Denisenko Vladislava. Special physical training of acrobats taking into account the requirements of the selected amploice (on the example of the bottom partners). Journal of Education, Health and Sport. 2020;10(4):262-271. eISSN 2391-8306. DOI http://dx.doi.org/10.12775/JEHS.2020.10.04.029
https://apcz.umk.pl/czasopisma/index.php/JEHS/article/view/JEHS.2020.10.04.029
https://zenodo.org/record/4016693

The journal has had 5 points in Ministry of Science and Higher Education parametric evaluation. § 8. 2) and § 12. 1. 2) 22.02.2019.

Received: 06.04.2020. Revised: 23.04.2020. Accepted: 30.04.2020.

SPECIAL PHYSICAL TRAINING OF ACROBATS TAKING INTO ACCOUNT THE REQUIREMENTS OF THE SELECTED AMPLOICE (ON THE EXAMPLE OF THE BOTTOM PARTNERS)

Vladislava Denisenko

National University of Physical Education and Sports of Ukraine, Kiev

Abstract

The article presents the results of introducing the program of special physical training of bottom acrobats into the training process, taking into account the requirements of the chosen position at the stage of preliminary basic training. The data obtained showed that the use of this program allows bottom acrobats to more successfully and qualitatively master the necessary skills of pair work, and also increases the response of partners as a system of bodies, which is confirmed by stabilographic studies.

Key words: stabilography; sports acrobatics; lower acrobats; special physical training of acrobats; workability of partners.

Constantly growing competition in the international arena puts forward new challenges in the training of athletes. One of the priorities is mastering international-class programs, as well as demonstrating the stability and reliability of their implementation in competition. All this becomes possible only if there is a rational technique of basic exercises, laid down at the earlier stages of preparation [2, 5]. However, the problem is complicated by a large number of narrow specializations in sports acrobatics [1, 4, 6]. It is the the bottom partner's ability to balance in pair exercises affects the accuracy of the movements, because his efforts are aimed at maintaining balance, they are much more effective than the efforts of

the top one. The bottom acrobat catches with his hands, and then bends them and squats, extinguishing the inertia of the body movement, while simultaneously balancing the top one due to extensors and working with the hands. Balancing the movements of the hands without shifting the bottom one indicates a high technique of performing exercises [3]. Therefore, when organizing the educational-training process, it is not always possible to correctly select and distribute the means and methods of acrobats training, taking into account the requirements of the chosen role. At present, the content of special physical and technical training does not fully meet the requirements of the chosen specialization, which in turn reduces the effectiveness of training. And as a result, the imperfect technique of work of bottom acrobats allows them to successfully compete in the program of the age group 11-16, sometimes 12-18 y.o., mainly due to a higher level of development of physical qualities, however, at later stages of training, such a system fails. The construction of the educational-training process, taking into account the requirements of the acrobats chosen amploice at the stage of preliminary basic training is the way out of this situation and it ultimately determines the relevance of the present research.

Hypothesis: we assumed that the introduction of special exercises with a partner into the training process, aimed at the developing of motor qualities, would allow bottom acrobats not only to improve the level of special physical and technical readiness, but also to increase the interaction of the body system when performing paired work.

The purpose of the research is to promote the coordination of partners' actions by means of special physical training, taking into account the requirements of the chosen amploice (for example, bottom acrobats).

To achieve this goal, we used the following research methods: analysis of scientific and methodological literature, pedagogical observation, testing, stabilography.

16 lower acrobats engaged at the stage of preliminary basic training were involved into research. They were divided into the main (MG, n=8) and control (CG, n=8) groups, as well as their top partners.

Pedagogical testing included:

• determination of the level of special physical readiness of bottom acrobats. For this we used tests on sports acrobatics curriculum for youth sports schools;

• determination of the bottom acrobats level of training, taking into account the requirements of the chosen amploice. For this, tests developed and proven by A. A. Reshetin were used [6].

