

RESULTS OF EXPERIMENTAL TESTING OF HEE GIRL STUDENTS' MOTOR SKILLS AT AEROBIC TRAININGS

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Abstract. *Purpose:* to analyze dynamic of motor skills' formation in girl students, who practice aerobic by experimental program. *Material:* in the research 40 girl students participated. Motor skills level was tested with the help of state and additional tests. *Results:* it was found that for training quickness it is necessary to use rope skipping in mode, corresponding to development of this quality. For training maximal strength it is purposeful to use more complex power exercises in ground part of the complex. *Conclusions:* implementation of rope skipping means in dance aerobic trainings increases training influence on practically all motor skills. Rope skipping permits to doze and regulate training load. The same under musical accompaniment develop sense of rhythm. In some modes such jumps facilitate training of speed power qualities and power endurance.

Key words: motor skills, aerobic, rope skipping, methodic, girl students, education.

Introduction

Training and perfection of students' motor skills in HEE is one of important and necessary component of discipline "Physical education". But recent years there have been observed weakening of students' motor skills, especially in girls [19, 21, 22].

Health related aerobic is a part of girl students' physical education practically in all HEEs. Interest to aerobics is conditioned by its high effectiveness, accessibility, bright emotional character and attractiveness [3, 20, 23].

Modern specialists worked out different approaches to development of motor skills at health related aerobic trainings. Methodic of motor skills' training on the base of graphic analytic models and bio-mechanical motor skills' indicators has been implemented [13]. Module technology of motor coordination training has also been implemented [16], and it permits to individualize training process on the base of girl students' potentials. Effectiveness of rhythm qualities simulation of girl students, who train health related aerobic has been experimentally substantiated [4].

Application of attractive kinds of training, considering girl students' individual features, is of the same importance for physical qualities' training [6–8, 10]. Specialists recommend not to limited to only one kind of aerobic. It is possible to vary them periodically [5]. Our attention was attracted by rope skipping aerobic. Specialists say that rope skipping is one of the best trainings by covering of muscular system and by its variety [9, 17]. The first rope skipping program was worked out by K. Cooper [5]. N.M. Amosov and I.V. Muravov think that it can not ensure versatile training of youth [1]. Analysis of scientific-methodic literature witnesses about absence of reliable aerobic rope skipping methodic for training of HEE girl students' motor skills. In this aspect the urgency of the topic of our research is rather evident.

Purpose, tasks of the work, material and methods

The purpose of the article is to analyze dynamic of motor skills' formation in girl students, who practice aerobic by experimental program and prove effectiveness of this program.

The methods and organization of the research: the research was conducted on the base of East-Ukrainian National university, named after Vladimir Dal. In experiment 40 girl students, who practice health related aerobic, participated. They were divided into two groups: experimental (EG) – 20 girls and control (CG) – 20 girls. CG girl students were trained by traditional program; EG girl students – by experimental methodic.

Level of motor skills was tested with state tests, envisaged by academic program for discipline "Physical education in HEE" and with additional tests.

Results of the researches

For training of girl students' motor skills at aerobic classes we offered experimental methodic. In dance aerobic program we introduced rope skipping. Such approach stipulates strengthening of aerobic influence on girl students' motor skills. For the period of experiment in both groups we registered confident improvement of results by all tested indicators (see table 1).

At the end of experiment we registered confident improvement of test results "2000meters' run" in EG – 11.03 ± 0.62 min ($p < 0.001$). It was 8.24% of increment in comparison with initial indicators. In CG we did not register any significant changes – 11.77 ± 0.52 min ($p < 0.001$), increment was 1.92%. Analysis of test "Long jump from the spot" showed significant difference in final CG indicators (1.69 ± 0.07 m) and in EG (1.77 ± 0.11 m) at level $p < 0.05$. Increment of CG results was 0.01 m ($p < 0.001$), and in EG – 0.11 m ($p < 0.001$). Increment of results in test "High jump from the spot" was in EG – 12.74% and in CG there were no significant changes (2.48%). Final result was, accordingly, the following: 38.05 ± 2.11 cm ($p < 0.001$) and 35.10 ± 2.20 cm ($p < 0.001$).

As we can see, in test "Torso risings in sitting position from lying position during 1 minute) confident increment of results was in both groups ($p < 0.001$). But in EG rate of increment was higher – 21.61%. It was very good result. In CG increment rate was only 4.31%. In test "100 meters' run" there were significant differences ($p < 0.001$) in both groups (EG – 17.09 ± 0.59 (2.57%), CG – 17.30 ± 0.67 (1.31%). Differences between final values between two groups were not significant ($p > 0.05$). In test "Shuttle run 4x9 m" we registered significant increment of indicators in EG – 6%. At the end of experiment result was 10.81 ± 0.35 sec. ($p < 0.001$). Control group indicators nearly did not change: 0.26%, $11.40 \pm$

0.48 sec. ($p < 0.001$). Increment of test "Pressing ups from the floor" did not have significant differences ($p > 0.05$) between EG (18.20 ± 7.06) and CG (15.55 ± 7.07). In test "Forward torso bending in sitting position" we registered confident changes in EG – 18.50 ± 3.79 cm, CG – 15.60 ± 4.65 cm ($p < 0.05$). Increment rates were accordingly: EG – 31.21%, CG – 12.23%.

