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Information about the authors

Kravchuk T.M.

tatyana1409@gmail.com
<https://orcid.org/0000-0002-6370-4000>
H.S. Skovoroda Kharkiv National Pedagogical University
street Alchevskikh, 29, Kharkiv, 61002, Ukraine

Bybel S.A.

svetyli4ka2685@gmail.com
<https://orcid.org/0000-0001-6725-3908>
H.S. Skovoroda Kharkiv National Pedagogical University
street Alchevskikh, 29, Kharkiv, 61002, Ukraine

Slastina O.O.

slastinaelena8@gmail.com
<https://orcid.org/0000-0003-4001-5242>
Kharkov Trade and Economics institute
Otakara Yarosha Lane, 8, Kharkiv, Ukraine, 61000

Kovalenko A.I.

anastasiakov27@gmail.com
H.S. Skovoroda Kharkiv National Pedagogical University
street Alchevskikh, 29, Kharkiv, 61002, Ukraine

Інформація про авторів

Кравчук Т.М.

tatyana1409@gmail.com
<https://orcid.org/0000-0002-6370-4000>
Харківський національний педагогічний університет імені Г.С. Сковороди
вул. Алчевських, 29, м. Харків, 61002, Україна

Бибель С.А.

svetyli4ka2685@gmail.com
<https://orcid.org/0000-0001-6725-3908>
Харківський національний педагогічний університет імені Г.С. Сковороди
вул. Алчевських, 29, м. Харків, 61002, Україна

Сластина О.О.

svetyli4ka2685@gmail.com
<https://orcid.org/0000-0001-6725-3908>
Харківський торговельно-економічний інститут Київського національного торговельно-економічного університету
провулок Отакара Яроша, 8, Харків, Харківська область, 61000

Коваленко А.І.

anastasiakov27@gmail.com
Харківський національний педагогічний університет імені Г.С. Сковороди
вул. Алчевських, 29, м. Харків, 61002, Україна

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Influence of means of parterre gymnastics on physical fitness of young athletes in acrobatic rock and roll

Kravchuk T.M., Golenkova Yu.V., Sanzharova N.M., Katrechko I.B.

H.S. Skovoroda Kharkiv National Pedagogical University

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Abstract

The aim: to determine the effectiveness of the use of means of parterre gymnastics for physical training at the initial stage of long-term training in acrobatic rock and roll.

Material and methods. The study involved 28 children 6-7 years (14 girls and 14 boys) engaged in acrobatic rock and roll the first year. *Research methods:* Study and analysis of scientific-pedagogical and special-methodical literature; analysis of the curriculum for acrobatic rock and roll, rules and videos of competitions; interview of coaches; pedagogical experiment; pedagogical control tests (testing); methods of mathematical statistics.

Results. As a result of the study, a statistically significant positive effect of parterre gymnastics exercises on the level of development of individual physical abilities of young athletes was revealed. Introduction to the educational and training process of young athletes engaged in acrobatic rock 'n' roll plot complexes of parterre gymnastics for 3 months, contributed to a significant increase in performance: forward tilt, splits, lifting the torso in the air for 1 min. and lifting straight legs in the vise, as well as three somersaults forward (at $p < 0.05$).

Conclusions. Priority physical qualities necessary for effective training of young athletes in acrobatic rock and roll are revealed. Among them: flexibility, strength and coordination abilities. On the basis of the analysis of anatomical, physiological and psychological features of the development of children engaged in rock and roll at the initial stage of long-term training, the exercises of parterre gymnastics of a plot orientation are selected. Implemented in the initial training groups. High efficiency of use of means of orchestra gymnastics for development of mobility in hip joints, strength of muscles of a trunk and legs and coordination of movements at children of primary school age who are engaged in acrobatic rock-n-roll at the initial level is experimentally proved.

Keywords: outdoor games, cheerleading, primary school students, physical abilities, speed, agility, strength, ability to rhythmic activity.

