

UDC 37.037-057.874:793.34

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## Change in the level of strength and endurance development of 5-6 grades pupils under cheerleading exercises influence

**Abstract. Purpose:** determine the degree of change in the level of strength and endurance development of 5-6 grades pupils under cheerleading exercises influence. **Material and Methods:** theoretical analysis and generalization of scientific and methodical literature, pedagogical testing, pedagogical experiment and mathematical statistics methods. **Results:** parameters of strength and endurance development level are presented with their degree of change under cheerleading exercises influence for 5-6 grades pupils of secondary school. **Conclusions:** cheerleading exercises usage has positive influence on demonstrated strength and endurance degree of secondary school children by all investigated parameters.

**Keywords:** strength, endurance, cheerleading, pupils of secondary school.

**Introduction.** Now one of the main priorities of the state is the increase of the general level of health of the nation, and first of younger generation [3; 5; 6; 10]. In this regard the priority task facing physical culture is the search of effective ways of a complex impact on physical development, strengthening of health, motivational and emotional sphere, etc. According to scientific data, physical culture has a positive impact on the formation at children of steady interest in classes by physical exercises owing to what there is an increase of a level of the development of physical qualities [4; 7; 11; 12].

It is of particular importance in physical training of pupils of middle classes as during this age period there is the development and formation of all main morphological and functional structures, and also the motive "foundation" is laid causing the labor potential of the population of the country.

A number of authors dealt with issues of optimization of the process of physical training in middle classes due to a change or an addition of the maintenance of lessons of physical culture at school: K. V. Lukyanova, 2012; T. M. Bala, I. P. Maslyak, 2014; I. A. Kuzmenko, 2015, etc. It should be noted that these works concerned, as a rule, the influence of various means and methods on a level of the development of separate motive abilities, physical development, level of physical fitness, etc.

Summarizing the aforesaid, it should be noted the lack of the scientific works concerning a question of the influence of exercises of cheerleading on a level of the development of separate motive abilities such as force and endurance of children of middle school age. Thus cheerleading for Ukraine is a new, "young" sport which popularity promptly grows among the studying youth. According to T. M. Bala, I. P. Maslyak, cheerleading is characterized by staginess, multidirectional influence, opportunity to include a wide age range in classes and at the same time doesn't demand considerable material inputs [2]. Thus, this scientific work is timely and actual.

**Communication of the work with scientific programs, plans, subjects.** The research was conducted according to the Consolidating plan of RW in the sphere of physical culture and sport for 2006-2010 of the Ministry of Ukraine for family, youth and sport in the direction 3.1 "Improvement of the process of physical training of pupils in educational institutions" on a subject No. 3.1.4 "Improvement of the process of physical training of pupils in educational institutions of a different profile" (number of the state registration is 0106U011983) and to the thematic plan for 2011-2015. Ministries of education, sciences of youth and sport of Ukraine in the direction 3. "Theoretic-methodological and technological bases of physical training and sport for all" on a subject No. 3.1 "Improvement programmatically-standard principles of physical training in educational institutions" (number of the state registration is 0111U001733).

**The objective of the research:** to determine an extent of change of a level of the development of force and endurance of pupils of the 5-6th classes under the influence of classes by cheerleading.

**Material and methods of the research.** Such methods, as theoretical analysis and generalization of scientific and methodical literature, pedagogical testing, pedagogical experiment and methods of mathematical statistics were used in the research.

The tests were used for the definition of a level of the development of force and endurance of pupils of the 5-6th classes which are presented by L. P. Sergiyenko [14; 15] and V. A. Romanenko [13], namely: pulling up on a high crossbeam (boys), a low crossbeam (girls) (number of times); raising of a trunk in a set from a starting position lying on a back (number of times); three jumps on one foot with an advance forward (m); uniform running on a place with intensity of 70% from maximum by the technique of B. V. Sermejev, V. A. Shekurov (s).

The researches were conducted on the basis of the comprehensive school No. 119 of Kharkov for 2010-2011 academic years. 103 pupils of the 5-6th classes from whom were took part in them two experimental and two control groups are made. All children who were taking part in the experiment were almost healthy and were under supervision of a school doctor.

