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## **MOTOR ABILITIES TRAINING OF 9-11 YEAR OLD TRACK-AND-FIELD ATHLETES WITH THE USE OF THE CONJUGATE INFLUENCE METHOD**

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**Key words:** young track-and-field athletes, initial training, conjugate, methods of physical training, motor abilities.

**Annotation.** This article presents contents of the experimental method of training motor abilities, which has shown high efficiency in comparison with the traditional one used at the stage of initial training for young track-and-field athletes. The developed method allowed increasing the effectiveness of the training process of 9-11 year old athletes, engaged in groups of initial training by implementing the developed sets of static, static-dynamic, dynamic exercises into the structure of classes, taking into account the goals and objectives set by the coach. A scientifically based algorithm for using the means of general training and complex coordination exercises allowed young athletes to achieve high growth rates of speed, speed-strength and coordination abilities. The present study involved girls (n=51) and boys (n=47), engaged in the «track-and-field» program in the initial training groups of the first, second and third years of training.

**Introduction.** Issue of organizing physical training of beginner athletes has been a subject of studies in different types of sports for many years [1-3], including track-and-field [4-5], and still has not lost its relevance at this moment.

Traditional measures of physical training, developed in different periods, cannot support a high level of development of motor activity in track-and-field athletes of the initial stage of training [6]. The development of modern technologies in sports field opens broad possibilities of the purposeful use of training devices in the training process of athletes [7-8]. Studies [7, 9, 10], which were carried out in this field, showed high effectiveness of the conjugate training of coordination, speed and strength abilities in athletes. Nonetheless, special literature, concerning physical training of young track-and-field athletes at initial stages of training, contains insufficient amount of scientific facts, revealing the technology of conjugate training of motor abilities using training exercises, which include static, static-dynamic and dynamic exercises.

At the modern stage, training devices are used for the conjugate training of coordination, strength and speed abilities in physical training of athletes of different sports [5, 7, 9]. At the same time, there is not enough data on the issue of using training devices when training motor abilities using the conjugate influence method in young track-and-field athletes at the initial training stage.

The issue is that the high level of competitiveness in track-and-field makes requirements to the versatile physical training of young track-and-field athletes. Usually, the use of narrowly specialized measures at initial stages of training leads to the forced development of motor abilities and early specialization. Such approach to physical fitness does not support a comprehensive training of motor abilities in 9-11 year old track-and-field athletes, who engage in initial training groups.

The purpose of this study is to scientifically justify, develop and test the method, which supports a comprehensive training of motor abilities in track-and-field athletes at the initial stage of training with implementing sets of static, static-dynamic and dynamic exercises into the structure of training classes.

**Methods and organization.** During the study, following methods were used: analysis of scientific and methodological literature, pedagogical testing, pedagogical experiment and methods of mathematical and statistical processing of data.

A comprehensive pedagogical testing was conducted according to the following program: “standing long jump”, “10 m running with the crouch start”, “10 m running with the standing start” and “4x9 m shuttle run”.

Girls (n=51) and boys (n=47), who engage in track-and-field in groups of the initial training for the first (IT-1), second and third year (IT-2,3), participated in the pedagogical experiment. Beginner track-and-field athletes, girls (n=25) and boys (n=23), who engage according to the general polyathlon training, were included in control groups (CG). Following control groups were formed:

- 9-year old girls (n=8) and boys (n=8) of the IT-1 groups;
- 10-11-year old girls (n=17) and boys (n=15) of the IT-2,3 groups.

Track-and-field athletes, girls (n=26) and boys (n=24), were included in following experimental groups (EG):

- 9-year old girls (n=9) and boys (n=8) of the IT-1 groups;
- 10-11-year old girls (n=17) and boys (n=16) of the IT-2,3 groups.

For the purpose of statistical analysis and processing of the obtained quantitative material, SPSS Statistics 17.0 and Microsoft Excel 2007 were used. Indicators in formed samples were checked for the normality using the Kolmogorov-Smirnov criterion. To test hypotheses about the equality of average values of the indicators, the Student's t-test was used. The differences were considered significant at a 5% significance level. The mean value ( $\bar{x}$ ) and the standard deviation ( $\sigma$ ) were calculated.

**Results and discussion.** The analysis of Federal standards for track-and-field indicates the fact that for athletes, who are specialized in short-distance running, hurdling, jumping, throwing and all-round, the most significant are speed, coordination abilities and vestibular tolerance (Table). Therefore, when planning physical training of young track-and-field athletes it is important to use an approach, which would support a proportionate development of motor abilities in young athletes at different stages of the long-term training. In our opinion, the conjugate training of strength, speed and coordination abilities is the right approach in the modern system of physical training of young track-and-field athletes.

