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Level of physical development and physical preparedness of weight-lifters of 10–12 years old

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Purpose: *to determine the level of physical development and physical preparedness of weight-lifters of 10–12 years old.*

Material & Methods: *boys of 10–12 years old, who go in for weightlifting sections in CYSS HTZ, and also in sports boarding school No 2 of Kharkiv, participated in this research. 34 boys were attracted to the experiment. Research methods: theoretical method and generalization of literature, pedagogical observation, pedagogical experiment, method of mathematical statistics.*

Results: *differences in intensity of gain of indicators of physical development for the biennium of observations display unevenness and heterochrony of ripening of organism of children were found. The noticeable difference in intensity of gain of the majority of the studied indicators of physical development is noted even for such rather short period (two years). The increase during the whole biennium is established for absolute values of the general physical operability of the tested. However, the size of relative intensity of gain of absolute values of general physical working capacity at stages of observations is different: the first year – 10,48%, the second – 0,86% ($t=22,3$; $p<0,01$). In other words, indicators of general physical working capacity considerably grow for the first year of observations (10–11 years old), and practically do not change for the second year (11–12 years old).*

Conclusions: *the established decrease in relative sizes of the general physical working capacity, which is noted at boys in total with the deterioration in results in run at distance of 1000 m, allowed to draw conclusion on the underdevelopment at them the major physical qualities and systems of organism, which define endurance and general physical working capacity. Undoubtedly, the insufficient level of endurance and general physical working capacity reduces adaptation opportunities of boys-weight-lifters.*

Keywords: *physical development, physical preparedness, physical working capacity, relative sizes, adaptation opportunities.*

Introduction

Weightlifting is the Olympic and popular kind of sport among modern youth (V. N. Platonov, 2004; L. S. Dvorkin, 2005; M. T. Lukyanov, 1969; V. G. Oleshko, 2011) [3; 10; 14; 17]. This circumstance draws attention of experts to the development and scientific-methodically foundation of the theory and the technique of training of sportsmen of different age and qualification.

According to the researches, the stage of initial preparation is especially important, because the fast development of power abilities, the formation of sports skill, and the intensive course of processes of adaptation to specific conditions of classes by weightlifting occur during this period. Certain attention is paid to the problem of training of young sportsmen at the stage of initial preparation in weightlifting, the constant improvement of technique of training of young sportsmen occurs. In particular, the scientific research, which is devoted to various aspects of this problem, is conducted in recent years (Yu. V. Verkhoshanskyi, 2013; L. S. Dvorkin, 2005; V. G. Oleshko, 2011) [1; 3; 14; 16], two methodical manuals are published (L. S. Dvorkin, 2005; V. G. Oleshko, 2011) [3; 16]. The large number of scientific articles is published; programs for sports school are edited. All this testifies to the relevance of the studied direction.

Analyzing the available scientific and methodical literature devoted to training of the beginning sportsmen in weightlifting, it should be noted that many questions are presented rather widely.

In particular, different views about age of the beginning of classes by weightlifting are considered (L. S. Dvorkin, 2005; V. G. Oleshko, 2011) [3; 16], volume and content of the training work (Yu. V. Verkhoshanskyi, 2013; B. I. Sheyko, 2008) [1; 21], use of various training means (L. S. Dvorkin, 2005; N. A. Laputin, 1973; Yu. K. Gaverdovsky, 2007; A. V. Chernyak, 1970; V. Yu. Dzhim, 2013) [2–4; 9; 15].

At the same time the available data are often contradictory, have a fragmentary character that does not allow developing the rational system of training of the beginning sportsmen in weightlifting (V. S. Farfel, 1963; V. P. Novikov, 1990) [13; 19].

So, the analysis of the theory of sports training and practice of the educational and training activity of young sportsmen at the stage of initial preparation in weightlifting reveals the number of contradictions:

– between the traditionally applied means of the development of power abilities and opportunities of the musculoskeletal system of the beginning sportsmen in weightlifting;

– to intensify the training process already between the aspiration of most of coaches at the initial stage of preparation by the decrease in share of overall physical fitness and need of all-round development of young sportsmen;

Communication of the research with scientific programs, plans, subjects

The scientific research is executed on the subject of the Consolidating plan of the research works in the sphere of physical culture and sport for 2011–2015 on the subject 3.7 "Methodological and organizational-methodical bases of the determination of individual norm of physical condition of the person" (number of the state registration is 0111U000192).

The purpose of the research:

to determine the level of physical development and physical fitness of weight-lifters of 10–12 years old.

Material and Methods of the research

Boys of 10–12 years old who go in for sections for weightlifting in CYSS HTZ, and also in sports boarding school No. 2 of Kharkov participated in this research. 34 boys who go in for section for weightlifting were involved in the experiment; all of them had no digit standards. All participants were involved throughout 3 stages of the pedagogical experiment: the 1st stage (10 years old) – the initial level, the 2nd stage (11 years old) – the data, which are recorded after the year of observations, the 3rd stage (12 years old) – the data, which are recorded after the second year of observations. Participants of the experiment trained 3 times a week.

