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# Variant of the methodology of speed-strength oriented skills development among young track and field athletes

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**Abstract:** The research work presents the methodology, directed toward quickness, speed, strength development among 11-12 year-old track and field athletes. The claims on the level of physical qualities development among young athletes constantly increase, underlining the necessity to introduce more effective scientifically substantiated methodologies into sports practice. The aim of the research work is to substantiate practically the effectiveness of the speed-strength oriented skills development methodology among 11-12 year-old track and field athletes. ***Material and Research methods***. We used the following research methods in the work: information sources analysis, speed-strength oriented skills testing, mathematical-statistical results handling. The research work was carried out during 2021/2022, on the basis of sports school № 5 in Izhevsk, Russia. 22 track and field athletes at the age of 11-12 took part in the research. We realized three complexes of exercises at a special-preparatory stage. They lasted 31 training lessons. In the series of exercises repetitions with the pauses of rest speed of running decreased. The methodology includes different exercises alternation. It leads to gradual effectiveness increase in speed and quickness testing exercises. ***Results.*** Gradual increase of the results in speed, quickness and strength forms the base of speed-strength oriented skills demonstration among young track and field athletes. We created the complex of special exercises. It helps to vary the load, on this basis optimize the means selection of speed-strength oriented skills development among young track and field athletes. The methodology leads to the firm base creation for a gradual and even quickness, speed and strength increase. It improves not only physical, but also functional readiness of young track and field athletes. The indices in all control exercises of speed-strength skills study among young track and field athletes from the experimental group have the tendency to improve in comparison with the same indices in the control group. ***Conclusion***. A purposeful use of special exercises complex helps to change the level of speed-strength oriented readiness among young track and field athletes. It influences the effectiveness at competitive distances. The use of the presented complexes helps to increase gradually speed-strength oriented skills without speed forcing.

**Keywords:** young track and field athletes, sports training, methodology, speed-strength oriented complex, plan- schedule.

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## Introduction

Training young track and field athletes goes through serious difficulties, first of all difficulties of methodical and moral-ethical character. It can be explained by the fact that serious changes happened in track and field athletes training during last decades. In terms of competitive activity and different sanctions opposition there was a constant increase of physical loads intensity. It significantly increased adaptive abilities of a human organism in professional sport. This situation gradually transferred into sport for children. However, constant and not controlled training load volume and intensity increase is inadmissible for young track and field athletes. There appeared the necessity to reconsider the approaches in physical qualities

development, where speed-strength oriented training takes the leading place in sprint distances.

Young track and field athletes training at the initial stage is one of the most important components for physical and functional base formation in physical and functional development. The methodology of physical training improvement is especially important in the training process of young athletes, as it is the leading component of the training system. The main thing in this system is a harmonious physical qualities and motor abilities development in accordance with the specificity of the chosen kind of sport.

The specialists broadened the range of the used methods of sports training [3,4,5,6,7,8,9,10,11,12,13].

R.A. Abzalov (2010) in his work "Dead ends and prospects of sports training methods development in cyclic kinds of track and field athletics" underlines the directions of sports training improvement. V.G. Alabin (2012) reveals the main principles of training in a long-term training among young athletes [1,2].

S.G. Borovik (2013) underlines the necessity to study a functional state of sprinters' neuromuscular apparatus, defining the dependence of speed qualities on the state of athletes' neuromuscular apparatus [8, p. 305-308].

Considered by us age period of track and field athletes is favorable for motor skills development. Significant morpho-functional quantitative and qualitative changes happen in the organisms of children under the influence of systematic lessons in a chosen kinds of sport [11,12]. It was revealed that natural changes of physical qualities among young track and field athletes are not the same. The specialists revealed their dependence on biological development of an organism, on the training effects and typology of blood circulation [13].

Physical abilities and anthropometric results of a young athlete predetermine the success in a chosen kind of sport. Tall and slim children would be successful in high and broad jumping. Young track and field athletes, who are short and strong-built, are inclined to powerful starts and speed running. The initial determination of physical qualities among young track and field athletes helps to plan sports training successfully.

In the opinion of the specialists, great role in training track and field athletes should belong to speed-strength oriented qualities, as working capacity and the success of the performances depend on these qualities [10,11,12,13].

Taking into account age-related regularities of quickness of movements, speed-strength oriented qualities and biological factors (which condition them) development would help to use more rationally the recommended means and methods of sports training depending on age, gender and qualification of the athletes. On the basis of solving the problems of a personality's harmonious development, health improvement among young athletes, higher level of speed-strength oriented qualities development creates favorable preconditions for their further sportsmanship improvement.