Анотація

Кравчук Т.М., Голенкова Ю.В., Санжарова Н.М., Катречко І.Б. Вплив засобів партерної гімнастики на фізичну підготовленість юних спортсменів в акробатичному рок-н-ролі

Мета: визначити ефективність використання засобів партерної гімнастики для фізичної підготовки на початковому етапі багаторічного тренування в акробатичному рок-н-ролі.

Матеріал і методи. В дослідженні взяли участь 28 дітей 6-7 років (14 дівчат та 14 хлопчиків), що займалися акробатичним рок-н-ролом перший рік. *Методи дослідження:* вивчення й аналіз науково-педагогічної і спеціально-методичної літератури; аналіз навчальної програми з акробатичного рок-н-ролу, правил та відеозаписів змагань; опитування тренерів; педагогічний експеримент; педагогічні контрольні випробування (тестування); методи математичної статистики.

Результати. У результаті дослідження виявлено статистично вірогідний позитивний вплив вправ партерної гімнастики на рівень розвитку окремих фізичних здібностей юних спортсменів. Так, введення до навчально-тренувального процесу юних спортсменів, що займаються акробатичним рок-н-ролом сюжетних комплексів партерної гімнастики протягом 3 місяців сприяло значному зростанню показників тестів нахил вперед, шпагати, піднімання тулуба в сід за 1 хв. та піднімання прямих ніг у висі, а також три перекиди вперед (при $p < 0,05$).

Висновки. Виявлено пріоритетні фізичні здібності, необхідні для ефективною підготовки юних спортсменів у акробатичному рок-н-ролі, зокрема гнучкість, силові і координаційні здібності; На основі аналізу анатомо-фізіологічних і психологічних особливостей розвитку дітей, що займаються рок-н-ролом на початковому етапі багаторічного тренування, підібрано вправи партерної гімнастики сюжетної спрямованості. Впроваджено їх у групах початкової підготовки. Експериментально доведено високу ефективність використання засобів партерної гімнастики для розвитку рухливості у тазостегнових суглобах, сили м'язів тулуба і ніг, та координованості рухів у дітей молодшого шкільного віку, що займаються акробатичним рок-н-ролом на початковому рівні.

Ключові слова: партерна гімнастика, рок-н-рол, фізичні здібності, гнучкість, координованість, силові здібності, початковий етап

Анотация

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Результати. У результаті дослідження виявлено статистично вірогідний позитивний вплив вправ партерної гімнастики на рівень розвитку окремих фізичних здібностей юних спортсменів. Так, введення до навчально-тренувального процесу юних спортсменів, що займаються акробатичним рок-н-ролом сюжетних комплексів партерної гімнастики протягом 3 місяців сприяло значному зростанню показників тестів нахил вперед, шпагати, піднімання тулуба в сід за 1 хв. та піднімання прямих ніг у висі, а також три перекиди вперед (при $p < 0,05$).

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Introduction

Acrobatic rock and roll is a complex and coordinated sport that is constantly evolving and gaining more and more fans and those involved in Ukraine and the world. The beauty, dynamism and emotionality of this sport provide it with spectacle, but require athletes to develop a wide arsenal of abilities at the initial stage of long-term training.

According to the analysis of the special literature, the process of training athletes in acrobatic rock and roll at the initial stage of their sports careers has repeatedly been the subject of scientific research. The system of training process at the stage of initial training in acrobatic rock 'n' roll on the basis of experimental check of efficiency of application of complexes of target orientation on kinds of preparation and the analysis of structural components of training process [1] were subject to substantiation and detailed consideration.

There are works devoted to certain aspects of training young athletes in acrobatic rock 'n' roll, in particular, the peculiarities of the development of coordination skills in athletes of acrobatic rock 'n' roll aged 7-8 years [2]; methods and organizational forms of dance training of athletes (6-9 years) in acrobatic rock and roll [3]; improvement of technical training by determining the biomechanical characteristics of the performance of the main course kick in acrobatic rock 'n' roll [4]; features of choreographic training [5].