During the research pupils of the control groups were engaged only according to the standard program for general education educational institutions "Physical culture. 5-9 classes", and the educational process on physical training of school students of the experimental groups was added with the variable module "Cheerleading" developed by us which included such elements as: high V, low V, T motion, half T, muscle man, touchdown, tuck, spread eagle, double hook, thigh stand, saddle lift, suspended split, etc. [2]. The specially picked up exercises of cheerleading made the maintenance of lessons of the module "Cheerleading", and also joined in the preparatory part of a lesson of other variable modules, in the system of organized changes and were given in the form of homeworks.

**Results of the research and their discussion.** Considering the primary data, the lack of reliable distinctions is

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revealed in indicators of pupils of the control and the experimental groups on all studied parameters ( $p > 0,05$ ).

Analyzing the data reflecting a level of the development of force and endurance, in general, the reliable improvement of results as at pupils of the control, and the experimental groups is revealed with the age ( $p < 0,05 - 0,001$ ). Exceptions make results of performance of pulling up in hanging boys of control and experimental groups and in hanging lying girls of control groups where age differences of indicators have doubtful character ( $p > 0,05$ ).

Investigating results on a gender sign, the prevalence of indicators of boys over data of girls is revealed. Thus distinctions have a reliable character only by results of the performance of raising of a trunk in a set and running on the spot with intensity of 70% from maximum ( $p < 0,01; 0,001$ ).

Comparing results of the performance of raising of a trunk in a set to the norms presented to L. P. Sergiyenko [15] it is revealed that results of girls of the 5th classes correspond to an assessment 1 point, boys of the 5th classes – 2 points, pupils of the 6th classes correspond to an assessment 3 points.

When comparing results of the performance of pulling up in hanging with standard estimates it is revealed that indicators of boys of the 5-6th classes correspond to an assessment 1 point, girls of the 5-6th classes answer an assessment of 5 points.

Comparing results of the performance of three jumps to advance with the norms presented to V. A. Romanenko [13] it is revealed forward that they correspond to an assessment 3 points, both at boys, and at girls of the studied groups.

When comparing results of the performance of running on the spot with intensity of 70% from maximum with the norms presented to L. P. Sergiyenko [14] it is revealed that the data of pupils of the 5-6th classes correspond below average developments of the general endurance that answers 2 points at the refraction to a rating scale.

After the experiment (tab. 1, 2) the reliable improvement of indicators both at boys, and at girls of the experimental groups is revealed ( $p < 0,050 - 0,001$ ). The exception is made by results of the performance of pulling up in hanging lying girls of all age groups and raising of a trunk in a set of girls of the 5th class where the improvement of results are doubtful ( $p > 0,05$ ). So, according to the performance of three jumps with an advance forward at boys of the 5th class results improved for 16,4%; the 6th class – for 12,1%, at girls respectively – for 16,6% and 9,2%.

According to raising of a trunk in a sitting position the results at boys of the 5th class improved for 11,6%; the 6th class – for 9,8%, at girls respectively – for 8,4% and 10%. By the results of pulling up of girls of the 5th class results improved for 8,0%; the 6th class – 9,1%, at boys the above indicators improved more than twice.

According to running on the spot with intensity of 70% from maximum results of boys of the 5th class improved for 6,9%; the 6th class – for 7,2%, at girls respectively – for 15,2% and 15,7%.

Thus, the data of boys of the 5th class on all studied parameters most significantly improved; girls of the 5th class by results of the performance of three jumps with an advance forward and schoolgirls of the 6th class by results of the performance of running on the spot with intensity of 70% of the maximum.

The analysis of these repeated researches of pupils of the experimental groups in age and sexual aspects showed that the tendency of distinctions remained invariable in comparison with the initial data.

At the research of results of pupils of the control groups received on the expiration of time of the experiment it is defined that they changed a little, however these changes are insignificant and doubtful ( $p > 0,05$ ). So, according to the performance of three jumps with an advance forward at boys of the 5th class results improved for 0,6%; the 6th class – for 0,5%, at girls respectively – for 0,6% and 1,0%. According to raising of a trunk in a sitting position results of boys of the 5th class improved for 3,8%; the 6th class – for 1,0%, at girls respectively – for 2,2% and 2,6%. By the results of pulling up of boys of the 5th class results improved for 20,0%; the 6th class – for 10,3%, at girls – for 1,0% and 6,5% respectively. According to running on the spot with intensity of 70% from maximum results of boys of the 5th class improved for 1,9%; the 6th class – for 2,9% at girls – for 7,2% and 5,1% respectively.

