

**USE OF SPECIAL PREPARATORY EXERCISES FOR MASTERING THE  
BASIC ELEMENTS OF SPORTS ACROBATICS BY YOUNG ATHLETES 7-9  
YEARS OLD**

**Tetiana Chernykh<sup>1</sup>**

**Viacheslav Mulyk<sup>1</sup>**

**Tetiana Skaliy<sup>2</sup>**

**Daria Okun<sup>1</sup>**

*Kharkiv State Academy of Physical Culture<sup>1</sup>,*

*Kharkiv, Ukraine*

*Institute of Sports and Physical Education of the  
University of Economics<sup>2</sup>,*

*Bydgoszcz, Poland*

**Purpose:** to develop complexes of special preparatory exercises and determine the effectiveness of their use in mastering basic exercises for beginners acrobats.

**Material and methods:** research was carried out on the basis of the Complex Children's Sports School No. 6, Slobodsky District (Kharkov). The study involved 28 children 6-7 years old, engaged in sports acrobatics in sports and health groups. The control group (n=14) conducted the training process according to the CYSS program, experimental (n=14) with the use of special exercises for each basic element ("swallow", "standing on the shoulder blades", "birch", "forward roll", "cartwheel", "bridge stand"), in the preparatory part of the lesson. At the end of the annual training, control testing of the implementation of the basic elements of young acrobats of 6-7 years old of the studied groups was carried out, which was assessed by 5 experts according to a 10-point assessment of their implementation.

**Results:** in the process of using complexes of special exercises for each basic element of young acrobats 6-7 years old, reliably better assessment results were obtained in relation to the control group in performing exercises "swallow" ( $t=6,25$ ;  $p<0,001$ ), "standing on the shoulder blades" ( $t=7,89$ ;  $p<0,001$ ), "forward roll" ( $t=4,00$ ;  $p<0,001$ ), "cartwheel" ( $t=4,69$ ;  $p<0,001$ ) and "bridge stand" ( $t=4,33$ ;  $p<0,001$ ).

**Conclusions:** as a result of the research, it was found that the use of the developed complexes of special exercises for mastering the basic elements by young acrobats of 6-7 years old effectively influences the formation of the elements of the technique of basic exercises and psychophysiological indicators, ensures their implementation.

**Keywords:** young acrobats, basic elements of technique, correlation, muscle groups.

## **Introduction**

The main elements that must be mastered by novice acrobats are "swallow", "stand on the shoulder blades", "forward roll"; "cartwheel", "bridge stand", which in the future make up combinations of the competitive program of the III youth sports category [7; 9; 10].

The sequence of their assimilation assumes the beginning from simple to more complex. The main feature is that in order to perform each of these exercises, a sufficient level of development of motor qualities of individual muscle groups is required, which ensure their manifestation. [8; 9].

Our analysis of each of these exercises allowed us to determine the muscle groups and motor qualities necessary for their implementation. One of the simplest exercises is "swallow" (keeping balance on one leg), in the performance of which the following are mainly involved: rectus and oblique abdominal muscles, biceps muscles of the legs; calf muscles; gluteal muscles; deltoid muscles; trapezius and rhomboid muscles of the back. A stand on the shoulder blades ("birch") requires a more significant manifestation of the static strength of the muscle groups of the

abdomen, buttocks, thighs, shoulder girdle and latissimus dorsi. "Forward roll " more needs the manifestation of flexibility and dexterity, which leads to the interaction of the muscles of the back, press, neck muscles and joints, the actions of which they fix. When performing the "cartwheel", most of the muscle groups are involved, ensuring the manifestation of dexterity and resistance of the vestibular apparatus. The exercise "swallow" is associated with the manifestation of flexibility and dexterity with the fixation of muscle groups that provide stability in all joints, including the spinal trunk, and require flexibility and dexterity.

**Purpose of the study:** to develop complexes of special preparatory exercises and determine the effectiveness of their use in mastering basic exercises for beginners' acrobats.

### **Material and methods**

The research was carried out on the basis of the Complex Children's Sports School No. 6 of the Slobodsky District (Kharkov). The study involved 28 children 6-7 years old, engaged in sports acrobatics in sports and health-improving groups. The control group (n=14) conducted the training process according to the CYSS program, experimental (n=14) with the use of special exercises for each basic element ("swallow", "stand on the shoulder blades", "birch", "forward roll", "cartwheel", "bridge stand") in the preparatory part of the lesson. At the end of the summer training, control testing of the implementation of the basic elements of young acrobats of 6-7 years old of the studied groups was carried out, which was assessed by 5 experts by a 10-point assessment of their implementation.