Nowadays in the theory of physical education and sports training great attention is paid to the methodology creation of speed-strength oriented qualities development. It means the ability to develop maximal power of the efforts within a short time period preserving optimal amplitude of movements.

There are no experimental results, which characterize optimal volume and dynamics of speed and speed-strength oriented exercises during year-round and long-term training of young track and field athletes. This problem conditioned the aim of the present research work.

The aim of the research: to check in practice the effectiveness of the speed-strength oriented skills development methodology among 11-12 year-old track and field athletes.

**Materials and methods**

Research methods: information sources analysis, testing, mathematical-statistical results handling. The indices of speed-strength oriented readiness among young track and field athletes were defined with the help of the following tests: standing long-jump and triple jump; 30 m running; 60 m running; pull-ups at a high bar.

The research work was carried out since October, 1, 2021 till December, 30, 2021, on the basis of sports school № 5 in Izhevsk, Russia. 22 track and field athletes at the age of 11-12 took part in the research.

**Results and discussion**

High effect of the training can be provided only in case if the level of physical qualities increases in a yearly cycle together with a successful solution of all training objectives. That is why the dynamics of speed-strength oriented indices should be planned beforehand, be provided by the whole organization of the training load and should be controlled. The practice proves that the dynamics of the level of speed-strength oriented indices among track and field athletes gradually increases by the competitive period. General volume of speed-strength oriented load increases by the middle of special-preparatory stage of the preparatory period. During the systematization of speed, strength, quickness development among young track and field athletes a considerable increase of speed-strength oriented skills is provided in a chosen kind of sport. In this case it is important not to achieve too quick indices increase, as it can lead to nervous processes tension in cortex. Speed-strength oriented exercises planning helps to get a firm base for physical

readiness increase jump among young track and field athletes. But often used means of speed-strength oriented qualities development can lead to speed barrier.

For the research organization we created the complex of special exercises, directed toward speed-strength oriented skills development among 11-12 year-old track and field athletes (table 1).

Table 1

Complex of speed-strength orientated exercises

| Description and content of the exercise | Dosage | Methodical instructions |
|---|---|---|
| Comlex № 1. “Jump from one foot to the other”. Is fulfilled along the straight distance with the point. The start from the initial position standing feet together. The movement is directed upwards with the stress on complete repulsion with the stationary foot. | 4-5x30-40 m; rest walking till 50 sec. 30-40 m | The exercise is fulfilled gradually. The tempo of movement gradually increases. |
| Complex № 1 “Jumping on two feet”. The exercise is fulfilled from a complete squat stand moving forward. The start of the exercise from the initial standing position. After each squat an athlete moves forward with the jumps. | 1 series – 8-10 repulsions; 2 series – 10x12 repulsions; 3 series – 12x15 repulsions | Legs after a squat stand during the repulsion are completely straightened. |
| Complex № 2 “Hurdle-race”. The exercise is fulfilled using 10 barriers, set along one line on a track. Barriers are placed one after another on the track, taking into account technical demands of barriers use. | 1 series – 6 barriers x 2-4 attempts; 2 series – 8 barriers x 4-6 attempts | The height of the barriers is no more than 50-60 cm taking into account individual abilities of young track and field athletes. |
| Complex № 2. “Jump onto the dais”. Dais is placed on a plane surface taking into account technical safety demands concerning the exercise fulfillment. | 1 series – 4x6 jumps onto; 2 series – 6x8 jumps onto. | The height of the barriers till 60-70 cm |
| Complex № 1. “Skip jumps on two legs”. The exercise is fulfilled pulling up the knees to the chest. | 1 series – 4x6 pull-ups 2 series – 6x8 pull-ups. | During skip jumps the body shouldn’t be severely bent forward |
| Complex № 1. “Standing upward jumps with two legs repulsion”. The jump is fulfilled standing with one's back to the bar, the athlete comes behind the bar gradually | 1 series jumps 2 series – 10x12 jumps. | Available height |
| Complex № 1. “ Standing long-jump ”. | 15-20 repulsions | 85% from maximal |

| | | |
|---|---|---|
| Complex № 2. “ Standing triple jump ” | 15-20 repulsions | 85% from maximal |
| Complex № 2. Running from different initial positions. Initial positions: prone position; backwards; bent standing position; crouch start. | 3x30m | To change the periods of orders giving |
| Complex № 2. Linear and shuttle races. Outdoor games | till 30’ and 1 min | Running races, jumping and mixed races, games |
| Complex № 3 Deadlift 5-10 kg x 5-10 times; 10-15 kg x 6-8 times; 10-15 kg x 4-6 times (three attempts). Straight legs barbell rowing: 10-15 kg x 4-6 times (three attempts 4-6 times each). Pull-ups 4-6 times, after 30 sec. 4-6 times of repetitions. Twisting on Roman chair till 10-20 repetitions. | 1 series of repetitions | The exercise is realized taking into account individual characteristics of physical qualities demonstration |