Table

Effect of physical qualities (abilities) on performance in track-and-field

Physical qualities (abilities)	Sprint and hurdles	Jumping	Throwing	All-round	Short and long distance running	Race walking
speed	3	3	3	3	2	2
strength	2	3	3	3	1	1
vestibular tolerance	1	3	2	2	1	1
endurance	2	1	1	3	3	3
flexibility	1	3	2	2	1	2
coordination	2	3	3	2	1	1

Note: 1 – insignificant effect; 2 – average effect; 3 – significant effect

The methodology of physical training is based on the idea of the conjugate usage of the system of generally accepted measures and developed sets of static, static-dynamic and dynamic exercises during training classes of young track-and-field athletes of the first (IT-1; 70% / 30% respectively), second and third (IT-2,3; 80% / 20% respectively) year of the initial stage of training, aimed to achieve the same goals and objectives.

This methodology includes replacing generally accepted methods with sets of coordinately complicated exercises, which in its turn does not lead to the increase of the duration of the training class and the total time spent for physical training.

Options of conjugating when training motor abilities:

- speed (generally accepted method of physical training) and speed-coordination abilities (integrated sets of exercises);
- strength (generally accepted method of physical training) and strength-coordination abilities (integrated sets of exercises).

Integration of sets of static, static-dynamic and dynamic exercises into the system of generally accepted methods of training is carried out based on following stages:

- the first stage includes performance of “basic” exercises, implementation of which does not include loads with high intensity and coordination complexity. As a

rule, kinematic characteristics of exercises are close to previously learned motor programs;

- the second stage includes an increase of intensity and coordination complexity of integrated exercises. During the implementation of exercises to previously learned motor activities, new elements are added;

- at the third stage, when performing the set of exercises, intensity and coordination complexity reach the highest values. To a greater extent, the selection of these exercises is directed towards the activation of proprioceptive and kinesthetic sensitivity in conditions of limited space and time.

The methodology is based on the algorithm of implementing sets of static, static-dynamic and dynamic exercises on different levels of organizing sports training.

During the large period of training, this methodology is implemented based on following principles: the unity of general and special training, the waviness of applied loads when using generally accepted measures of training and developed training tasks.

On the level of training classes, the use of implemented sets of exercises is based on the continuity of the structure and content of physical loads, is consistent with both previous and subsequent training effects, obeying the following rule: at the beginning of training classes, the emphasis is laid on the conjugate training of speed and coordination abilities, at the end – the conjugate training of strength and coordination abilities.

The used algorithm of implementing exercises and their sets on the level of one training class is based on the following:

- training of speed and coordination abilities using the conjugate method is carried out in the first half of the class's main part;

- training of strength and coordination abilities using the conjugate method is carried out in the first half of the class's main part.

When planning sets of exercises, it is advisable to consider the level of physical development of young track-and-field athletes.

For track-and-field athletes with a low level of physical development, weak constitution and a mass deficit of the body, a decrease in volume and loads by 10-20% is advised. The spectrum of training effects is shifted towards static-dynamic and dynamic exercises.

Meanwhile, for track-and-field athletes with a low level of physical development and excessive body mass, a decrease in volume and loads by 20-30% is advised. The spectrum of training effects is shifted towards static and static-dynamic exercises.

At initial stages, sets, directed towards the conjugate training of speed and coordination abilities, are presented by “basic” jumping and running exercises. The complication of exercises is made through implementing new elements.

Sets of exercises, directed towards the conjugate training of strength and coordination abilities, are made mainly with static exercises, which are the “basic” ones. As static exercises are being mastered, static-dynamic, as well as dynamic exercises, implemented in a group flow method, are included in sets. Coordination complexity of sets of static, dynamic and static-dynamic exercises increases through implementing new elements.

Appropriate parameters of training loads in the integrated sets of complex coordination exercises were offered.

Training loads vary, considering age features and the level of development of motor abilities of 9-11 year old track-and-field athletes.

Within the huge period and small cycles of training, exercises and their sets are differentiating by volume (low, average, high) and intensity (low, average, high).

In one training class, sets of exercises directed towards the conjugate training of components of speed and coordination abilities, consist of jumping and running exercises on the “speed ladder”. There are implemented as follows: jumping and speed exercises are performed for 8-15 s. A total amount of exercises in the class – 5-8, an amount of exercise sequences – 1-4, one sequence includes 4-6 repeats, 30-60 s of rest are included between repeats, 30-120 s – between sequences.