### **Results of the research**

The muscles that provide the fulfillment of basic elements in young acrobats at the stage of initial training were determined, they made it possible to compose complexes of motor exercises for their further assimilation.

So, to establish balance on one leg ("swallow"), the following exercises were used: standing facing a gymnastic stand, swinging one leg back; balance, standing sideways to the gymnastic stand balance, independently keep from 3-4 s to 10-12 s; balance with closed eyes. At the same time, attention is drawn to the errors that arise:

when the body is tilted forward, the leg drops; the supporting leg is not fully extended; the back is not extended; hands down.

Special exercises for mastering the "forward roll" are: rolls forward and backward in a tuck, lying on your back while sitting in a tuck, roll back and again forward, pushing off with your hands at the head; bending your arms in a squat position and tilting your head until the back of your head touches the floor.

Errors when performing a forward roll that reduce the score are: support with hands is close to the feet; there is no accentuated kick off; insufficient grouping; wrong hand position; support by hands is carried out from behind when moving to the support squat.

To master the technique of performing the "cartwheel" element, exercises were used to facilitate their correct implementation: squats, jumps, stretching during the warm-up, handstand against the wall; side stand; turns 360 degrees; jumping from foot to foot in a standing triangle. At the same time, attention was paid to: relaxation when keeping the legs and arms; too slow motor action; legs at the end of the movement are not in line; strong back arch.

When performing a stand on the shoulder blades ("birch"), the following were used: head bends to the sides, forward and backward; push-ups in support lying on the floor; maximum forward bends of the body; squats until the hip is parallel to the floor.

The main mistakes when performing "standing on the shoulder blades" are: flexion in the hip joints; the body is deflected from the vertical plane; the shoulder blades are wide apart; support is carried out mainly on the neck; pressed chin to chest.

For the implementation of the full implementation of the exercise "bridge stand", special exercises were used: a bridge with an emphasis on the shoulders; "reverse bar"; entrance to the bridge from the gymnastic bench; "half-bridge stand"; entrance to the bridge with support along the wall.

While performing the "bridge stand" exercise as a whole, mistakes should be avoided, which may be: when bending the body back and accepting the "bridge

stand", the chairman is not sufficiently laid back; the legs are bent at the knee joints; the shoulders are offset from the points of support of the hands; arms and legs wide apart.

The specified basic motor actions include: maintaining a rational dynamic posture in the conditions of complex coordination movements; possession of the technique of static-dynamic balance and power movements (the task is solved by means of technical, special and special-motor training); possession of the technique of throwing movements and catching (the task is solved by means of technical and special-motor training); possession of unsupported rotation of varying complexity; possession of the technique of stable landing; possession of the technique of rational interaction of partners.

*Table 1*

**Psychophysiological indicators of young acrobats 6-7 years old under the influence of the use of special preparatory exercises during a one-year macrocycle**

№ i/o	Indicators	At the beginning $\bar{x} \pm m$ (n=14)	In the end $\bar{x} \pm m$ (n=14)	t	p
1.	Mental stability according to the Schulte test, c.u.	1,06±0,02	0,95±0,04	2,44	<0,05
2.	Number of errors according to the Bourdon test, c.u.	19,4±0,78	15,6±0,86	3,28	<0,001
3.	Concentration of attention according to the Bourdon test, c.u.	221,5±4,14	243,4±4,21	3,71	<0,001
4.	Switching attention according to the Bourdon test, cu	39,4±1,18	34,5±1,16	2,99	<0,001
5.	Indicator of switching attention according to Gorbov's test, red-black table, c.u.	148,5±3,15	133,1±3,11	3,48	<0,001
6.	Reaction time to light stimulus, average value, ms	346±5,12	328,6±5,06	1,99	>0,05
7.	Reaction time to a sound stimulus, average value, ms	581,5±8,15	542,3±8,04	3,44	<0,001
8.	Accuracy of reproduction of short periods of time, ms	988,7±10,11	902,1±10,15	6,06	<0,001
9.	Rufier index, c.u.	14,0±0,43	13,2±0,41	1,33	>0,05
10.	Romberg test, s	15,8±0,44	17,8±0,46	3,17	<0,001
11.	Selection response time, s	1,31±0,03	1,18±0,03	3,10	<0,001
12.	Yarotsky test, s	29,4±0,56	34,0±1,01	4,00	<0,001

Mastering the indicated motor actions is one of the most important criteria of technical readiness of acrobats [1]. During the implementation of the experimental

program, the indicators for most of the psychophysiological qualities of young acrobats of 6-7 years old have increased, which significantly affect the performance of basic exercises of young acrobats (Table 1).