Presented in table 1 complex of exercises was used during the main part of the training lesson and was used during all training lessons of general-preparatory and special preparatory stage of training 11-12 year-old athletes. At first sight exercises seem to be not new, however, their realization in the presented sequence helps to influence physical qualities development.

Table 1 shows that complex № 1 is directed toward speed-strength oriented qualities development among young track and field athletes and includes mainly jumping exercises. Complex № 2 includes the starts from different initial positions, shuttle races, outdoor games and after all a triple jump.

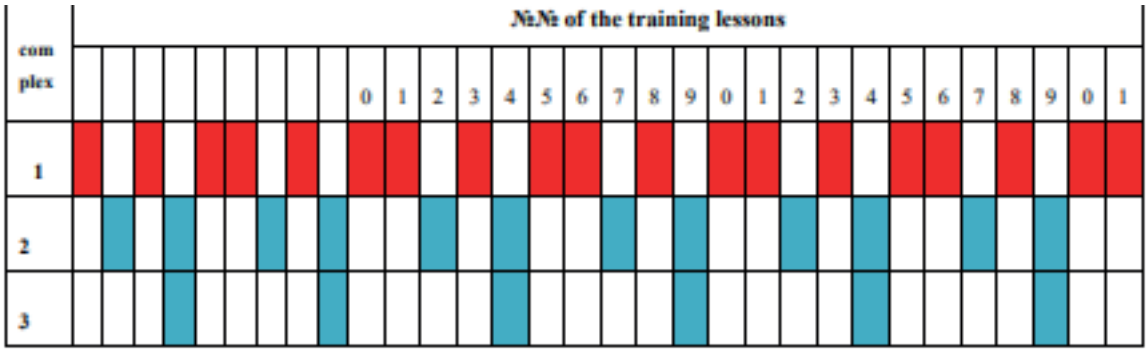
Complex № 2 for young track and field athletes became a basic one and was realized through the lessons. It provided the need formation for speed-strength oriented exercises and adaptation of the main group of muscles to speed and strength oriented load.

Complex № 3 became the basic one and was directed toward strength abilities of muscle groups improvement. Deadlift, barbell rowing for young track and field athletes were used in order to strengthen muscle corset and develop strength oriented abilities. It forms the base for sprinting formation. Pull-ups were used as the exercises for strength abilities development of the upper shoulder girdle and twisting on a Roman chair was used for body muscles strengthening.

Table 2 presents a model schedule of the complexes of exercises № 1, № 2 and № 3, realization. They are directed to speed-strength qualities development among young track and field athletes.

Table 2

A model schedule of the training complexes realization




Analyzing special information sources and taking into consideration the interviews with coaches, we came to the conclusion that many coaches underestimate the role of speed-strength oriented training, considering it some addition to running training. Using monotonous, similar exercises at the lessons with young athletes leads to increase of students, who discontinued training at the early stages of sports training. If some coaches use a directed speed-strength oriented training, very often it has generally developing character. It is far from the specificity of the chosen kind of track and field (sprinting). Some research works show that rationally organized complex special speed-strength oriented training provides significant effectiveness improvement of all system of training among young track-and-field athletes. The role of speed-strength oriented training is not only in the level of motor qualities increase, but also in a specific training effect of speed-strength oriented exercises. A complex development of speed-strength oriented qualities significantly influences the indices in speed-strength oriented exercises and physical development of young track and field athletes.

The organized speed-strength oriented readiness testing helped to study the main motor qualities appearance among young track and field athletes and define the level and tempo of their development and also the expediency of the offered complex of exercises realization (table 3).