The analysis of the technique of performing competitive exercises was carried out at competitions (championship of Ukraine, championship of Kiev). The mistakes made by the bottom partners, which led to reduction by judges of points for execution technique, were analyzed.

Stabilography included analysis of the speed of movement of the center of pressure of the feet (CPF) and the length of the stabilogram.

The results:

Based on the analysis of scientific and methodological literature and the results of pedagogical observation, as well as on the basis of the analysis of mistakes made by bottom acrobats in the process of competitive activity, we developed a training program for bottom acrobats, taking into account the requirements of the chosen amploice at the stage of preliminary basic training.

The purpose of the program is to master the technique of performing the functional duties of a bottom acrobat.

The program included the following tasks:

• to prepare the musculoskeletal system of bottom acrobats;

• to form a sufficient level of special physical fitness (SPF) of bottom acrobats, taking into account the requirements of the chosen amploice;

• to facilitate interaction between partners.

Within our program, we used the following means of special physical training of bottom acrobats, taking into account the requirements of the chosen amploice:

• means for "setting the legs" of the bottom partners in pair-group work;

• means for “setting the hand” of the bottom partners in pair-group work;

• means to increase the speed-strength abilities of the lower partners in pair-group work;

• means for "setting the back" of the lower partners in pair-group work;

• means for "balancing" the top partners in pair-group work.

Before the implementation of the program developed, we tested the level of special physical fitness of athletes. Its results showed that the athletes of the two groups do not have significant differences in the level of special physical fitness. The level of acrobats of both the main and control group can be assessed as "above average".

After the pedagogical experiment, repeated testing of the special physical training of acrobats was carried out. As a result, it was shown that the level of special physical training of bottom acrobats increased both in the main and control groups. The results of tests 3 and 7 in

the MG acrobats are significantly higher ($p < 0.05$) than in the CG. There is also a steady tendency to a more pronounced increase in leg strength in the MG acrobats compared to the control (Table 1).

Table 1

The level of special physical fitness of the bottom acrobats of the main (MG) and control (CG) groups after the experiment

N	Test SPT	Group	$\bar{x}$	S	P
Test 1	Raising legs, times	MG	14.67	2.58	
		CG	15.00	3.41	p>0.05
Test 2	Angle hold, sec	MG	15.00	2.58	p>0.05
		CG	15.00	0.0	
Test 3	Flexion-extension of the arms on the parallel bars	MG	18.67	1.51	p<0.05
		CG	14.33	2.16	
Test 4	Squats on one leg, times	MG	18.33	2.58	p>0.05
		CG	17.67	2.58	
Test 5	Running for 30 m	MG	5.92	0.56	p>0.05
		CG	5.88	0.61	
Test 6	Long jump from a place, mm	MG	178.5	11.9	p>0.05
		CG	177.67	12.18	
Test 7	Pull-ups, times	MG	15.33	0.82	p<0.05
		CG	11.00	O.1	

Interesting results were obtained when studying SPF of acrobats, taking into account the requirements of the chosen amploice. The MG athletes have a level of this readiness significantly ($p < 0.05$) higher than in the CG according to five criteria. According to two criteria, the indicators in the MG acrobats are higher than in the CG acrobats (Table 2), while the level of SPF in both groups does not fundamentally differ (Table 1).

Table 2

The level of special physical fitness of bottom acrobats, taking into account the chosen role

Tests	Groups	$\bar{x}$	S	P
Squats with a barbell on straight arms	MG	9.25	0.226	p <0.05
	CG	8.43	0.532	
Tossing the barbell with the subsequent catch	MG	9.08	0.133	p <0.0 5
	CG	7.77	0.753	
Fixing the working position for the throw	MG	9.07	0.288	p> 0.05
	CG	8.18	0.755	
Joint squatting of the bottom & top partners	MG	9.30	0.228	p <0.05
	CG	7.93	0.668	
Moving forward in a straight line with a partner on straight arms	MG	8.50	0.329	p <0.05
	CG	7.18	0.519	
Handstand with the bottom's on the bent arms of the top. Squats.	MG	8.88	0.293	p <0.05
	CG	7.57	0.383	
Balancing with a gymnastic stick	MG	6.00	2.098	p> 0.05
	CG	4.83	2.137	

To determine the effectiveness of the program developed, we studied the level of technical readiness of acrobats of both groups (Table 3). To do this, we analyzed the protocols of the competition, as well as the protocols of the experts (judges of the highest category), whose task was to carry out penalties for technical errors made by the bottom acrobats when performing pair work.