The most significant ( $p < 0.001$ ) positive changes obtained in the tests: the number of errors according to the Bourdon test; concentration of attention according to the Bourdon test; indicator of switching attention according to Gorbov's test, red-black table; response time to a sound stimulus, average; error of reproduction of short periods of time; Romberg test; choice reaction time; test Yarotsky.

To a lesser extent ( $p < 0,05-0,01$ ) the indicators improved: mental stability according to the Schulte test; switching attention with the Bourdon test; reaction time to light stimulus, average; Ruffier index. It is important to realize about the formation of psychophysiological indicators under the influence of the use of special auxiliary exercises that contribute to the high-quality implementation of the basic elements of the technique at the stage of initial training. Thus, a correlation was established between individual elements of basic training using special exercises and psychophysiological indicators that are formed under their influence (Table 2).

The greatest influence on the formation of the physiological properties of the organism of young acrobats is the performance of the "swallow" exercise, during which the exercises presented at the beginning of the article are used.

The average level of correlation between the performance of the "swallow" exercise is traced with mental stability according to the Schulte test ( $r=0,51$ ), concentration of attention according to the Bourdon test ( $r=0,52$ ), switching attention with the Bourdon test ( $r=0,54$ ), indicator attention switching with Gorbov's test ( $r=0,52$ ), error in reproducing short periods of time ( $r=0,60$ ), Ruffier index ( $r=0,51$ ), Romberg's test ( $r=0,63$ ), Yarotsky's test ( $r=0,68$ ).

The use of exercises for the formation of a "stand on the shoulder blades" affects the increase in mental stability indicators according to the Schulte test ( $r=0,53$ ), concentration of attention according to the Bourdon test ( $r=0,51$ ), errors in reproduction of short periods of time ( $r=0,58$ ), Ruffier index ( $r=0,53$ ), Romberg's test ( $r=0,61$ ), Yarotsky's test ( $r=0,56$ ).

**Correlation matrix of basic initial exercises and psychophysiological indicators  
of young athletes 6-7 years old**

№ i/o	Exercises Indicators	«Swallow»	«Stand on the shoulder blades»	«Forward roll»	«Cartwheel»	«Bridge stand»
1.	Mental stability according to the Schulte test, c.u.	0,51	0,53	0,12	0,16	0,50
2.	Number of errors according to the Bourdon test, c.u.	0,15	0,17	0,48	0,21	0,26
3.	Concentration of attention according to the Bourdon test, c.u.	0,52	0,51	0,21	0,54	0,52
4.	Switching attention according to the Bourdon test, cu	0,54	0,27	0,58	0,52	0,36
5.	Indicator of switching attention according to Gorbov's test, red-black table, c.u.	0,52	0,21	0,56	0,54	0,40
6.	Reaction time to light stimulus, average value, ms	0,22	0,16	0,54	0,56	0,21
7.	Reaction time to a sound stimulus, average value, ms	0,19	0,18	0,53	0,54	0,22
8.	Accuracy of reproduction of short periods of time, ms	0,60	0,58	0,24	0,16	0,51
9.	Rufier index, c.u.	0,51	0,53	0,15	0,21	0,54
10.	Romberg test, s	0,63	0,61	0,24	0,17	0,51
11.	Selection response time, s	0,21	0,16	0,52	0,51	0,20
12.	Yarotsky test, s	0,68	0,56	0,40	0,52	0,56

The use of dynamic exercises for mastering the "forward roll" increases the level of indicators of attention switching according to the Bourdon test ( $r=0,58$ ) and Gorbov's test ( $r=0,56$ ), reaction time to light ( $r=0,54$ ) and to sound stimulus ( $r=0,53$ ) and choice ( $r=0,52$ ).