The analysis of indicators of pupils of the control groups in age and sexual aspects didn't reveal essential changes in comparison with basic data.

Comparing the results of pupils of the experimental and control groups received on the expiration of time of the experiment (tab. 3), generally the reliable prevalence of results of school students of experimental groups over control is revealed ( $p < 0,05 - 0,001$ ). An exception indicators of performance of running on the spot with intensity of 70% from maximum make boys of the 5th class; raising of a trunk in a sitting position of girls of the 6th class and pulling up on a low crossbeam of schoolgirls of the 5-6th classes where distinctions are doubtful ( $p > 0,05$ ).

When comparing results of the performance of pulling up in hanging with standard estimates it is revealed that indicators of a level of the development of force of muscles of hands of boys of the 5-6th classes increased by 1 point and began to correspond to 2 points; data of girls also increased, however it wasn't reflected in a rating scale in any way, and they also as well as before the experiment correspond to 5 points.

At the repeated comparison of results of raising of a trunk in a sitting position of pupils of the experimental groups with standard estimates it is revealed that at the studied 5-6th classes indicators of a level of the development of force of muscles of an abdominal tension improved on 1 point and 2 points, boys of the 5th and girls of the 6th classes – 3 points, boys of the 6th class – 4 points began to correspond at girls of the 5th class to an assessment. It should be noted that the improvement of results wasn't reflected in a rating scale at girls of the 6th class.

Comparing the repeated results of the performance of three jumps to advance with the norms presented to V. A. Romanenko [13] it is revealed forward that indicators of force of muscles of feet improved on 1 point and began to correspond to 4 points at pupils of the 6th, boys of the 5th of classes, the improvement of indicators of girls of the 5th class wasn't reflected in a rating scale also they as well as before the experiment, which is correspond to an assessment 3 points.

At the repeated comparison of the results of the performance of running on the spot with intensity of 70% from maximum pupils of the experimental groups with the norms presented to L. P. Sergiyenko [14] it is revealed that indicators

Table 1

**Indicators of a level of the development of strength of pupils of the experimental groups before the experiment**

The testing period to statist. indicators	the 5th class		the 6th class	
	Indicators, $\bar{X} \pm m$			
<b>Boys</b>				
<b>Three jumps on one foot with an advance forward (sm)</b>				
Before the experiment	(n=13)	377,8±11,25	(n=13)	421,5±11,54
After the experiment		440,0±9,86		472,7±9,29
t		4,16		3,45
p		<0,001		<0,01
<b>Pulling up in hanging (number of times)</b>				
Before the experiment	(n=13)	1,1±0,49	(n=13)	2,0±0,54
After the experiment		3,0±0,46		4,7±0,63
t		2,86		3,25
p		<0,01		<0,001
<b>Raising of a trunk in a sitting position (number of times)</b>				
Before the experiment	(n=13)	25,8±0,68	(n=13)	32,0±0,98
After the experiment		28,8±0,78		35,1±0,86
t		2,91		2,41
p		<0,01		<0,05
<b>Girls</b>				
<b>Three jumps on one foot with an advance forward (sm)</b>				
Before the experiment	(n=15)	356,0± 15,11	(n=14)	413,9± 9,31
After the experiment		415,3±10,68		451,8±9,46
t		3,21		2,85
p		<0,01		<0,01
<b>Pulling up in hanging lying (number of times)</b>				
Before the experiment	(n=15)	11,7±0,49	(n=14)	14,1±0,77
After the experiment		12,6±0,33		15,4±0,70
t		1,57		1,24
p		>0,05		>0,05
<b>Raising of a trunk in a sitting position (number of times)</b>				
Before the experiment	(n=15)	22,3±0,70	(n=14)	29,2±0,45
After the experiment		24,2±0,82		32,1±0,94
t		1,74		4,25
p		>0,05		<0,001

of the development of the general endurance improved on 1 point, and began to correspond to the average level (3 points) at the studied 5-6th classes.

The similar analysis of the received results of pupils of the control groups showed the lack of changes in a level of the development of force and endurance at the studied all age groups on all studied parameters.

