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# INCREASING PHYSICAL FITNESS OF SHORT-DISTANCE BARRIER RUNNERS AT THE STAGE OF PRELIMINARY BASIC TRAINING

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**Purpose:** to determine the development of the overall preparedness of young athletes aged 12-13 years engaged in barrier sprint running.

**Material and methods:** the reseach involved 30 athletes (14 girls and 16 boys) aged 12-13 years engaged in Children and Youth Sports Schools of Kharkiv region. In the process of the pedagogical experiment the following methods were used: analysis of scientific-methodical literature, pedagogical testing; pedagogical observations of training activities for young runners, specializing in the hurdles at short distance, pedagogical experiment, and mathematical statistics.

**Results:** it was revealed that the average values of physical fitness indicators among girls and boys correspond to the standards of the educational-training group of initial basic training according to the results of testing the physical fitness of hurdler for short distances. The experimental group worked on this program where were included some speed and speed-power exercises in the training sessions. The growth rates of the indices of special physical fitness in girls and boys is shown in the table 2 and 3, the analysis of which allows detecting positive changes of indices of physical preparedness of hurdlers for short distances during the experiment.

**Conclusions:** the data of scientific-methodical literature on physical training of hurdler-runners on short distances are analyzed and summarized. The level of general physical fitness of young athletes at the age of 12-13 years old, engaged in hurdles running for short distances, was determined and assessed. The influence of the means of speed-power orientation on special physical fitness of hurdler-runners for short distances has been experimentally confirmed.

**Keywords:** physical training, hurdles, special physical fitness.

## Introduction

Improving the physical fitness is the key to improving results in many athletics disciplines. The improvement of motor abilities occupies an important place in sports training of young sportsmen. If you purposefully influence motor abilities during the period of age-old development, and speed qualities develop, it is at an early age, and then the pedagogical effect will be significantly better than in other periods. Therefore, overall physical training of young sportsmen plays a significant role in the subsequent development of physical qualities and physical perfection.

This determines the need to develop such selective means of training loads that correspond to the laws of development of those systems of the body that interact with loads that directly affect the development of speed.

Increasing the physical fitness of sprinters-hurdlers is one of the important conditions for improving the sports training process. High indicators of general physical fitness are the basis for the development of special physical fitness of sprinters-hurdlers, and are also the basis for improving the technical, tactical, psychological training of athletes.

The research of overall physical fitness of 12-13 years old young sportsmen who are engaged in sprint hurdling makes it possible to assess the level of perception of load and assimilation of special motor exercises of an athlete, as well as to test experimentally the influence of high-speed and power direction on the special physical fitness of sprinters-hurdlers.

Modern scientific and methodological literature on the problems of sprint hurdling is quite large. However, most of the works are devoted to training of adults, qualified athletes. References on the training of young sprinters-hurdlers, as a rule, consider different aspects of the development of motor qualities at individual stages of training sportsmen. At the same time, there isn't enough work that considers the system of physical fitness of sprinters-hurdlers at the stage of initial training [2].

The analysis of scientific methodical literature indicates that many researchers studied physical training of runners [5, 8, 11], technical preparation of athletes [6, 12] and means of their improvement in the training process [9, 13]. However, only some works reveal the features of physical training of runners at the stage of previous basic training [3, 4].

Data of scientific and methodical literature and sports practice show that the development of high-speed and power abilities is carried out mainly by methods of interval and combined exercise [7, 14].

V.K. Vlasov believes that study precedes improvement - this is the first stage of the previous basic training, while improvement is its continuation. Study should be considered as a process of constant qualitative change in the system of motor actions in sprinting [3].

The number of works is quite limited and doesn't allow you to consider the problem finally solved for sprinters of the base group (12-13 years). Despite the presence of a number of scientific developments of this problem, the recommendations on physical fitness of sprinters-hurdlers at the stage of the previous basic preparation of the annual training cycle are quite contradictory and not always experimentally proved. Quite often there is a significant difference in the views of specialists on the issue of applying the methodology for introducing motor actions in the minimum time period for these conditions [10].

Special physical training provides for the development of functions of all organs and systems necessary for successful mastery of technique and improvement of sportsmanship. It is carried out primarily by performing special and preparatory exercises close to the coordination structure of the main sports exercises [2, 4].

The practical significance of the results of speed development lies in the early manifestations of abilities. Speed manifests itself through human abilities such as downtime rates and complex responses; speed of separate motor action, frequency of movements (tempo). [7]. The application of new approaches will provide an opportunity to coordinate the content of the training process aimed at the development and improvement of physical training of young track and field runners who are engaged in sprint hurdling at the stage of previous basic training [4].

**The purpose of the research** is to determine the level of development of overall physical fitness at 12-13 years old young sportsmen who are engaged in sprint hurdling.

## Material and Methods of the research

The following methods were used during the pedagogical experiment: analysis of scientific and methodological literature, pedagogical testing; special pedagogical observations on training activities of young runners who specialize in sprint hurdling, pedagogical experiment, mathematical statistics.