Research methods: theoretical method and generalizations of literature, pedagogical observation, pedagogical experiment, method of mathematical statistics.

Results of the research and their discussion

It is noted in special literature that negative tendencies in indicators of physical development of children are revealed; especially in the age groups of older than 12 years old for the last decades. The reliable decrease in length and body weight, indicators of physical fitness of teenagers in comparison with their peers is established in previous years [4; 7; 9; 14].

We made the pedagogical experiment which essence was the definition for two years of dynamics of physical development, physical fitness and general physical efficiency of the beginning weight-lifters of 10–12 years old for the assessment of features of physical development and physical fitness of modern teenagers.

Results of indicators of physical development of the examinees weight-lifters at all three stages of the pedagogical experiment (the 1st stage (10 years old) – the initial level, the 2nd stage (11 years old) – the data, which are recorded after the year of observations, the 3rd stage (12 years old) – the data, which are recorded after the second year of observations) are presented in table 1.

It is necessary to notice that the analysis of not only absolute values of the studied indicators of physical development of examinees, but also relative intensity of gain of these indicators by years is of interest to the characteristic of features of the age development of young weight-lifters.

Analyzing the submitted data, it should be noted the unevenness of gain of the studied indicators first of all. The size of relative intensity of gain for the first year of observations was higher for such indicators as: body length (4,5% in the first year and 2,74% in the second; $t=12,8$; $p<0,01$), body weight (11,44 and 8,73%; $t=8,3$; $p<0,01$), weight-growth index of Quetelet (6,89 and 6,03%; $t=2,6$; $p<0,05$), vital capacity of lungs (12,09 and 5,77%; $t=16,5$; $p<0,01$), thorax circle (2,69 and 2,33%; $t=2,2$; $p<0,05$), shin circle (4,99 and 2,91%, $t=10,1$; $p<0,01$) and dynamometry of the strongest hand (16,05 and 9,19%; $t=16,7$; $p<0,01$).

The size of relative intensity of gain was higher for such indicators as: shoulder circle (8,44 and 13,28%; $t=16,4$; $p<0,01$), hip circle (8,44 and 13,28%; $t=16,4$; $p<0,01$) and back dynamometry (12,46 and 18,1%; $t=13,1$; $p<0,01$) for the second year of observations.

The size of relative intensity of gain for such indicators as thorax circle difference on breath and exhalation, circle of waist and circle of pelvis in both years of observations was approximately identical, therefore distinctions by years are not statistically reliable ($p<0,05$).

The revealed distinctions for the two-year period of observa-

Table 1

Indicators of physical development of weight-lifters of 10-12 years old at stages of the pedagogical experiment (M±m), (n=34)

Indicators	10 years old	11 years old	12 years old
Length of body (sm)	142,0±0,6	149,5±0,6	155,4±0,7
Body weight (kg)	39,5±0,4	45,7±0,6	50,6±0,5
Index of Quetelet	278,1±3,3	305,7±3,4	325,6±3,0
VCL (l)	2,1±0,1	2,3±0,1	2,5±0,1
Circle of thorax (sm)	67,5±0,5	70,4±0,5	74,7±0,3
Circle of waist (sm)	59,4±0,4	61,9±0,4	64,3±0,4
Circle of pelvis (sm)	63,0±0,3	65,8±0,3	67,9±0,3
Circle of shoulder (sm)	18,1±0,2	19,7±0,2	21,1±0,2
Circle of hip (sm)	36,2±0,2	40,8±0,3	43,3±0,3
Circle of shin (sm)	22,3±0,2	23,9±0,2	24,7±0,3
Hand dynamometry (kg)	21,3±0,4	26,6±0,4	31,7±0,4
Back dynamometry (kg)	48,9±0,7	55,3±0,7	61,3±0,7

tions reflect in intensity of gain of indicators of physical development, in our opinion, unevenness and heterochrony of maturing of organism of children The noticeable difference in intensity of gain of the majority of the studied indicators of physical development is noted even for such rather short period (two years).

Indicators of physical development at young weight-lifters for two years of the pedagogical experiment were determined by results of the control exercises (run on 30 m from low start, standing long-jump, throw of shot of 3 kg forward from the place two hands, run on 1000 m) allowing to judge their physical fitness. Results of measurements are presented in table 2.

