,05
Shuttle run 3x10 m (sec)	11,45±0,13	11,30±0,10	1,4	> 0,05
Standing long jump (cm)	139,75±12,25	144,25±11,25	0,4	> 0,05
Sit-and-reach test (cm)	8,0±2,5	10,25±2,75	1,0	> 0,05
Pull-up on the crossbar (times)	20,75±3,25	25,00±3,50	1,5	> 0,05
6-minute run (m)	1050,0±35,0	1077,5±32,75	0,7	> 0,05

Table 5

Dynamics of indicators of the level of strength endurance in boys during the experiment

Tests	Experimental group ($\bar{X}_1 \pm m_1$)	Control group ($\bar{X}_2 \pm m_2$)	T_{emp}	Reliability of differences (p)
Experimental group				
Sit-ups from the prone position (times)	36,67±5,44	45,83±5,83	2,3	≤ 0.05
Squats for 1 minute (times)	45,83±1,50	48,50±1,50	2,5	≤ 0.05
Push-ups in the prone position (times)	24,0±4,00	36,0±3,67	3,7	≤ 0.01
Holding the body in the hang (sec)	12,5±5,50	31,5±8,17	3,8	≤ 0.01
The plank exercise (min, sec)	1.54,50± 19,83	2.49,5±18,33	3,4	≤ 0.01
30-second endurance jump (times)	22,83±4,17	30,83±3,17	3,0	≤ 0.05
Control group				
Sit-ups from the prone position (times)	34,86±4,17	39,57±3,80	1,8	> 0,05
Squats for 1 minute (times)	45,29±2,33	46,43±1,92	0,7	> 0,05
Push-ups in the prone position (times)	26,57±3,22	29,71±3,39	1,3	> 0,05
Holding the body in the hang (sec)	15,57±3,18	22,29±	2,8	≤ 0.05
The plank exercise (min, sec)	1.40,71±23,39	1.50,29±22,04	0,7	> 0,05
30-second endurance jump (times)	25,57±1,63	27,57±1,51	1,9	> 0,05

develop and experimentally substantiate the methodology for the development of special endurance of young swimmers by the method of circular training.

Methods and organization. The set of methods used to solve the tasks

included: theoretical analysis and synthesis of data from the scientific and methodological literature; pedagogical testing, method of circular training, pedagogical observation and experiment, methods of statistical processing of the material obtained.

The research was carried out in 2020-2021 in the Gomel children and youth sports school № 6. The study involved swimmers aged 9-10 years, groups of initial training of the second year of training.

Table 6

Dynamics of indicators of the level of strength endurance in girls during the experiment

Tests	Experimental group ($\bar{X}_1 \pm m_1$)	Control group ($\bar{X}_2 \pm m_2$)	T_{emp}	Reliability of differences (p)
Experimental group				
Sit-ups from the prone position (times)	24,4±2,08	33,0±2,80	4,2	≤ 0.01
Squats for 1 minute (times)	46,8±1,36	50,6±0,88	3,8	≤ 0.01
Push-ups in the prone position (times)	12,6±8,32	24,6±5,92	2,1	> 0,05
Holding the body in the hang (sec)	22,2±10,24	39,0±6,4	2,6	≤ 0.05
The plank exercise (min, sec)	2.14,6±35,68	2.43,4±32,88	1,1	> 0,05
30-second endurance jump (times)	25,2±2,24	30,8±1,84	3,3	≤ 0.05
Control group				
Sit-ups from the prone position (times)	26,25±4,24	31,25±3,38	1,4	> 0,05
Squats for 1 minute (times)	44,25±1,75	46,75±1,86	1,4	> 0,05
Push-ups in the prone position (times)	17,75±7,63	24,0±6,50	0,9	> 0,05
Holding the body in the hang (sec)	28,25±10,25	33,75±8,25	0,7	> 0,05
The plank exercise (min, sec)	2.09,5±29,0	2.21,5±23,50	0,5	> 0,05
30-second endurance jump (times)	27,5±4,00	29,0±3,00	0,5	> 0,05

Table 7

Indicators of competitive fitness of young swimmers at the beginning of the experiment

Tests	Experimental group ($\bar{X}_1 \pm m_1$)	Control group ($\bar{X}_2 \pm m_2$)	T_{emp}	Reliability of differences (p)
Boys				
100 meters freestyle distance (min, sec.)	1.31,33±3,33	1.26,0±2,00	2,3	≤ 0,05
Girls				
100 meters freestyle distance (min, sec.)	1.40,±2,20	1.35,5±2,25	2,0	> 0,05

At the first stage of the research, the analysis of scientific and methodological literature was conducted, as well as preliminary testing of the level of physical fitness and the level of strength endurance was carried out.