Thus, the application in the course of physical training of cheerleading positively affected the level of the development of force and endurance of pupils of middle classes. The greatest gain in indicators is recorded at boys of 10 years old and girls of 11 years old. It should be noted that the results of girls improved more significantly, than indicators of boys.

Thus, results of the research allow drawing the following **conclusions**:

1. The data of the primary research of a level of the development and endurance of pupils of the 5-6th classes when comparing with standard criteria corresponds to an assessment 3 points ("average level").

In the age aspect the reliable improvement of results with age, both at boys, and at girls of the studied groups is generally observed ( $p < 0,05 - 0,001$ ). The domination of results of boys over data of girls is revealed in the sexual aspect ( $p < 0,01; 0,001$ ).

2. The inclusion in the process of physical training of exercises of cheerleading positively affected a level of the development of force and endurance of pupils of the experimental groups which began to correspond above the average level – 4 points. The greatest gain in indicators is recorded at boys of 10 years old and girls of 11 years old. Indicators of a level of the development of force and endurance of pupils of the control groups after the experiment didn't undergo

Table 2

**Indicators of a level of the development of endurance of pupils of the experimental groups before the experiment**

The testing period, statist. indicators	the 5th class		the 5th class	
	Indicators, $\bar{X} \pm m$			
<b>Running on the spot with intensity of 70% from maximum (s)</b>				
<b>Boys</b>				
Before the experiment	(n=13)	50,31±0,79	(n=13)	60,62±0,63
After the experiment		53,77±0,85		65,00±0,78
t		2,99		4,37
p		<0,001		<0,001
<b>Girls</b>				
Before the experiment	(n=15)	39,93±0,91	(n=14)	44,21±1,13
After the experiment		46,00±0,76		51,14±1,25
t		5,12		4,11
p		<0,001		<0,001

Table 3

**Indicators of a level of the development of force and endurance of pupils of the experimental and control groups after the experiment**

Classes	Groups				t	p	
	n	Experimental	n	Control			
<b>Indicators, <math>\bar{X} \pm m</math></b>							
<b>Three jumps on one foot with an advance forward (sm)</b>							
5 class	B	13	440,0±9,86	16	381,2±8,81	4,44	<0,001
	G	15	415,3±10,68	9	348,3±11,59	4,25	<0,001
6 class	B	13	472,7±9,29	13	420,8±14,04	3,08	<0,001
	G	14	451,8±9,46	10	396,5±15,50	3,04	<0,001
<b>Pulling up (B) in hanging, (G) in hanging lying (number of times)</b>							
5 class	B	13	3,0±0,46	16	1,5±0,42	2,41	<0,01
	G	15	12,6±0,33	9	11,1±0,67	1,99	>0,05
6 class	B	13	4,7±0,63	13	2,5±0,85	2,02	<0,05
	G	14	15,4±0,70	10	13,1±1,61	1,33	>0,05
<b>Raising of a trunk in a sitting position (number of times)</b>							
5 class	B	13	28,8±0,78	16	25,7±0,73	2,95	<0,01
	G	15	24,2±0,82	9	20,9±1,19	2,29	<0,05
6 class	B	13	35,2±0,86	13	31,5±0,93	2,85	<0,01
	G	14	32,1±0,94	10	31,1±0,64	1,27	>0,05
<b>Indicators of endurance, <math>\bar{X} \pm m</math></b>							
<b>Running on the spot with intensity of 70% from maximum (s)</b>							
5 class	B	13	53,77±0,85	16	52,06±0,93	1,36	>0,05
	G	15	46,00±0,76	9	42,78±0,98	2,59	<0,01
6 class	B	13	65,00±0,78	13	61,77±0,71	3,06	<0,001
	G	14	51,14±1,25	10	47,20±1,33	2,25	<0,05

considerable changes.

The analysis of results of the repeated researches in the age and sexual aspect didn't reveal considerable changes in comparison with the initial data.

3. The conducted researches testify to a positive influence of the cheerleading sets of exercises offered by us on a level of the development of force and endurance of pupils of the 5-6th classes that gives the chance to recommend to teachers of physical culture to include the exercises developed by us in the educational process on physical training of pupils of middle classes the cheerleading.

**Prospects of further researches** in this direction can be carried out by the definition of extent of influence of classes by cheerleading on a level of the development of force and endurance of pupils of the 7-9th classes.

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Received: 12.05.2015.

Published: 30.06.2015.

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