

# Impact of physical activity on the level of development of the physical qualities of athletes 12–15 years old, involved in kettlebell lifting at the stage of initial training

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**Purpose:** to investigate the development of the physical qualities of athletes 12–15 years old, involved in kettlebell lifting, under the influence of practicing kettlebell lifting during the one-year macrocycle.

**Material & Methods:** studies were conducted in Complex Youth Sports School No. 16 and Public Institution Complex Youth Sports School No. 8 of Kharkiv with athletes 12–15 years old engaged in kettlebell lifting during the one-year macrocycle in the amount of 30 people. The following research methods were used: analysis of literary sources and testing of the level of motor qualities in certain age categories.

**Results:** pedagogical testing is presented to determine the level of motor capabilities of young athletes 12–15 years old engaged in kettlebell lifting. Exercises were identified that are advisable to use at these stages of preparation: running at 60 meters; at 1500 m; number of jumps in 30 seconds, standing long jump; flexion and extension of the arms in the support lying on the floor; raising legs hanging on the wall bars.

**Conclusion:** as a result of the testing of motor skills using non-specific exercises for kettlebell lifting, it was found that the performance improves every year in all exercises ( $p > 0,05$ ), especially in 60 m running, which significantly increased in the age range from 13 to 14 years and in the race for 1500 m, from 14 to 15 years. The speed-strength abilities of young athletes aged 12–15 years who are involved in kettlebell lifting were more pronounced in the age range from 13 to 14 years.

**Keyword:** testing, physical qualities, kettlebell lifting, female athletes.

## Introduction

Kettlebell lifting is not an Olympic sport but it is in demand among modern youth (V. Platonov, 2004; L. S. Dvorkin, 2005; M. T. Lukyanov, 1969; V. G. Oleshko, 2011) [1; 3; 8; 18]. This circumstance attracts the attention of specialists to the development and scientific and methodological substantiation of the theory and methodology of training athletes of different ages and qualifications.

According to the research, the initial preparation stage is especially important, since during this period there is a rapid development of power abilities, the development of sportsmanship, an intensive process of adaptation to the specific conditions of doing weightlifting. The problem of training young athletes at the initial training stage in weightlifting is given some attention, there is a constant improvement in the training methods of young athletes. In particular, in recent years, research has been conducted on various aspects of this problem (Yu. V. Verkhoshansky, 2013; L. S. Dvorkin, 2005; V. G. Oleshko, 2011) [2; 3; 18–19], two methodological manuals were issued (L. S. Dvorkin, 2005; V. G. Oleshko, 2011) [3; 18]. A large number of scientific articles have been published, programs for youth sport school have been issued. All this testifies to the relevance of the studied direction.

Analyzing the available scientific and methodological literature on the training of athletes in kettlebell lifting, it should be noted that many issues are presented quite widely.

In particular, different views are considered on the age at which we begin doing kettlebell lifting (L. S. Dvorkin, 2005; V. G. Oleshko, 2011), the scope and content of the training work (Yu. V. Verkhoshansky, 2013, B. I. Sheyko, 2008), the use of various training tools (L. S. Dvorkin, 2005; N. A. Laputin, 1973; Yu. K. Gaverdovsky, 2007; A. V. Chernyak, 1970; V. Yu. Dzhyim, 2013).

At the same time, the available information is often contradictory, it is fragmentary in nature, which does not allow us to develop a rational system for training athletes engaged in heavy sports (V. S. Farfel, 1963; V. P. Novikov, 1990) [10; 20].

**Purpose of the study:** to investigate the development of the physical qualities of athletes 12–15 years old, involved in kettlebell lifting, under the influence of practicing kettlebell lifting during the one-year macrocycle.

## Material and Methods of the research

The research was carried out in the Complex Youth Sports School No. 16 and Public Institution Complex Youth Sports School No. 8 of Kharkiv, with female athletes 12–15 years engaged in weight lifting, for a one-year macrocycle of 30 people. The research methods used were: analysis of literary sources and testing of motor quality in selected age categories.