At the second stage, complexes of circular training exercises were compiled, aimed at developing special endurance of swimmers:

- at the preliminary stage, we developed 2 sets of exercises, the basis of which was 25 golden universal Kifuta exercises [9];

- at the pre-competition stage, we decided to use more specialized means aimed at developing strength endurance;

- at the competitive stage of training, means aimed at developing strength endurance were also used.

The pedagogical experiment finished our research. The data were compiled from October 2020 to May 2021 based on the material of the real training process of two groups of initial training of the second year of training. The experimental group consisted of 6 boys and 5 girls, in the control group there were 7 boys and 4 girls.

To determine the effectiveness of using the circular training method for the development of special endurance of young swimmers, two groups (control and experimental) were compared. The control group was involved in the generally accepted program of training swimmers, and the experimental group according to the methodology developed by us.

The effectiveness of the suggested method was determined by the results of changes in the level of physical preparedness, the level of strength endurance and changes in sports results in the control and experimental groups.

The results of the study. The analysis of the results of the physical preparedness of the swimmers of the control and experimental groups at the beginning of the experiment (November 2020) revealed reliable differences only in the standing long jump where the control group was much stronger than their peers from the experimental group. In the remaining physical preparedness tests, the groups were homogeneous in composition (Table 1).

A comparison of the level of special strength endurance in the studied groups showed the absence of reliably significant differences in the performed tests (Tables 2).

During the training sessions, we used a set of exercises developed by us for the formation of special endurance of young swimmers by the method of circular training. At the end of the experiment (May 2021), we conducted a control test of physical preparedness indicators and tests to determine the level of special strength endurance of the study participants. The dynamics of the results of the testing of boys in both groups is presented in Table 3.

Statistical analysis of physical preparedness indicates higher growth rates of boys in the experimental group over the control group in endurance exercises (pull-up on

the crossbar and a 6-minute run). In these tests, a reliably significant change in parameters was achieved in the experimental group, at $p < 0,05$.

Let's consider the dynamics of the results of the testing of physical preparedness indicators of girls in both groups (Table 4). The analysis of the physical preparedness indicators of the girls showed a reliably significant increase in the experimental group in the pull-up on the crossbar from the prone position ($p \leq 0,01$) and 6-minute run ($p \leq 0,05$). In the control group, there was a positive dynamics of all indicators, but no reliably significant differences were revealed.

Also, at the end of the pedagogical experiment, the level of strength endurance was tested. The dynamics of the indicators of boys are presented in Table 5.

As a result of the statistical analysis of the indicators of the level of strength endurance of boys, we found that in the experimental group, reliably significant changes were observed in all tests. In push-ups in the prone position, squats for 1 minute and 30-second endurance jump, $p \leq 0,05$, in push-ups, the plank exercise and holding the body in the hang, the changes were even more significant ($p \leq 0,01$). Thus, we can conclude that the method we used contributed more to the development of strength endurance of the arms and torso than the legs. In the control group, positive dynamics was observed in all tests, but reliably significant differences with a probability of $< 0,05$ were only in the

Table 8

Dynamics of indicators of competitive activity in swimming 100 meters freestyle during the experiment

Tests	Experimental group ($\bar{X}_1 \pm m_1$)	Control group ($\bar{X}_2 \pm m_2$)	T_{emp}	Reliability of differences (p)
Boys				
100 meters (min, sec)	1.31,33±3,33	1.24,33±2,72	3,2	≤ 0,01
The first half of the distance (sec)	40,5±1,50	38,67±1,33	1,8	> 0,05
The second half of the distance (sec)	50,83±1,83	45,67±1,56	4,3	≤ 0,01
The second half of the distance (%)	55,56±0,30	54,12±0,43	5,8	≤ 0,01
100 meters (min, sec)	1.27,0±2,00	1.24,0±0,86	2,9	≤ 0,05
The first half of the distance (sec)	38,71±0,98	37,29±0,90	2,1	> 0,05
The second half of the distance (sec)	48,29±1,39	46,71±0,41	2,4	≤ 0,05
The second half of the distance (%)	55,5±0,59	55,7±0,47	0,5	> 0,05
Girls				
100 meters (min, sec)	1.38,2±3,76	1.25,0±2,4	1,2	> 0,05
The first half of the distance (sec)	44,0±1,6	43,2±1,44	0,6	> 0,05
The second half of the distance (sec)	56,2±1,04	51,8±1,04	5,0	≤ 0,01
The second half of the distance (%)	56,11±0,48	54,32±0,53	4,6	≤ 0,01
100 meters (min, sec)	1.35,5±2,25	1.39,75±1,75	2,4	> 0,05
The first half of the distance (sec)	42,75±1,13	40,0±1,00	2,7	≤ 0,05
The second half of the distance (sec)	52,75±1,13	50,75±1,13	1,8	> 0,05
The second half of the distance (%)	55,19±0,37	55,93±0,61	1,6	> 0,05

holding the body in the hang.