Some aspects of the organization of the educational and training process of qualified athletes in acrobatic rock 'n' roll were subject to research. In particular, the means and methods of special physical and technical training of athletes in this sport in the annual macrocycle were studied [6]; criteria for selection and prediction of sports improvement in acrobatic rock 'n' roll [7], means to increase the efficiency of the training process in acrobatic rock 'n' roll [8].

The study of a wide range of special-methodical literature also showed the presence of a curriculum in acrobatic rock 'n' roll approved by the Commission on Education of Pupils and Students of the Scientific and Methodological Council for Education of the Ministry of Education and Science of Ukraine (Minutes № 5 from 23.12.2010).) [9]; methodical recommendations on the organization and conduct of training sessions in dance sports [10], the manual "Acrobatic rock and roll" [11] and programs for studying acrobatic rock and roll in grades 1-4 of secondary schools [12].

However, despite the large number of works devoted to improving the training process at the stage of initial training in acrobatic rock 'n' roll, the use of

floor gymnastics as a means of effective training in this sport is still underdeveloped.

The aim: to determine the effectiveness of the use of floor gymnastics for physical training at the initial stage of long-term training in acrobatic rock and roll.

Objectives of the study:

- Based on the analysis of the curriculum in acrobatic rock 'n' roll, special methodological literature and a survey of coaches to identify the physical abilities necessary for the effective training of young athletes in this sport.

- Choose floor gymnastics exercises that can promote the development of these abilities in acrobatic rock 'n' roll and implement them in initial training groups.

- Experimentally test the effectiveness of the use of ground gymnastics in the process of physical training of athletes in acrobatic rock 'n' roll at the initial stage.

Material and methods

Participants

. The study involved 28 children aged 6-7 years (14 girls and 14 boys) who were engaged in acrobatic rock and roll in the first year. From them the control (n = 14) and experimental (n = 14) groups with the same number of girls and boys (n = 7) were formed. The research was conducted in the sports club of acrobatic rock and roll "Rock Stars" (Kharkov).

Research methods

The study and analysis of scientific and pedagogical and special methodological literature helped to determine the degree of research of the problem; analysis of the acrobatic rock 'n' roll curriculum, rules and video recordings of the competitions helped to identify the physical abilities needed to create a solid foundation for the technical training and further growth of young athletes in the sport; the survey of trainers made it possible to identify the tasks of physical training and the priority of using the means of developing physical abilities at the initial stage of long-term training; the pedagogical experiment was conducted in order to identify the impact of the proposed means of ground gymnastics on the development of physical abilities of young athletes; using the method of pedagogical control tests (testing), we identified the level of development of physical abilities of the subjects at



the beginning and end of the experiment, in particular:

- flexibility: leaning forward from a sitting position (cm), twine on the right leg (cm), twine on the left leg (cm) and transverse twine (cm);

- forces: flexion of extension of arms in an emphasis lying on a floor (number of times); lifting the torso to the side from a supine position for 1 minute (number of times) and lifting straight legs in the axis (number of times);

- ability to maintain balance: static - according to the method of Bondarevsky with open eyes (c); dynamic - time of 4 turns on the narrow side of the gymnastic bench (c);

- coordination of movements: time of performance of three forward throws (c);

- control of the sense of rhythm: rhythmic movements of the upper and lower extremities (number of cycles of movements for 20s.)

The technology of testing is presented in the work of LP Sergienko [13].

Statistical analysis

Methods of mathematical statistics were used to process the results of tests obtained during the study. Thus, for each indicator the arithmetic mean value, standard deviation (S) (standard deviation), coefficient of variation (V) and estimation of the probability of discrepancies between the parameters of the initial and final results by Student's t-test with the corresponding probability level (p) were determined.