Our research was aimed at revealing the level of physical preparedness of young female athletes of 12–15 years engaged

in weight lifting, representing the process of development of motor qualities, as a result of which the level of athletic skill of athletes is manifested.

As a pedagogical testing to determine the level of motor capabilities of young female athletes 12–15 years old engaged in kettlebell lifting, we have chosen exercises that are appropriate to use at these stages of preparation.

## Results of the research

Testing of motor skills in the training process took place with the use of in-preparatory exercises: 60 meters running; at 1500 m; number of jumps in 30 seconds; standing long jump seats; flexion and extension of the arms in the support lying on the floor; raising legs in vise on the wall bars (Table 1).

( $p < 0,05 - 0,001$ ), while girls 12 and 13 years, as well as 14 and 15 years, the changes were not significant ( $p > 0,05$ ) (Table 3)

Indicators of a standing long jump among young female athletes aged 12–15 years involved in kettlebell lifting increased from 12 to 15 years, and from 13 to 15 years ( $p < 0,05 - 0,001$ ) (Table 3).

When testing the strength indices of the muscles of the upper extremities (flexion and extension of the arms in the rest lying on the floor), no difference was found in girls between 12–13 years, 13–14 years, and 14–15 years ( $p > 0,05$ ), however, statistically significantly increased results in girls from 12 to 14 years old, from 12 to 15 years old, and from 13 to 15 years old ( $p < 0,05 - 0,001$ ) (Table 4).

**Table 1**  
Dynamics of indicators of general physical fitness of young female athletes 12–15 years old, involved in kettlebell lifting (n=30)

Indicators	12 years	13 years	14 years	15 years
	$\bar{X}_1 \pm m_1$	$\bar{X}_2 \pm m_2$	$\bar{X}_3 \pm m_3$	$\bar{X}_4 \pm m_4$
Running at 60 m, s	10,4±0,10	10,1±0,11	9,6±0,13	9,2±0,09
Running at 1500 m, s	525,5±2,15	507,6±4,84	487,3±4,20	463,0±8,96
Jump-ups for 30 s, number of times	22,0±1,02	23,6±0,82	26,8±0,79	28,3±0,69
Standing long jump, cm	163,2±3,51	166,0±1,69	168,3±1,44	176,0±4,15
Flexion and extension of the arms in the support lying, num. of times	15,2±1,36	18,0±1,23	21,2±1,55	24,5±1,50
Raising legs hanging on the wall bars, the number of times	13,2±2,63	17,6±1,95	20,8±2,15	24,0±1,74

The indicator of speed qualities in the 60m race for girls 12–13 and 14–15 years old did not change ( $p > 0,05$ ), at the same time the changes were revealed in the age intervals of 12 and 14 years old, 12 and 15 years old, 13 and 14 years, 13 and 15 years ( $p < 0,05 - 0,001$ ) (Table 2).

Over the course of the study, for girls aged 12–15 years, stamina at a distance of 1500 m statistically significantly changed at all age intervals ( $p < 0,05 - 0,001$ ) (Table 2).

Testing the exercise, the amount of jump-ups for 30 seconds showed an increase in results at age intervals of 12 and 14 years, 12 and 15 years, 13 and 14 years, 13 and 15 years

As can be seen from table 4, the results of raising legs hanging on the wall bars girls 12 and 14 years old, 12 and 15 years old, 13 and 15 years old have a statistically significant difference ( $p < 0,05 - 0,001$ ), while girls 12 and 13 years, 13 and 14 years, 14 and 15 years she is absent ( $p > 0,05$ ).