The dynamics of indicators of the level of strength endurance that occurred during the experiment in girls of the experimental and control groups are presented in Table 6.

Its analysis shows a positive dynamics in all indicators in both groups. However, no indicators with reliably significant changes were detected in the control group. On the contrary, in the experimental group, reliably significant differences were found in most indicators. With a probability of ≤0,05, the indicators of the tests changed: holding the body in the hang and 30-second endurance jump with a probability of ≤0,01, the indicators changed: Sit-ups from the prone position and squats for 1 minute.

The level of competitive preparedness of young swimmers of the experimental and control groups at the beginning of the experiment (November 2020) was estimated based on the results of swimming

at a distance of 100 meters freestyle (Tables 7).

At the beginning of the experiment, the boys of the control group showed reliably better results (≤ 0,05) at the competitive distance of 100 m freestyle. No reliable differences were found among the girls of the control and experimental groups, therefore, the studied groups were equivalent.

The dynamics of indicators of competitive activity in swimming 100 meters freestyle at the beginning and end of the experiment are presented in Table 8.

Conclusions. The analysis of competitive activity showed positive dynamics in both groups, in boys and girls. In boys, the change in the shown result was reliable; in the experimental group, the reliability was ≤ 0,01, in the control group – ≤ 0,05. It should be noted that the increase in the sports result in the experimental group was due to a decrease in the percentage of

the second half of the distance from 55,56±0.30 % to 54,12±0.43 %, with a reliability of ≤ 0,01.

In the control group, the result was improved due to a uniformly increased speed over the entire distance. The percentage ratio of the time of the first and second half of the distance does not have a reliably significant difference (>0,05) before the experiment and after it. It follows that the sports result was improved due to the development of special endurance.

In girls, the overall decrease in the time of passing the competitive distance was not reliably significant (in both groups, the reliability was >0,05). In the control group, the girls began to swim the first half of the distance faster (≤ 0,05), the time of passing the first half also improved in percentage terms. The second half has a negative dynamics from 55,19±0,37 % to 55,93±0,61%, the changes were not reliable (> 0,05). In the experimental group,

the sports result was improved in the second half of the distance (reliability $\leq 0,01$).

As a percentage, there were reliably significant changes ($\leq 0,01$) in the experimental group. For the second half of the distance, the girls of the experimental group

began to spend $54,32 \pm 0,53$ %, compared to $56,11 \pm 0,48$ %, before the experiment.

The effectiveness of the proposed method was confirmed by an increase in the results of the level of physical preparedness, including the improvement of swimming

the second half of the competitive distance in the experimental group by representatives of both sexes indicates the development of special endurance of young swimmers.

Conflict of interest. The authors declare that there is no conflict of interest.