Two homogeneous groups were formed by age and level of physical fitness, control and experimental groups, which are engaged in initial training groups of CYSS. Training lessons in the control group were conducted according to the generally accepted program on athletics for the sports school of the previous basic training.

The experimental group additionally included exercises of speed, high-speed and power character in training lessons (running on segments at speed, running on the track, serial repeated runs on the sand, using encumbrances on the shins, exercises on simulators and more).

## Results of the research

For the results of testing the physical fitness of sprinters-hurdlers, it was found that the average values of physical fitness indicators at girls and boys (Table 1), in general, meet the standards for the training group of the previous basic training.

*Table 1*

**Physical fitness indicators of 12-13 years old sprinters-hurdlers ($\bar{x} \pm m$)**

| Tests | Girls (n=7) | Boys (n=8) |
|---|---|---|
| Run 30 m (s) | 5,32±0,31 | 4,95±0,77 |
| Run 30 m from the move (s) | 4,14±0,67 | 3,98±0,52 |
| Shuttle run 4x9 m | 11,4±0,32 | 10,5±0,67 |
| Run 60 m (s) | 9,32±0,46 | 8,85±0,54 |
| Hurdling 60 m (s) | 13,52±0,84 | 11,62±0,74 |
| Standing long-jump, cm | 210±0,38 | 225±0,16 |
| Run 300 m (s) | 58,0±0,46 | 48,2±0,36 |

Results of run 30 m, 57% of girls and 43% of boys, showed lower than the standards. Results of the test run 30 m from the move found that 72% of girls and 64% of boys have lower indicators from the standards. Results of run 60 m indicate that 50% of girls and 71% of boys showed results lower than the standards for this group. As a result of performing test exercises of run 300 m to 43% of girls and boys have indicators lower than standards ones.

Performing standing long-jump test exercise, which characterizes the manifestation of high-speed and power abilities, made it possible to find that girls and boys have results within the limits of the standards.

Considering the results of the research, comprehensive speed-force exercises were developed to increase special physical fitness as well as exercises from other sports to increase overall physical fitness. The reseach was carried out during September - October of the preparatory period.

The performance of sportsmen at the beginning of the 1st year of initial basic training indicates that 86% of runners have lower sports result from the standards one, requires the search for new means and methods of sports training to achieve high indicators of physical fitness.

The growth rate of special fitness at girls is shown in table 2, the analysis of which reveals positive changes during the experiment: in run 30 m 7.9% in the experimental group (EG) and 2.6% in the control group (CG); run 30 m from the move 13.5% in the EG and 3.9% in the CG; shuttle run 4x9m 13.8 in EG and 5.3% in CG; run 60 m 3.4% in EG and 1.9% in CG; hurdling 60 m 5.0% in the EG and 2.7%

in the CG; run 300 m 2.7% in the EG and 1.7% in the CG; standing long-jump 9.3% in the EG and 2.4% in the CG ($p<0.05$). Statistically unreliable data ($p>0.05$) were found in run 30 m in the EG, hurdling 60 m in the EG and CG.

*Table 2*

**Rate of growth in special physical fitness indicators of girls-hurdlers by the results of the pedagogical experiment**

| Tests | Groups | Test results | | Confidence assessment | Changes in indicators % |
|---|---|---|---|---|---|
| | | Before the experiment $\bar{x} \pm m$ | After the experiment $\bar{x} \pm m$ | t; p | |
| Run 30 m (s) | CG (n=7) | 5,32±0,64 | 5,18±0,28 | t=2,00; p>0,05 | 2,6 |
| | EG (n=7) | 5,30±1,58 | 4,88±0,44 | t=2,56; p>0,05 | 7,9 |
| Run 30 m from the move (s) | CG (n=7) | 4,12±0,92 | 3,96±0,36 | t=2,18; p<0,05 | 3,9 |
| | EG (n=7) | 4,14±0,92 | 3,58±1,12 | t=3,86; p<0,05 | 13,5 |
| Shuttle run 4x9m | CG (n=7) | 11,4±1,24 | 10,8±0,86 | t=3,98; p<0,05 | 5,3 |
| | EG (n=7) | 11,6±0,58 | 10,0±0,24 | t=2,55; p<0,05 | 13,8 |
| Run 60 m (s) | CG (n=7) | 9,30±1,34 | 9,12±0,56 | t=1,24; p>0,05 | 1,9 |
| | EG (n=7) | 9,32±1,18 | 9,0±0,16 | t=2,69; p>0,05 | 3,4 |
| Hurdling 60 m (s) | CG (n=7) | 13,52±0,56 | 13,16±0,84 | t=3,51; p>0,05 | 2,7 |
| | EG (n=7) | 13.54±0,44 | 12,86±1,22 | t=5,24; p>0,01 | 5 |
| Standing long-jump, cm | CG (n=7) | 210±0,62 | 215±1,34 | t=3,38; p>0,01 | 2,4 |
| | EG (n=7) | 215±2,58 | 235±1,64 | t=6,54; p<0,001 | 9,3 |
| Run 300 m (s) | CG (n=7) | 58,0±0,54 | 57,4±1,38 | t=4,05; p>0,01 | 1,7 |
| | EG (n=7) | 58,2±2,36 | 56,6±0,68 | t=6,51; p<0,001 | 2,7 |

For the results of the pedagogical experiment, the growth rates in indicators of special physical fitness at boys are presented in Table 3.