Results

As a result of a survey of coaches in acrobatic rock 'n' roll (interviewed only 12 people) and analysis of previous research to determine the priority of the development of physical abilities in this sport [1, 14] it was determined that for successful competitive activities in acrobatic rock and roll role at the initial stage of training requires a uniform harmonious development of physical abilities such as flexibility, agility, strength and a large arsenal of coordination skills.

To optimize the development of these abilities, we have developed three sets of exercises for ground gymnastics. Parterre gymnastics, as a revolutionary technique in the field of choreography, was proposed in the middle of the 20th century by dancer, choreographer and teacher Boris Knyazev. Its essence is that the exercises of classical choreography were performed lying down or sitting on the floor. Ground floor gymnastics of Boris Knyazev was aimed at the development of elasticity

of ligaments, strengthening the muscles of the lower extremities, good posture, stability, good coordination of movements [15, 16].

In view of this, the exercises for the experiment were selected in such a way that gradually taught young athletes to control their bodies, from the toes to the fingers. Given the younger school age of the subjects, the complexes had a plot color and were combined under the name "birth of a butterfly".

Thus, the first set of "caterpillars" included exercises performed from a supine position and on the abdomen with straight as tense legs and arms. In particular, the complex included flexion of the toes, feet, lifting of the straight legs and torso by 30-45° alternately and simultaneously, from a supine position, lifting the pelvis with support on the shoulders and heels, tilting the torso forward from a sitting position; emphasis lying on the thighs bent, exercises in the emphasis lying on the forearms. Exercises were performed at different speeds in dynamic mode and with a delay of up to 8 counts

The second complex "doll" was also performed from a supine position, but most exercises were performed in a position or from a grouping position. Among the exercises of this complex are the following: grouping from a supine position to a sitting position and squatting, grouping from a supine position; roll in grouping both around the horizontal and around the vertical axis of the body, "basket", "frog" and roll over and back from different starting positions.

The third complex "butterfly" was performed from a supine position on the back, abdomen and side and included high-amplitude swings forward, sideways, backward, jerks with straight legs in straight and transverse twine; circles with straight legs.

The developed complexes were offered to young athletes who were part of the experimental group for 3 months from September to November 2018. Exercises were performed during the warm-up with the obligatory musical accompaniment, which included children's songs and classical music with a size of 4/4 or 2/4. Each month, the number of repetitions of exercises in the complexes increased by 4-8. From the very beginning of inclusion in employment exercises of complexes were repeated on 8-10 times depending on complexity and amplitude. A total of 39 classes were conducted using the developed complexes. 15 to 25 minutes were allotted directly to the complexes in the lesson. Athletes of the experimental group attended traditional classes aimed mainly at learning the technique of dance exercises.



Analysis of indicators of physical fitness in the studied control and experimental groups at the beginning of the experiment showed their homogeneity (Table 1-2). A study of selected indicators of physical fitness of young athletes at the end of the experiment showed their growth in both groups under the influence of training loads. However, statistical processing of the study results showed the probability of this growth only in the experimental group for individual indicators (Table 2).

In particular, the most statistically significant increase in the experimental group occurred in flexibility. Thus, the lean forward test index improved in girls by 45% and in boys by 41%; twine

on the right leg - 42% of girls and 38% of boys; twine on the left leg - 27% for girls and 32% for boys; transverse twine - for girls by 28%, boys by 26%.

Among the indicators of strength, statistically significant improvement in the experimental group were indicators: lifting the torso to the side for 1 min. 29% for girls and 26% for boys; raising straight legs at the waist for girls by 33%, boys - 28%. In our opinion, this growth is not accidental, as most of the exercises of ground choreography are aimed at strengthening the abdominal muscles, as important factors in forming the correct posture and foundation for mastering the elements of rock 'n' roll.