To receive more information about effectiveness of experimental methodic we used additional tests (see table 2).

Changes in test "Rope skipping during 30 sec." were confident in every group and between groups ($p < 0.001$). At the end of experiment in EG (73.35 ± 3.56) there was much better result than CG 59.45 ± 6.92). Percentage of increment rates was in EG – 34.71% and in – 7.6%. Analysis of "Romberg's test" showed that EG girl students' balance indicators increased up to 13.35 ± 3.07 ($p < 0.001$). In CG they increased only to 6.45 ± 2.54 ($p < 0.001$). The registered differences were statistically confident at level $p < 0.001$.

Test "Integral coordination indicators" (ICI) [2] showed significant difference between results of both groups at level $p < 0.001$. Increment rate of ICI in EG was 84.32%. It witnesses about high level of jump coordination (0.72 ± 0.09 , $p < 0.001$). CG girl students improved their results by 15% (0.46 ± 0.07 , $p < 0.001$). We observed confident positive changes in rhythm of basic steps [7] ($p < 0.001$). In EG improvement of results was by 35.27% (14.00 ± 0.92 points), in CG – by 19.25% (12.7 ± 1.08 points). Differences between groups also were of significance $p < 0.001$. Increment rates of jump rhythm in EG were 40.3% (4.70 ± 0.47 points), and in CG – 20% (4.20 ± 0.52 points) ($p < 0.001$). The detected differences between EG and CG girl students in tapping test were statistically different at level $p < 0.01$ (right hand) and $p < 0.05$ (left hand). For example in EG increment rates were: right hand – 8.45% (214.25 ± 11.03 quantity of points), left hand – 5.88% (198.00 ± 10.73 quantity of points). In CG they were accordingly 3.04% (203.157 ± 7.08 quantity of points) and 2.36% (191.00 ± 6.27 quantity of points).

Discussion

The conducted by us research expands the data about development of HEE girl students' motor skills. The research confirms the conclusions of specialists that aerobics permit to vary methodic depending on its purpose [15]. Application of various aerobic programs permits to obtain maximal use for minimal time [5].

In process of our work on the set problem we worked out and experimentally tested application of rope skipping in dance aerobic.

Analysis of scientific methodic literature witnesses that rope skipping permits to doze and regulate training load. As it is noted by scientists rope skipping is a men of training of general endurance [18]. Rope skipping under music accompaniment develops rhythm sense [14]. In certain modes of load they facilitate training of speed power and power endurance [11, 12].

Results of our research confirm it.

Conclusions

Thus, the received data witness about effectiveness of rope skipping implementation in dance aerobic trainings. Such approach increases training influence on practically all motor skills. For training quickness (in our opinion) it is necessary to use specialized exercises from light athletic or use rope skipping in mode, corresponding to development of this quality. We think to be purposeful to use more complex power exercises in ground part of the complex for development of maximal strength.

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Conflict of interests

The author declares that there is no conflict of interests.

Table 1. Dynamic of CG and EG girl students' motor skills progress by state tests

№	Tests	Period of testing	Statistic indicators					
			Control group			Experimental group		
			n=20	σ	X	n=20	σ	X
1.	100 m run, sec.	beginning	17,53		17,54			
		end	17,30		17,09			
		t	7,452	0,77	14,673	0,63	-0,022	
		p	p3<0,001	0,67	p4<0,001	0,59	1,049	
		increment of results increment, % beginning end t p	0,23 1,31 12,00 11,77 6,920 p3<0,001 0,23 1,92		0,45 2,57 12,02 11,03 66,359 p4<0,001 0,99 8,24		p1>0,05 p2>0,05	
2.	2000 m run, min., sec	beginning	17,53		17,54			
		end	17,30		17,09			
		t	7,452	0,77	14,673	0,63	-0,022	
		p	p3<0,001	0,67	p4<0,001	0,59	1,049	
		increment of results increment, % beginning end t p	0,23 1,31 12,00 11,77 6,920 p3<0,001 0,23 1,92		0,45 2,57 12,02 11,03 66,359 p4<0,001 0,99 8,24		p1>0,05 p2>0,05	
3.	Flexibility, cm	beginning	17,53		17,54			
		end	17,30		17,09			
		t	7,452	0,77	14,673	0,63	-0,022	
		p	p3<0,001	0,67	p4<0,001	0,59	1,049	
		increment of results increment, % beginning end t p	0,23 1,31 12,00 11,77 6,920 p3<0,001 0,23 1,92		0,45 2,57 12,02 11,03 66,359 p4<0,001 0,99 8,24		p1>0,05 p2>0,05	
4.	Torso rising in sitting position during 1 minute, times	beginning	17,53		17,54			
		end	17,30		17,09			
		t	7,452	0,77	14,673	0,63	-0,022	
		p	p3<0,001	0,67	p4<0,001	0,59	1,049	
		increment of results increment, % beginning end t p	0,23 1,31 12,00 11,77 6,920 p3<0,001 0,23 1,92		0,45 2,57 12,02 11,03 66,359 p4<0,001 0,99 8,24		p1>0,05 p2>0,05	
5.	Pressing ups on the floor, times	beginning	17,53		17,54			
		end	17,30		17,09			
		t	7,452	0,77	14,673	0,63	-0,022	
		p	p3<0,001	0,67	p4<0,001	0,59	1,049	
		increment of results increment, % beginning end t p	0,23 1,31 12,00 11,77 6,920 p3<0,001 0,23 1,92		0,45 2,57 12,02 11,03 66,359 p4<0,001 0,99 8,24		p1>0,05 p2>0,05	