In turn, the exercises that are used to perform the "cartwheel" have a positive effect on concentration according to the Bourdon test ( $r=0,54$ ), attention switching with the Bourdon test ( $r=0,52$ ), the indicator of attention switching according to the Gorbov test ( $r=0,54$ ), reaction time to light stimulus ( $r=0,56$ ), sound stimulus ( $r=0,54$ ) and choice reaction time ( $r=0,51$ ), Yarotsky's test ( $r=0,52$ ).

The exercise "bridge stand", which is formed under the influence of the use of special exercises, has a positive effect on psychophysiological indicators: mental stability according to the Schulte test ( $r=0,50$ ), concentration of attention according to the Bourdon test ( $r=0,52$ ), errors in reproduction of short intervals time ( $r=0,51$ ), Ruffier index ( $r=0,54$ ), Romberg's test ( $r=0,51$ ) and Yarotsky's test ( $r=0,56$ ).

After the end of the one-year macrocycle, testing of the implementation of the basic elements of the primary training technique for young acrobats 6-7 years old was carried out.

Five judges of the first category were involved in the assessment, who carried out the assessment on a 10-point system, which is accepted in acrobatics. The results of the output and final results are presented in table 3.

*Table 3*

**The results of assessing the performance indicators of basic elements by young acrobats 6-7 years old during the annual macrocycle (according to a 10-point assessment) (n1=n2=14),  $\bar{x}\pm m$**

№ i/o	Exercises	At the beginning $\bar{x}\pm m$ (n=14)	In the end $\bar{x}\pm m$ (n=14)	Reliability assessment	
				t	p
1	«Swallow»	4,4 ±0,16	6,2±0,24	6,25	<0,001
2	«Stand on the shoulder blades»	3,6±0,18	5,1±0,23	7,89	<0,001
3	«Forward roll»	3,8±0,21	5,2±0,28	4,00	<0,001
4	«Cartwheel»	3,5±0,19	5,0±0,26	4,69	<0,001
5	«Bridge stand»	4,1±0,17	5,4±0,25	4,33	<0,001

Thus, in the process of using the complexes of preparatory exercises, the physical qualities necessary for the implementation of the basic elements of the technique have significantly increased. The average score for the “swallow” exercise increased by 1,8 points (t=6,25; p <0,001), for "standing on the shoulder blades" – by 1,5 points (t=7,89; p <0,001), "forward roll" – by 1,4 points (t=4,00; p <0,001), "cartwheel" – by 1,5 points (t=4,69; p <0,001), "bridge stand" – by 1,3 points (t=4,33; p<0,01).

The above indicates that the use of special exercises in accordance with each exercise allows you to improve the quality of the basic elements of acrobatics at the stage of initial training.

**Conclusions / Discussion**

Today there are several approaches to teaching individual elements of technology: start learning from simple to more complex elements [2, 4]; training



should be carried out at the beginning of the lesson [5; 6]; use special and underwater exercises, etc. [3].

At that time, along with the positive use of these and other techniques, in our opinion, it is advisable to approach the teaching of exercises more carefully, foreseeing the following: to determine at the expense of which muscle groups each exercise is performed; establish the motor potential that is necessary for their implementation; to develop a set of exercises to increase (normalize) the development of muscle groups, which ensure their implementation; only after that, master the basic elements, and in our case the basic elements of the entry-level acrobatics.

Our results indicate that the use of special exercises for each of the basic elements of the technique allowed us to increase the results in relation to young acrobats 6-7 years old in the control group in the performance of "swallows" ( $t=6,25$ ;  $p<0,001$ ), "standing on the shoulder blades" ( $t=7,89$ ;  $p<0,001$ ), "forward roll" ( $t=4,00$ ;  $p<0,001$ ), "cartwheel" ( $t=4,69$ ;  $p<0,001$ ) and "bridge stand" ( $t=4,33$ ;  $p<0,001$ ).