Table 1

Indicators of physical fitness of the studied control group before and after the experiment

Indicators of physical fitness	Gender	Before the experiment	After the experiment	t	p
Lean forward, cm	Boys	3,1 ± 0,55	4,4 ± 0,62	1,6	p>0,05
	Girls	4,1 ± 0,93	6,1 ± 0,86	1,6	p>0,05
Twine on the right leg, cm	Boys	18,3 ± 1,71	13,7 ± 1,65	1,9	p>0,05
	Girls	14,1 ± 1,64	10,0 ± 1,25	2,0	p>0,05
Twine on the left leg, cm	Boys	18,7 ± 1,81	14,9 ± 1,30	1,7	p>0,05
	Girls	15,0 ± 1,53	11,1 ± 1,04	2,1	p>0,05
Transverse twine, cm	Boys	17,7 ± 3,08	12,0 ± 2,68	1,4	p>0,05
	Girls	14,4 ± 3,26	10,3 ± 2,50	1,0	p>0,05
Flexion of the arm extension in the supine position, the number of times	Boys	7,6 ± 1,29	9,9 ± 1,19	1,3	p>0,05
	Girls	4,6 ± 1,37	6,4 ± 0,62	1,2	p>0,05
Lifting the torso to the side in 1 minute (number of times)	Boys	19,9 ± 1,91	25,3 ± 1,58	2,2	p>0,05
	Girls	18,1 ± 1,88	23,3 ± 2,17	1,8	p>0,05
Lifting straight legs in height, the number of times	Boys	17,0 ± 2,35	23,3 ± 2,14	2,0	p>0,05
	Girls	14,6 ± 2,83	21,3 ± 2,75	1,7	p>0,05
Static equilibrium with open eyes, s	Boys	13,7 ± 2,18	20,7 ± 2,50	2,1	p>0,05
	Girls	15,0 ± 3,33	19,9 ± 1,99	1,3	p>0,05
Dynamic equilibrium, s	Boys	17,2 ± 0,83	15,5 ± 0,55	1,7	p>0,05
	Girls	16,9 ± 0,88	14,9 ± 0,49	1,9	p>0,05
Three throws forward, s	Boys	9,8 ± 0,58	8,1 ± 0,39	2,3	p>0,05
	Girls	9,2 ± 0,39	8,2 ± 0,28	2,2	p>0,05
Rhythmic movements of the upper and lower extremities, number	Boys	7,9 ± 0,93	9,4 ± 0,81	1,3	p>0,05
	Girls	7,0 ± 0,82	8,9 ± 0,68	1,7	p>0,05

During the period of using ground gymnastics exercises in the subjects of the experimental group, although the indicators of static and dynamic equilibrium increased, but this increase, as in the control group was not probable. This can be explained by the fact that all the exercises of the proposed complex of ground gymnastics were performed in a supine and sitting position, which did

not have the necessary effect on the vestibular apparatus of the subjects.

Significant improvement in the experimental group, both boys and girls gained coordination of movements (three throws forward). Thus, for boys the time of this test improved by 20%, and for girls by 23%, which indicates a positive influence of ground gymnastics on the development and improvement of this coordination ability of young athletes in acrobatic rock and roll.



Table 2

Indicators of physical fitness of the studied experimental group before and after the experiment