Table 3

Results of performance of competitive compositions

Referee's penalty	Groups	$\bar{x}$	S	P
Insufficient fixation of the static position	MG	0.15	0.164	p <0.05
	CG	0.40	0.245	
The displacement of the bottom, associated with the loss of balancing during the static fixation	MG	0.03	0.082	P <0.05
	CG	0.27	0.186	
Positions (dynamic posture) of the bottom during the static fixation	MG	0.07	0.082	p> 0.05
	CG	0.23	0.137	
Positions (dynamic posture) of the top during the static fixation	MG	0.05	0.084	P <0.05
	CG	0.15	0.105	
Low amplitude of the top's flight during dynamic exercise	MG	0.08	0.098	p <0.05
	CG	0.18	0.172	
Bottom's movements associated with the loss of balance during a throw in a dynamic exercise	MG	0.03	0.052	p <0.05
	CG	0.08	0.075	
Bottom's movements associated with the loss of balance during the catch in the dynamic exercise	MG	0.03	0.052	p> 0.05
	CG	0.07	0.082	

The values of the referee's penalties for the technique of performing pair work in the competitive composition among the MG acrobats are lower than in the CG. According to three criteria, the penalties in the MG are significantly ($p < 0.05$) lower than in the control, which, in our opinion, indicates the effectiveness of the program developed.

For an objective assessment of the coordination of the partners' actions, we used the stabilography method.

Sportsmen of both groups performed the following motor tasks:

• imitation by the bottom partner of the pyramid "stand in the hands of the bottom";

• execution of the bottom exercise "handstand";

• performing in pairs "handstand in the hands of the bottom".

Also, it should be noted that prior to the experiment, acrobats of both groups performed the pyramid "stand on the bottom's shoulders". At the same time, stabilographic indicators (the length of the stabilogram and the speed of movement of the feet centre) did not have significant differences between the groups ($p > 0.05$). This, in our opinion, indicates that the acrobats of both groups had the same level of body's system interaction.

The stabilographic indexes of the bottoms in both groups at performing imitation "stand in the hands of the bottom" are given in Table 4.

Table 4

Length and velocity of feet pressure centre movement of bottom acrobats in MG and CG at performing imitation pyramid "stand in the hands of the bottom"

	Main group, n=8	Control group, n=8
Stabilogram's length	6807.81 (4770.08;8512.73)	6900.33(4814.14;8480.60)
	p>0.05	
Velocity of feet pressure movement	170.2(119.25; 212.82)	172.51 (120.35;212.01)
	p>0.05	

The analysis of indicators revealed that when performing a simulating exercise, the level of maintaining static balance in acrobats of both groups does not differ statistically ($p > 0.05$). Also, no statistically significant differences were found between their top partners when performing a handstand (Table 5.).

Table 5

The length and velocity of the arms' center of pressure of the top acrobats stabilogram in the MG and CG when performing the "Handstand" element after the experiment

	Main group, n=8	Control group, n=8
Stabilogram's length	2014.57 (1981.35;2104.37)	1971.03 (1854.96;20999.50)
	p>0.05	
Velocity of hand centre pressure movement	197.1027(198.14;210.44)	197.10(201.87;209.95)
	p>0.05	

At the same time, the level of maintaining an upright posture in the acrobats' body system of the MG is significantly higher than in the control (Table 6.). This is confirmed by statistically significant differences ($p < 0.05$) of stabilographic indicators of acrobats of the main and control groups when performing the pyramid "handstand in the hands of the bottom acrobat".