References

1. Anpilogov, I. E., Vrublevskiy, E. P. (2011). The methodology of special speed and strength training of young sprinters based on the use of locally selective means of influence. *Theory and Practice of Physical Culture*. 4. 72 p. (in Russian).
2. Antonova, E. A. Vrublevskiy, E. P. (2015). The method of speed and strength training of jumpers on the acrobatic track of sports categories. *News of the Tula state university. Physical Culture. Sport*. 2. 37-41 pp. (in Russian).
3. Bulgakova, N. Zh. (2001). Selection and training of young swimmers. M.: Physical Culture and sport, 160 p. (in Russian).
4. Vaitsekhovskiy, S. M. (1976). Physical training of swimmers. M.: Physical Culture and sport. 152 p. (in Russian).
5. Golubev, G. Yu. (2000). Rationing of training workloads in the annual training of highly qualified swimmers: abstract. dis. ... cand. ped. sciences. 18. (in Russian).
6. Kostyuchenko, V. F., Vrublevskiy, E. P., Kozhedub, M. S. (2017). The method of individualized training of female athletes in a one-year cycle specializing in sprint running. *Scientific notes of the University P.F. Lesgaft*. № 10 (152). 115-121 pp. (in Russian).
7. Kostyukevich V.M., Vrublevskiy E.P., Wozniak T.V. (2017). Theoretical and methodical foundations of the control of the physical sport. Vinnitsa: Planer. 218 p. (in Ukrainian).
8. Logvina, T. Yu., Vrublevskiy E. P., Kostyuchenko, V. F. (2016). Organizational and methodical orientation of the process of preserving children's health by means of physical culture. *Scientific notes of the University P.F. Lesgaft*. 8 (138). 116-121 pp. (in Russian).
9. Lucero B. (2011). *Swimming: 100 Best Exercises* (translated from the English by T. Platonova). Moscow: Eksmo, 280 p. (in Russian).
10. Markova, I. A. Vrublevskiy, E. P., Sevdalev S. V. (2015). The fundamentals of the motor regime of primary school children. *Modern technologies of education of health culture of participants of the educational process: collection of mater. international scientific and practical conference - Lipetsk: LSPU*, 69-71 pp. (in Russian).
11. Maksimuk O.V., Vrublevskiy E.P., Lin Wang. (2014). Students' motivation to study Chinese recreational gymnastics classes wushu. *Physical education of students*, 18(3): 40-43. DOI: 10.6084/m9.figshare.974479 (in English).
12. Meylan, C., Cronin, J., Oliver, J., Hopkins, W., Pinder, S. (2014). Contribution of vertical strength and power to sprint performance in young male athletes. *International journal of sports medicine*, 35(09), 749-754 pp. (in English).
13. Misyura, A.A., Vrublevskiy, E.P. Albarkaayi D. (2019). Physical culture in the life of elementary school pupils. *Sportyvnyi Visnyk Prydniprovia*. 3. - S. 197-202 pp. (in English).
14. Misyura, A. A., Vrublevskiy, E. P. (2019). Assessment of the level of development of motor abilities of younger schoolchildren of extended-day groups. *Actual problems of physical culture and sports in the system of higher education: a collection of materials of the II international scientific and practical conference*. Omsk: Omsk State Agrarian University, 37-41 pp. (in Russian).
15. Narskin A. G., Melnikov S. V., Vrublevskiy E. P., Kostyuchenko V. F., Orekhov E. F. (2016) The efficiency of using the vital capacity of the lungs in swimmers of various specializations. *Scientific notes of the University P.F. Lesgaft*. № 2 (132). 135-139 pp. (in Russian).
16. Polishchuk, V.D. (2009). *The use of special and leading exercises in the training process of athletes*. Kiev: Olympic Literature, 144 p. (in Russian).
17. Sergienko L.P. (2013). *Sports selection: theory and practice: monograph*. M.: Soviet sport, 1048 p. (in Russian).
18. Skorina, A. A. Vrublevskiy, E. P. Vrublevskaya, L. G. (2015). Organization of training of young judoists taking into account the data of genetic analysis. *Science and sport: current trends*. 6. 1. 56-60 pp. (in Russian).
19. *Sports swimming: the way to success: in 2 books*. (2012). / edited by V. N. Platonov. - M.: Soviet Sport, Book 2 – 544. (in Russian).
20. Svetlakova, M. V., Petrushkina, N. P. (2019). Me-

- thodic approaches to teaching swimming to hard-of-hearing children. Optimization of the educational process in educational organizations of physical culture. XXIX regional scientific and methodic conference. 194-196 pp. (in Russian).
21. Shirkovets, E. A. Shustin B. N., Kvashuk P. V. (2018). The ratio of workloads of different directions and the adaptation of the body in the macrocycle of training highly qualified swimmers. Sports science bulletin. 3. 14–18 pp. (in Russian).
22. Vrublevskiy E. P., Kozmin R. K. (1983) To help the coach. Athletics. 12. 13. (in Russian).
23. Vrublevskiy E. P., Vrublevskaya L. G., Narskin G. I. (2010). The level of physical preparedness of schoolchildren living in various environmental conditions. Health for everyone. 2. 9-11. (in Russian).
24. Vrublevskiy E.P., Khorshid A.Kh., Albarkaii D.A. (2019). Focused strength and speed-strength trainings of sprinters. Theory and Practice of Physical Culture, 4, 3-5. (in English).
25. Vrublevskiy, E.P., Skrypko, A., Asienkiewicz, R. (2020). Individualization of selection and training of female athletes in speed-power athletics from the perspective of gender identity. Physical education of student, 4, 135-142 pp. (in English).
26. Yakovlev A.N., Vrublevskiy E.P., Stadnik V.I., Kravchenin A.A., Yakovleva M.A., Glushenko N.A. (2020). Youth physical education and sports: visions of future, problems and prospects. Theory and Practice of Physical Culture, 5, 57-59 pp. (in English).

Borovaya Valentina,

Educational Establishment «Francisk Skorina Gomel State University»
Gomel, Sovetskaya street, 104, 246019, Republic of Belarus
e-mail: va-borovaya@yandex.by
phone number +375(44)7264174

Sherenda Sergey,

Educational Establishment «Francisk Skorina Gomel State University»
Gomel, Sovetskaya street, 104, 246019, Republic of Belarus
e-mail: Sherenda@gsu.by
phone number +375(29)6679375

Molchanov Vitaliy,

Educational Establishment «Francisk Skorina Gomel State University»
Gomel, Sovetskaya street, 104, 246019, Republic of Belarus
e-mail: Molchvitaly@yandex.ru
phone number +375(44)7417604