## Conclusions / Discussion

Analysis of the scientific literature has confirmed that research in the field of weight-lifting has been mostly fragmented. In recent years, scientists conducted studies on the content and methods of the training process of young female gymnastics 12–15 years old with various methods of motor skills and

**Table 2**  
Matrix of the significance of the difference in the performance of running 60 m and running 1500 m of young female athletes 12–15 years old engaged in kettlebell lifting (n=30)

Age	Test	13 years	14 years	15 years
12 years	Running at 60 m	t=2,02; p>0,05	t=4,88; p<0,001	t=8,92; p<0,001
	Running at 1500 m	t=3,38; p<0,01	t=8,10; p<0,001	t=6,78; p<0,001
13 years	Running at 60 m	–	t=2,94; p<0,01	t=6,33; p<0,001
	Running at 1500 m	–	t=3,17; p<0,01	t=4,38; p<0,001
14 years	Running at 60 m	–	–	t=2,53; p<0,05
	Running at 1500 m	–	–	t=2,46; p<0,05

**Table 3**  
Matrix of the difference in jump-ups rates for 30 s and long jump from the place of young female athletes 12–15 years old engaged in kettlebell lifting (n=30)

Age	Test	13 years	14 years	15 years
12 years	Jump-ups for 30 s	t=1,22; p>0,05	t=3,72; p<0,001	t=5,12; p<0,001
	Standing long jump	t=0,72; p>0,05	t=1,34; p>0,05	t=2,35; p<0,05
13 years	Jump-ups for 30 s	–	t=2,81; p<0,01	t=4,39; p<0,001
	Standing long jump	–	t=1,04; p>0,05	t=2,23; p<0,05
14 years	Jump-ups for 30 s	–	–	t=1,43; p>0,05
	Standing long jump	–	–	t=1,75; p>0,05

Table 4

**Matrix of the reliability of the difference in the indicators of flexion and extension of the arms in the support lying and raising legs hanging on the wall bars of young female athletes 12–15 years old engaged in kettlebell lifting (n=30)**

Age	Test	13 years	14 years	15 years
12 years	flexion and extension of the arms in the support lying	t=1,53; p>0,05	t=2,91; p<0,01	t=4,59; p<0,001
	raising legs hanging on the wall bars	t=1,34; p>0,05	t=2,24; p>0,05	t=3,42; p<0,01
13 years	flexion and extension of the arms in the support lying	–	t=1,62; p>0,05	t=3,35; p<0,01
	raising legs hanging on the wall bars	–	t=1,10; p>0,05	t=2,45; p<0,05
14 years	flexion and extension of the arms in the support lying	–	–	t=1,53; p>0,05
	raising legs hanging on the wall bars	–	–	t=1,16; p>0,05

strength qualities (Yu. V. Verkhoshansky, L. S. Dvorkin [2; 3]), training planning process during the one-year macrocycle of female athletes 12–15 years old (V. M. Platonov [1]) and the influence of the training process of young female gymnasts 12–15 years old on manifestations of physical qualities (N. S. Ipolitov, B. S. Evdokimov; M. T. Lukyanov, V. P. Filin;

A. V. Chernyak [4; 7–9; 11]. However, the influence of physical exertion on the performance of young female athletes 12–15 years old engaged in kettlebell lifting at the first stage of training for many years was not studied, which prompted us to do an analysis in this direction.

The study confirmed the results of other authors [2; 3] about the need to take into account the effect of training on the physical performance of athletes 12–15 years old at the initial training stage. Also, data of domestic ones were expanded [4; 7–9; 11] and foreign authors [21; 22; 23; 24] on raising the level of the most significant indicators of physical qualities on a young body of athletes involved in kettlebell lifting.

As a result of the testing of motor skills using non-specific exercises for kettlebell lifting, it was found that the indicators improve every year in all exercises (p>0,05), especially in 60 m running, which significantly increased in the age range from 13 to 14 years and in the race for 1500 m from 14 to 15 years (Table 2). The speed-strength abilities of young athletes aged 12–15 years who are involved in kettlebell lifting were more pronounced in the age range from 13 to 14 years.

**Prospects for further research** include the determination of the impact of kettlebell lifting training on the functional state and psychophysical indicators of young female athletes aged 12–15 years engaged in kettlebell lifting during the one-year macrocycle.

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