Indicators of physical fitness	Gender	Before the experiment	After the experiment	t	p
Lean forward, cm	Boys	3,3 ± 0,45	5,6 ± 0,70	2,7	p<0,05
	Girls	3,9 ± 0,76	7,1 ± 1,14	2,4	p<0,05
Twine on the left leg, cm	Boys	17,6 ± 2,11	11,0 ± 1,83	2,4	p<0,05
	Girls	15,6 ± 2,09	9,1 ± 1,32	2,6	p<0,05
Twine on the left leg, cm	Boys	19,3 ± 1,31	14,6 ± 1,20	2,7	p<0,05
	Girls	16,3 ± 1,65	11,9 ± 0,72	2,5	p<0,05
Transverse twine, cm	Boys	17,6 ± 3,26	13,0 ± 2,60	1,1	p>0,05
	Girls	15,9 ± 2,98	11,4 ± 2,43	1,2	p>0,05
Push-up, the number of times	Boys	8,0 ± 1,25	10,3 ± 1,15	1,3	p>0,05
	Girls	4,1 ± 1,19	6,0 ± 0,62	1,4	p>0,05
Lifting the torso to the side in 1 minute (number of times)	Boys	20,3 ± 2,26	27,3 ± 1,90	2,4	p<0,05
	Girls	17,9 ± 1,99	25,0 ± 1,55	2,8	p<0,05
Lifting straight legs in height, the number of times	Boys	17,4 ± 2,21	24,1 ± 1,74	2,4	p<0,05
	Girls	15,9 ± 2,47	23,6 ± 2,08	2,4	p<0,05
Static equilibrium with open eyes, s	Boys	13,3 ± 2,96	20,4 ± 2,20	1,9	p>0,05
	Girls	14,0 ± 2,44	21,6 ± 2,36	2,2	p>0,05
Dynamic equilibrium, s	Boys	16,8 ± 0,87	15,4 ± 0,68	1,3	p>0,05
	Girls	16,2 ± 0,60	15,1 ± 0,50	1,4	p>0,05
Three throws forward, s	Boys	9,7 ± 0,46	8,1 ± 0,42	2,5	p<0,05
	Girls	8,9 ± 0,30	7,3 ± 0,49	2,8	p<0,05
Rhythmic movements of the upper and lower extremities, number	Boys	7,4 ± 0,74	9,0 ± 0,67	1,6	p>0,05
	Girls	6,7 ± 0,73	7,9 ± 0,80	1,1	p>0,05

Despite the fact that the indicator of the ability to rhythmic activity (rhythmic movements of the upper and lower extremities) improved significantly in both groups, the dynamics of its development did not show statistical probability.

Discussion

In any sport, a solid foundation for mastering the technique of exercises and further successful training and competitive activities is physical training. Therefore, we fully agree with the opinion of O. Kaluzhna (2010) on the importance and significance of this section of sports training in dance sports, which creates optimal conditions for the implementation of other sections of sports training [17].

We consider the opinion of a number of authors [1, 3, 14, 18, 19] to be correct, that the most favorable period for laying the foundations of almost all physical abilities is considered to be the younger school age. This is confirmed in the curriculum for acrobatic rock 'n' roll. The developers of this program

highlight the age anatomical and physiological characteristics of children who are engaged at the initial level and the methodological features that follow from this, in particular: the formation of correct posture; careful development of flexibility and strength abilities; creating an emotional background for classes; small amount of loads [9].

After analyzing our own coaching experience and the experience of other coaches described in scientific papers [14, 16, 17, 20], we found that in the practice of dance sports training and coaching are carried out by repeating specific compositions, ie actually competitive exercises, which reduces their quality assimilation and in the future can cause posture disorders and injuries.

In addition, the results of measuring the level of development of certain physical abilities of children of primary school age, who begin to engage in acrobatic rock 'n' roll, showed their low level. Thus, a comparative analysis of the obtained indicators of novice athletes and normative assessments of physical fitness of Ukrainian primary school students [21] revealed that at the beginning of



the study they were, at best, satisfactory on a five-point scale.

Fully supporting the authors on the high importance of physical training and its features in the initial stages of many years of training, we searched for effective means of developing flexibility, strength, coordination and other abilities. It turned out that a large number of scientists [5, 16, 22, 23, 24] suggest using choreographic exercises as a basis for learning the technique of dance exercises. The value of such exercises is undeniable, they are effective for the development of the necessary physical abilities, but the complexity and increased requirements for the musculoskeletal system do not make beginners want to perform them. It is quite different when it comes to ground floor choreography, in which exercises are performed in lying and sitting positions, which reduces the load on the musculoskeletal system of children.