6.	Shuttle run 4x9 m, sec.	beginning	11,43		11,5				
		end	11,40		10,81				
		t	1,045		20,673				
		p	p3>0,05	0,50	p4<0,001	0,37	0,538	p1>0,05	
		increment of results	0,03	0,48	0,69	0,35	-4,471	p2<0,001	
7.	Long jump from the spot, m	increment, %	0,26		6				
		прирост, %							
		beginning	1,68		1,66				
		end	1,69		1,77				
		t	-4,239	0,08	-27,341	0,13	0,651	p1>0,05	
8.	High jump from the spot, cm	p	p3<0,001	0,07	p4<0,001	0,11	-2,451	p1<0,05	
		increment of results	-0,01		-0,11				
		increment, %	0,60		6,63				
		beginning	34,25		33,75				
		end	35,10		38,05				
		t	-5,101	2,55	-15,253	2,15	0,670	p1>0,05	
		p	p3<0,001	2,20	p4<0,001	2,11	-4,325	p2<0,001	
		increment of results	-0,85		-4,3				
		increment, %	2,48		12,74				

Notes: p1 – confidence of differences of initial values

p2 - confidence of differences of final values

p3 – confidence of EG indicators' increment

p4 - confidence of CG indicators' increment

Table 2. Dynamic of CG and EG girl students' motor skills progress by additional tests

№	Tests	Period of testing	Statistic indicators							t	P
			Control group		Experimental group						
			n=20		n=20						
			X	σ	X		σ				
1.	Rope skipping, <i>times</i>	beginning end t p increment of results increment, %	55,25 59,45 -4,526 P3<0,001 -4.2 7.6	8,22 6,92	54,45 73,35 -26,465 P4<0,001 -18.9 34.71	5,34 3,56		0,365 -7,992	P1>0,05 P2<0,001		
2.	Romberg's test, <i>sec.</i>	beginning end t p increment of results increment, %	5,30 6,45 -5,510 P3<0,001 -1.15 21.7	2,60 2,54	5,55 13,35 -25,6 P4<0,001 -7.8 140.54	1,99 3,07		-0,342 -7,746	P1>0,05 P2<0,001		
3.	Integral coordination indicator, <i>m/sec.</i>	beginning end t p increment of results increment, %	0,40 0,46 -7,973 P3<0,001 -0.06 15	0,06 0,07	0,39 0,72 -14,308 P4<0,001 -0.33 84.62	0,09 0,09		0,219 -10,421	P1>0,05 P2<0,001		
4.	Rhythm of basic steps, <i>points</i>	beginning end t p increment of results increment, %	10,65 12,7 -7,183 P3<0,001 -2.05 19.25	1,18 1,08	10,35 14,00 -17,490 P4<0,001 -3.65 35.27	1,35 0,92		0,748 -4,100	P1>0,05 P2<0,001		
5.	Rhythm, of jumps, <i>points</i>	beginning end t p increment of results increment, %	3,50 4,20 -6,658 P3<0,001 -0.7 20	0,51 0,52	3,35 4,70 -12,337 P4<0,001 -1.35 40.3	0,49 0,47		0,946 -3,179	P1>0,05 P2<0,01		

6.	Tapping test – right hand, <i>quantity of points</i>	beginning end t p increment of results increment, % прирост, %	197,15 203,15 -14,184 P3<0,001 -6 3.04	8,27 7,08	197,55 214,25 -14,644 P4<0,001 -16.7 8.45	13,25 11,03	-0,115 -3,788	P1>0,05 P2<0,01
7.	Tapping test –left hand, <i>quantity of points</i>	beginning end t p increment of results increment, %	186,60 191,00 -14,184 P3<0,001 -4.4 2.36	6,89 6,27	187,00 198,00 -34,785 P4<0,001 -11 5.88	10,96 10,73	-0,138 -2,519	P1>0,05 P2<0,05

Notes:

P1 – confidence of differences of initial values
P2 - confidence of differences of final values
P3 – confidence of EG indicators' increment
P4 - confidence of CG indicators' increment

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