Reliable changes were established ($p<0.05$) was found: in run 30 m 10.4% in the experimental group (EG) and 4.6% in the control group (CG); run 30 m from the move 9.5% in the EG and 3.8% in the CG; shuttle run 4x9m in CG 2.9 and EG 7.7 ($p>0.05$); run 60 m 6.2% in EG and 1.7% in CG; hurdling 60 m 5.7% in EG ($p>0.01$) and 1.5% in CG; run 300 m 2.5% in EG and 1.7% in CG ($p>0.01$); standing long-jump 6.8% in the EG and 2.4% in CG.

*Table 3*

**Rate of growth in special physical fitness indicators of boys-hurdlers by the results of pedagogical experiment**

| Tests | Groups | Test results | | Confidence assessment | Changes in indicators % |
|---|---|---|---|---|---|
| | | Before the experiment $\bar{x} \pm m$ | After the experiment $\bar{x} \pm m$ | t; p | |
| Run 30 m (s) | CG (n=8) | 4,95±0,58 | 5,18±0,22 | t=3,71; p<0,01 | 4,6 |
| | EG (n=8) | 5,0±1,84 | 4,88±1,12 | t=2,41; p<0,05 | 10,4 |
| Run 30 m from the move (s) | CG (n=8) | 3,95±0,28 | 3,80±0,54 | t=2,47; p<0,05 | 3,8 |
| | EG (n=8) | 3,98±1,18 | 3,60±0,48 | t=2,98; p<0,05 | 9,5 |
| Shuttle run 4x9m | CG (n=8) | 10,5±1,34 | 10,2±0,64 | t=2,02; p<0,05 | 2,9 |
| | EG (n=8) | 10,4±1,46 | 9,6±0,58 | t=5,09; p>0,01 | 7,7 |
| Run 60 m (s) | CG (n=8) | 8,85±0,46 | 8,70±0,52 | t=2,16; p>0,05 | 1,7 |
| | EG (n=8) | 8,9±0,62 | 8,35±1,38 | t=3,64; p<0,01 | 6,2 |
| Hurdling 60 m (s) | CG (n=8) | 11,62±0,68 | 11,45±0,14 | t=2,45; p<0,05 | 1,5 |
| | EG (n=8) | 11.65±1,34 | 11,00±0,46 | t=4,59; p>0,01 | 5,7 |
| Standing long-jump, cm | CG (n=8) | 225±1,62 | 235±2,46 | t=3,39; p<0,01 | 2,4 |
| | EG (n=8) | 220±3,34 | 240±2,88 | t=3,40; p<0,01 | 6,8 |
| Run 300 m (s) | CG (n=8) | 48,2±1,36 | 47,4±1,62 | t=3,78; p<0,01 | 1,7 |
| | EG (n=8) | 48,0±2,36 | 46,8±0,54 | t=4,96; p>0,01 | 2,5 |

Therefore, in order to determine the effectiveness of the introduced training means with additional power burdens, running exercises on speed, running exercises on a sloping track, running and jumping exercises on sand, exercises on mysterious simulators, the reliable ($p<0.05$) increase in most indicators of special physical fitness of sprinters girls-hurdlers and boys-hurdlers was established.

**Conclusions/Discussion**

As a result of the research, it was found that the average values of physical fitness indicators of the training group of athletes meet the standards for the reseach group of the previous basic training, but for the results of hurdling 60 m to 56% and

in jumping tests to 32% of boys and girls have results, which are lower for this training group, which in turn encourages the search for effective means of sports training in order to increase physical fitness of sprinters-hurdlers at the stage of previous basic training.

The results of the experiment showed the reliable increase in results of girls (7.9%) and boys (10.4%) in run 30 m, 13.5% at girls and 9.5% at boys in run 30 m from the move, in standing long-jump 6.8% at boys, 9.3% at girls and 5.3% at boys; 3.4% for girls and 6.2% for boys in run 60 m; 13.8% girls and 7.7% boys in shuttle run 4x9m; 5% girls and 5.7% boys in hurdling 60 m in the experimental group.

There were no statistically significant differences in run 300m ($p>0.05$), indicating that there were no significant differences in the level of speed endurance at the studied hurdlers.

Consequently, the results of the research found that the use of high-speed and power means in the training process of sprinters girls-hurdlers and boys-hurdlers at the stage of previous basic training positively affect the increase in special physical fitness of sportsmen.

**The perspective of subsequent researches** will be aimed at determining the relationship between indicators of special physical fitness and technical of runners at the stage of specialized basic training.

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