Table 3

Indices of speed-strength oriented readiness of young track-and-field athletes

| Indices in testing exercises | Control group (n= 11, (X±δ)) | | | Experimental group (n= 11, (X±δ)) | | |
|---|---|---|---|---|---|---|
| | before | after | difference | before | after | difference |
| 30 m running, sec. | 5,70 ± 0,3 | 5,34 ± 0,6 | 0,36 ± 0,3 | 5,71 ± 0,1 | 5,07 ± 0,2 | 0,64 ± 0,1 |
| 60 meters running, sec. | 9,77 ± 0,1 | 9,66 ± 0,2 | 0,11 ± 0,1 | 9,79 ± 0,2 | 9,27 ± 0,1 | 0,52 ± 0,1 |
| Standing long-jump, cm | 168,5± 2,8 | 171,6 ± 3,2 | 3,1 ± 0,4 | 170,25 ± 3,0 | 198,3 ± 2,6 | 28,05 ± 0,4 |
| Triple standing long-jump, m | 4,98 ± 2,4 | 5,21 ± 2,2 | 0,23 ± 0,2 | 5,00 ± 1,8 | 6,78 ± 1,2 | 1,78 ± 0,6 |
| Pull-up, quantity | 3,5 ± 0,4 | 3,9 ± 0,5 | 0,4 ± 0,1 | 3,6 ± 0,6 | 6,56 ± 0,7 | 2,96 ± 0,1 |

The results analysis in 30 and 60 meters running showed that by the end of the experiment there were valid differences in the indices between the EG and the CG.

At the beginning of the experiment the results in 30 meters running in the examined groups of young track and field athletes were the same, in the end of the research we see more distinct valid improvement, especially in the EG. At the beginning of the experiment in the EG the result in 30 meters running was 5,71+ 0,1 sec., in the end of the experiment the result was 5,07+ 0,sec., the difference was 0,64 + 0,1 sec. In the CG at the beginning of the research the result in 30 meters running was 5,70+0,sec., in the end of the research it was 9,27+ 0,1, the difference was 0,36+ 0,sec.

In 60 meters running the result of young track and field athletes from the EG at the beginning of

the experiment was 9,79+ 0,sec., in the end of the research it was 9,27+ 0,sec, the difference – 0,52+ 0,sec. In the CG the results in 60 meters running at the beginning and in the end of the experiment were the following: 9,77+ 0,sec. and 9,66+ 0,sec.. The difference was 0,11+ 0,1 sec. Analyzing the received results we came to the conclusion that speed qualities of young track and field athletes increase during the complex of differently oriented exercises realization. It was underlined that a gradual increase of the results in testing exercises of speed orientation helps to create a firm base for physical and functional readiness. Quick increase of speed qualities among young track and field athletes can lead to speed barrier in short distances and insignificant increase underlines inefficacy of the training tasks.

It was defined that the exercises, which provide gradual increase of quickness, speed and power, have a positive influence on psychological status of young track and field athletes. The intensity of speed oriented exercises increase in order to increase the speed leads to tense running and speed barrier formation in competitive distances.

In the EG the index of broad jump was the following: at the 1st stage of the research 170,25+ 3,0 cm, in the end of the research 198,3+ 2,6 cm. The difference within the period of the research was 28,05 + 0,4cm.

In the control group there was no significant results increase in broad jump, at the beginning of the research - 168,5+ 2,8 cm, in the end of the research – 171,6+ 3,2cm, the difference during the period of the research was 3,1+ 0,4cm.

In a triple jump we revealed the results improvement in the experimental group for 1,78 + 0,6 m, in the control group for 0,23 + 0,2 m. Insignificant effectiveness increase in triple jump, in the opinion of the specialists, is connected with the difficulty of teaching technical actions.

The result in pull-up among track and field athletes from the experimental group was 3,6+ 0,6 times, in the end of the experiment it was 6,56+ 0,7 times. In the control group the results in pull-up was the following: at the beginning – 3,5+ 0,4 times, in the end – 3,9+ 0,5 times. Thus, in the experimental group the increase of according to this index by the end of the experiment was 2,96 + 0,1 times, in the control group –0,4 + 0,1 times.

**Conclusion**

The created complex of exercises helps to vary the load and on this basis optimize means selection for quickness, speed and strength development among young track and field athletes. The use of the presented complexes helps to increase speed-strength oriented skills gradually among young track and field athletes without speed forcing. It is necessary at the age of 10-12.

A purposeful development of speed-strength oriented skills among young athletes, who specialize in speed-strength oriented kinds of track and field athletics, is the base on which preconditions for sports results improvement in a chosen distances are formed.

It is necessary to pay attention to preferential use of speed-strength oriented exercise in form of game with the importance determination for the definite athlete. During the lessons the exercises for quickness, speed and strength development should be clearly defined.

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