Table 6

Length and speed of stabilogramm feet pressure centre movement in acrobats of MG and CG in pairs when performing the element "Handstand in the hands of the bottom one" after the experiment

	Main group, n=8	Control group, n=8
Stabilogram's length	1681.09 (1512.93; 1771.36)	1971.03 (1854.96;20999.50)
	p>0.05	
Velocity of feet centre pressure movement	197.1027(198.14;210.44)	197.10(201.87;209.95)
	p>0.05	

For greater clarity, Fig. 1 shows the stabilograms of movement of the support pressure center when acrobatic couples perform motor tasks after the pedagogical experiment.

As shown in Fig. 1, the trajectory of the center of foot pressure in the CG when performing the exercise with the top partners "handstand in the hands of bottom" is significantly larger than in the MG. Given that the indicators of the top acrobats of both groups when performing handstands on the stabilographic platform and the trajectory of moving the center of foot pressure by the bottom acrobats when performing the imitation (pyramid "stand in the hands of bottom") do not differ.

That is, we can assume that the indicator of the static-dynamic stability in pair N 1 of the main group is better than in the CG due to the work of the bottom acrobat and his ability

to balance and maintain the balance of the body system, which confirms the results of V.N. Boloban and A.V. Tishler [1, 7].

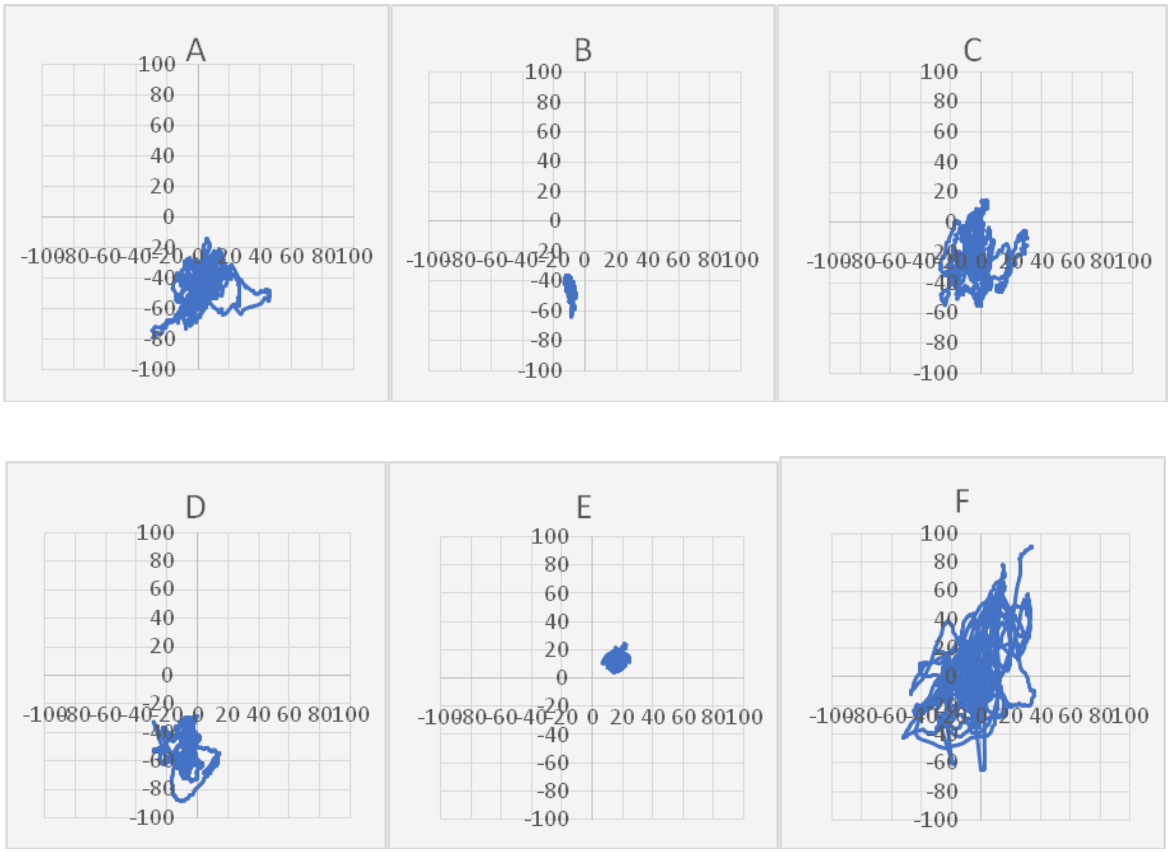

Fig. 1. Trajectory of movement of feet and hands center pressure during the performance of motor tasks by acrobats

A - the trajectory of the center of pressure of the hands of the top acrobat N 1 MG during the exercise "handstand";

B - trajectory of movement of the center of pressure of the foot acrobat N1 of the MG when performing an imitation of the pyramid "stand in the hands of the bottom";

C - trajectory of movement of the center of pressure of the feet of the bottom acrobat N 1 MG in para - top acrobat N1 MG when performing the exercise "handstand, in the hands of the bottom one";

D - trajectory of movement of the center of pressure of the hands of the top acrobat N 1 CG when performing the exercise "handstand";

E - trajectory of movement of the center of pressure of the feet of the bottom acrobat N 1 CG when performing the pyramid imitation "stand in the hands of the bottom";

F - trajectory of movement of the center of pressure of the feet of the lower acrobat N 1 CG paired with the top acrobat N 1 CG when performing the exercise "handstand, in the hands of the bottom one."

Conclusions:

Smaller indicators of the CPF trajectory length if the main group after the introduction of the training program under discussion for bottom acrobats in comparison with the same

indicators of the control group indicate an improvement in the static-dynamic stability of the MG athletes [1].

Analysis of displacements showed that the bottom acrobats of the main group decreased the total length of CPF trajectory compared with the control group. Also, it should be noted that the MG bottom acrobats managed to minimize the oscillations of the top ones. Since the stabilograms of the top partners showed a large trajectory length and speed of the CPF movement when performing a handstand independently.

The bottom acrobats of the main group were more successful in aligning with their tops. They moved their center of gravity at once to the center of gravity of the top ones and due to this, they needed to perform fewer leveling movements.

Also, the smallest sweep of their sagittal vibrations can be achieved by balancing with the hands, because it is these oscillations of the top partners the bottom ones learn to "suppress" by changing the inclination of the top ones, namely, tilt the haands at a certain angle, which also testifies to the effectiveness of the program developed.

References:

1. Boloban V. N. Sensorimotor coordination as the basis for technical training / V. N. Boloban // Science in Olympic sport, 2015. - № 2. - P.73 - 80.

2. Gaverdovsky Yu. K. Theory and methodology of artistic gymnastics. - M .: Soviet sport. - 2014. - Book. 1. - 2014. – 368 p.

3. Korkin V. P. Acrobatics. The canons of terminology / V. P. Korkin, V.I. Arakcheev. - M .: Physical culture and sport, 1989. —144 p.

4. Malinovskiy S. K Methods of improving the special physical training of acrobats at the stage of initial sports specialization: Dis. Cand. Ped. Sciences: 13.00.04 / Malinovsky S. K. - Khabarovsk, 2003. - 172 p.

5. Morozevich T. A. The method of basic elements as a basis for increasing the effectiveness of training acrobats / T. A. Morozevich // Mater. final scientific. conf. Faculty SPMVS BGAFK, 2002 - Minsk: BGAFK, 2003.

6. Reshetin A. A. Teaching throwing exercises in pair-group acrobatics at the stage of specialized training / A. A. Reshetin. // Scientific Notes of the University. P.F. Lesgaft. - 2008. - No. 11. - S. 77–80.

7. Tishler A. V. Improving the balancing function as a phenomenon of coordination of movements when performing exercises in paired acrobatics: Dis. Cand. Ped. Science / A. V. Tishler. - K., 1975 .- 111 p.