In general the submitted data characterize age changes of the level of physical fitness of examinees. At the same time it is revealed that the continuous progress from one stage of observations to another is observed in the exercises, which are connected with high-speed and high-speed and power qualities. The similar dynamics is not revealed for results of run on 1000 m characterizing endurance of examinees. If the reduction of time of run of distance of 1000 m is noted (5,24±0,15 min at the beginning of observations and 5,11±0,15 min in one year; $t=2,5$; $p<0,05$) for the first year of observations, some deterioration in results (5,11±0,15 min after the first year of observations and 5,08±0,16 min at the end of experiment; $t=0,3$; $p>0,05$) occurs for the second year. Change of results of run at distance of 1000 m is not statistically reliable for the second year of observations for this selection of examinees (n=34), but demonstrates, in our opinion, manifestation of tendency of decrease in endurance of weight-lifters of 12-years old.

The important information characterizing age features of the development of modern boys can be received studying dynamics of indicators of physical working capacity (tab. 3).

Analyzing the submitted data, first of all, it should be noted two opposite tendencies: increase from one stage to another of absolute values of the general physical working capacity and along with it decreases in relative values (in terms of kilogram of body weight) of the general physical efficiency of boys of weight-lifters.

It is visible from the submitted data that the multidirectional changes of indicators of physical fitness and general physical working capacity throughout the two-year period of observations are observed at the examinees, who are going in for weightlifting.

In particular, the increase in results (reduction of time) in run on 30 m throughout the entire period of observations takes place, however the relative intensity of gain of results is higher for the first year of observations. For the first year – 3,75%, for the second – 2,86%. The difference of values of intensity of gain of results in run on 30 m by years has a statistically reliable character ($t=7,5$; $p<0,01$).

The size of relative intensity of gain of results in standing long-jumps approximately identical for the entire period of observations (the first year – 8,27%, the second – 8,49%). Distinctions for this selection of examinees are not statistically reliable ($t=0,7$; $p>0,05$).

Results of throw of shot of 3 kg forward from the place two hands increased with high intensity at examinees (the first year – 21,23%, the second – 18,36%; $t=18,3$; $p<0,01$). So, high relative intensity of gain of results of throw reflects, in our opinion, the fast development of muscles of shoulder girdle and upper extremities in this age period.

Multidirectional changes were found in examinees in the analysis of dynamics of size of intensity of gain of results in run on 1000 m: in the first year – the increase in results (reduction of time of run); in the second year – the insignificant deterioration [4; 11; 15].

The conducted research confirmed results of other authors [2; 3] about need of taking the note of trainings on physical indicators of young weight-lifters at the first grade level. Also the data of native [6; 7; 10; 15; 20] and foreign authors [21; 22; 23; 24] are expanded in the directions of increase in level of the most significant indicators of physical qualities of young weight-lifters.

Conclusions

Analyzing the stated material, it is possible to note that physi-

Table 2

Indicators of overall physical fitness of weight-lifters of 10–12 years old at stages of the pedagogical experiment (M±m), (n=34)

Indicators	10 years old	11 years old	12 years old
Run of 30 m (s)	5,60±0,12	5,42±0,12	5,21±0,12
Standing long-jump (sm)	148,2±2,7	154,3±2,8	163,1±2,8
Throw of shot of 3 kg (m)	4,24±0,19	5,43±0,19	6,89±0,2
Run of 1000 m (min)	5,24±0,15	5,11±0,15	5,08±0,16

Table 3

Indicators of general physical efficiency of weight-lifters of 10–12 years old at stages of the pedagogical experiment (M±m), (n=34)

Indicators	10 years old	11 years old	12 years old
Absolute value PWC_{170} ($kgm \cdot min^{-1}$)	703,2±7,8	780,9±6,9	787,7±7,3
Relative value PWC_{170} ($kgm \cdot min^{-1}$ on 1 kg of weight)	16,7±0,6	15,5±0,6	14,4±0,6

cal development, physical fitness and general physical efficiency of modern boys of 10–12 years old, who train in sports school on the majority of indicators, correspond to peers of the ninetieth years. The noted facts demonstrate the delay of processes of deceleration of physical development of modern children.

Also the revealed by us dynamics of indicators of the general physical working capacity testifies about the same. The increase throughout the whole two-year period is established for absolute values of the general physical efficiency of examinees. However the size of relative intensity of gain of absolute values of the general physical working capacity at stages of observations is different: the first year – 10,48%, the second – 0,86% ($t=22,3$; $p<0,01$). In other words, indicators of the general physical working capacity considerably increase for the first year of observations (10–11 years old), and for the second year (11–12 years old) practically do not change. On the contrary, the decrease in values throughout the period of observations is established for relative sizes of the general physical working capacity. At the same time intensity of decrease in relative values of the general physical working capacity for the first year – 0,96%, for the second – 7,87% ($t=21,4$; $p<0,01$).

The decrease in relative values of the general physical working capacity, which is noted at boys with the deterioration in results in run at distance of 1000 m in total, allow to make the conclusion about the underdevelopment at them the major physical qualities and systems of organism, defining endurance and general physical working capacity. Undoubtedly, the insufficient level of endurance and general physical working capacity reduces adaptation opportunities of boys-weightlifters.

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