**Conflict of interests.** The authors declare that no conflict of interest.

**Financing sources.** This article didn't get the financial support from the state, public or commercial organization.

## **References**

1. Boloban, V. N. (2007), Metodika otbora detei dlia zaniatii akrobatikoi [Methods of selection of children for acrobatics]: navchalnii posibnik. Vinnitcia: Planer, 273 p. (in Russ.).
2. Volkov, L. V. (2002), Teoriia i metodika detskogo i iunosheskogo sporta [Theory and methodology of children's and youth sports]. Kiev : Olimpiiskaia literatura, 295 p. (in Russ.).
3. Issurin, V. B. (2016), Podgotovka sportsmenov XXI veka: nauchnye osnovy i postroenie trenirovki [Training of athletes of the XXI century: scientific foundations and construction of training]. Moskva: Sport, 464 p. (in Russ.).

4. Kalenskaia, G. A., Barbashov, S. V. (2017), "Theoretical substantiation of the programs of theoretical training of young acrobats", Vestnik Iugorskogo gosudarstvennogo universiteta, Vypusk 1 (44), pp. 105–112. (in Russ.).
5. Platonov, V. N., Sakhnovskii, K. P. (1988), Podgotovka iunogo sportmena [Training of a young athlete]. Kiev : Radianska shkola, 288 p. (in Russ.).
6. Platonov, V. N. (2017), Dvigatelnye kachestva i fizicheskaia podgotovka sportmenov [Motor qualities and physical training of athletes]. Kiev: Olimpiiskaia literatura, 656 p. (in Russ.).
7. Pomazan, A. A. (2011), "Motor characteristics of boys 4-6 years to determine the prospects for gymnastics", Pedagogika, psykholohiia ta medyko-biolohichni problemy fizychnoho vykhovannia i sportu. Vyp. 10, pp. 57-60. (in Ukr.).
8. Senytsia, A. I., Senytsia, M. M., Perederii, A. V. (2010), Sportyvna akrobatyka [Sports acrobatics]: navchalna prohrama dlia dytiacho-yunatskykh sportyvnykh shkil. Vinnytsia, 92 p. (in Ukr.).
9. Kharchenko, T. P., Mulyk, V. V. (2009), "Research of reliability and informativeness of tests for definition of static and dynamic balance at young figure skaters of 7-9 years", Slobozhanskyi naukovo-sportyvnyi visnyk. Vyp. 3. pp. 82-84. (in Ukr.).
10. Chernykh, T., Mulyk, V., Okun, D. (2019), "Study of the level of physical fitness of young acrobat athletes at the initial stage of training", Slobozhanskyi naukovo-sportyvnyi visnyk, No. 5(73), pp. 61-65, doi:10.15391/snsv.2019-5.010 (in Ukr.).
11. Taboada-Iglesias, Y., Abalo, R. (2018), Lesiones en los deportes acrobáticos gimnásticos y disciplinas afines. Trances, No. 10(1), pp. 21-44. (in Eng.).

Received: 18.11.2020.

Published: 21.12.2020.

### **Information about the Authors**

**Tetiana Chernykh:** graduate student of the Department of Olympic and Professional Sports; Kharkiv State Academy of Physical Culture: 61058, Kharkiv, st. Klochkivska, 99, Ukraine.

[orcid.org/0000-0003-0797-2059](https://orcid.org/0000-0003-0797-2059)

**E-mail:** [tchernish147@gmail.com](mailto:tchernish147@gmail.com)

**Viacheslav Mulyk:** Doctor of Sciences (Physical Education and Sports), Professor; Kharkiv State Academy of Physical Culture: 61058, Kharkiv, st. Klochkivska, 99, Ukraine.

[orcid.org/0000-0002-4441-1253](https://orcid.org/0000-0002-4441-1253)

**E-mail:** [mulyk.viacheslav@gmail.com](mailto:mulyk.viacheslav@gmail.com)

**Tetiana Skaliy:** PhD (Physical Education and Sport), Assistant Professor; Institute of Sports and Physical Education of the University of Economics in Bydgoszcz, Poland: University of Economy, Garbary 2 85-229 Bydgoszcz.

[orcid.org/0000-0002-6779-877X](https://orcid.org/0000-0002-6779-877X)

**E-mail:** [tatiana.skaliy@byd.pl](mailto:tatiana.skaliy@byd.pl)

**Daria Okun:** PhD (Physical Education and Sport); Kharkiv State Academy of Physical Culture, 61058, Kharkiv, st. Klochkivska, 99, Ukraine.

[orcid.org/0000-0002-0639-5846](https://orcid.org/0000-0002-0639-5846)

**E-mail:** [dariaokun@gmail.com](mailto:dariaokun@gmail.com)