Agreeing with the statement of the authors [10, 25, 26] that children of primary school age better absorb information if it has a plot color, we suggested that young athletes, when performing floor gymnastics exercises, compare them with different stages of butterfly birth. Initially, they learned to master low-amplitude movements of the legs and arms and the body as a whole, performing abduction and reduction, as well as flexion and extension, while imitating the caterpillar. Exercises in grouping and rolling in them and overturning imitated a cocoon or "doll", and high-amplitude dynamic movements of legs and arms in all directions should remind children of butterfly wings.

The introduction of parterre choreography complexes in the educational and training process of young athletes engaged in acrobatic rock 'n' roll has shown the high efficiency of their use. After three months, during which the developed complexes were introduced into the training of young rock and roll players, they improved their results to an excellent

level on a five-point scale of normative assessments of physical fitness of Ukrainian primary school students [21].

The results of the study also confirm the sexual characteristics of the development of certain physical abilities [13, 21]. Thus, in boys of the experimental and control groups, all indicators of flexibility were lower than in girls, and strength in boys, on the contrary, were higher. Regarding the indicators of static balance and coordination of movements, they were better in girls of both groups, both at the beginning and at the end of the experiment. And the dynamic balance and ability to rhythmic activity, according to the test of rhythmic movements of the upper and lower extremities, was better in boys of both groups.

Conclusions

1. The study and analysis of educational and methodological and special scientific literature and the survey of coaches revealed the priority physical abilities necessary for the effective training of young athletes in this sport, including flexibility, strength and coordination skills.

2. Based on the analysis of anatomical-physiological and psychological features of development of children engaged in rock 'n' roll at the initial stage of long-term training, ground floor gymnastics exercises are selected, aimed at developing the necessary physical abilities and introduced in initial training groups.

3. The high efficiency of the use of ground gymnastics for the development of mobility in the hip joints, the strength of the muscles of the torso and legs, and coordination of movements in primary school children engaged in acrobatic rock and roll at the elementary level has been experimentally proven.

Conflict of interest

Authors state that there is no conflict of interest.

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Information about the authors

Kravchuk T.M.

tatyana1409@gmail.com

<https://orcid.org/0000-0002-6370-4000>

H.S. Skovoroda Kharkiv National Pedagogical University

Alchevskikh street, 29, Kharkiv, 61002, Ukraine

Sanzharova N. M.

ninasanzarova@gmail.com

<https://orcid.org/0000-0003-0916-4100>

H.S. Skovoroda Kharkiv National Pedagogical University

Alchevskikh street, 29, Kharkiv, 61002, Ukraine

Golenkova Ju.V.

golenkovaulia@gmail.com

<https://orcid.org/0000-0003-1553-8893>

H.S. Skovoroda Kharkiv National Pedagogical University

Alchevskikh street, 29, Kharkiv, 61002, Ukraine

Katrechko I.B.

1986kib@gmail.com

H.S. Skovoroda Kharkiv National Pedagogical University

Alchevskikh street, 29, Kharkiv, 61002, Ukraine

Інформація про авторів

Кравчук Т.М.

tatyana1409@gmail.com

<https://orcid.org/0000-0002-6370-4000>

Харківський національний педагогічний університет імені Г.С. Сковороди

вул. Алчевських, 29, м. Харків, 61002, Україна

Санжарова Н.М.

ninasanzarova@gmail.com

<https://orcid.org/0000-0003-0916-4100>

Харківський національний педагогічний університет імені Г.С. Сковороди

вул. Алчевських, 29, м. Харків, 61002, Україна

Голенкова Ю.В.

golenkovaulia@gmail.com

<https://orcid.org/0000-0003-1553-8893>

Харківський національний педагогічний університет імені Г.С. Сковороди

вул. Алчевських, 29, м. Харків, 61002, Україна

Катречко І.Б.

1986kib@gmail.com

Харківський національний педагогічний університет імені Г.С. Сковороди

вул. Алчевських, 29, м. Харків, 61002, Україна

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