Performing sets of exercises, directed towards the conjugate training of components of strength and coordination abilities, implies using a non-stable surface in the training class, and is carried out using the repeated or interval method based on following load parameters:

- duration of one static exercise varies from 20 to 30 seconds. 1-4 exercises are included into the class, a total number of repetitions is 1-4, 30-120 s of rest are also included;

- a number of repeats of one static-dynamic exercise is 8-15 s with a fixation in main support points (0,5-1 s). In case of using weights, the weight varies between 1-3 kg. The class includes 3-5 exercises, with 2-4 repeats and 1-2 minutes of rest;

- duration of one dynamic exercise varies from 15 to 25 seconds. The class includes 1-4 exercises, with 2-4 sequences and 6-8 repeats. Rest period in each repeat takes 15-30 s, between sequences – 1-2 minutes.

We implemented a group parallel pedagogical experiment in order to evaluate the developed experimental methodology.

At the end of the experiment, female track-and-field athletes of the EG (IT-1 and IT-2,3) revealed significant differences ( $P < 0,05$ ) in four pedagogical tests in comparison with the CG. In male track-and-field athletes of the EG (IT-1) significant

differences ( $P < 0,05$ ) were revealed in two pedagogical tests: the “standing long jump” and “4x9 m shuttle run”. In male track-and-field athletes of the EG (IT-2,3) significant differences ( $P < 0,05$ ) were revealed in three pedagogical tests: the “standing long jump”, “10 m running with the crouchstart”, “10 m running with the standing start”, as well as the “4x9 m shuttle run” in comparison with the CG.

**Conclusion.** A contradiction between existing approaches in teaching motor abilities and modern tendencies of sports development was revealed in the theory and methodology of physical training of 9-11 year old beginner track-and-field athletes.

We suggested the methodology of physical training, based on the idea of the conjugate use of generally accepted and developed sets of coordinately complicated exercises in training classes of young track-and-field athletes, oriented towards solving the same goals and objectives. The methodology includes a replacement of a part of generally accepted measures with sets of developed exercises, which, in its own turn, leads to the increase of the training class’s duration and total time spent on physical preparation.

We organized and implemented the pedagogical experiment in order to check the effectiveness of the developed methodology. As a result, significantly higher indicators of tests, showing speed, speed-strength and coordination abilities in track-and-field athletes of the first, second and third year of the initial training, were revealed.

### References

1. Guba V.P. Individualization of young sportsmen training / V.P. Guba, P.V. Kvashuk, V.G. Nikitushkin // M.: Physical Education and Sports. – 2009. – 276 p.
2. Liguta V.F. Assessment of the state of conditioned physical fitness of schoolchildren / V.F. Liguta, A.V. Liguta / Problems of modern teacher education. – 2016. – № 53(4). – P. 42-53.
3. Platonov V.N. Motor qualities and physical training of athletes / V.N. Platonov // M.: Publishing house «Sport». – 2019. – 656 p.
4. Morozov A.P. Features of building a complex training session at the stage of initial training in track-and-field athletics / A.P. Morozov, N.A. Semenenko, A.A. Dotsenko // National Association of Scientists – 2015. – № 9-1 (14). – P. 49-50.
5. Tabakov A.I. Features of training of young track-and-field athletes / A.I. Tabakov, V.N. Konovalov // Track-and-field. – 2020. – №3-4 – P. 22-26.
6. Sokolova N.M. Comparative analysis of the effectiveness of two variants of the initial training program for young athletes / N.M. Sokolova // Yaroslavl. – 2009. – 24 p.

7. Platonov V.N. Motor qualities and physical training of athletes / V.N. Platonov // M.: Publishing house «Sport». – 2019. – 656 p.

8. Matishev A.A. Risk factors and measures to prevent injuries of the musculoskeletal system in young athletes / A.A. Matishev, G.A. Makarova, S.A. Loktev, S.M. Chernukha // M.: Publishing house «Sport». – 2018. – 128 p.

9. Konovalov V.N. Physical training of hockey players with the use of technical means / V.N. Konovalov, D.A. Bernatavichyus, A.I. Tabakov, A.N. Martynenko, V.A. Blinov / Siberian State University of Physical Culture and Sports, Omsk. – 2020 – 188 p.

10. Nikolayeva O.O. Optimization of the training process in cross-country skiing based on a special functional training / O.O. Nikolayeva, E.A. Liskovskij, P.D. Dobrenko // Improving the Professional and Physical Training of Cadets, Students of Educational Organizations and Employees of Law Enforcement Agencies: materials of the International Scientific and Practical Conference. – 2014. – P. 382-385.

### **Spisok literatury**

1. Guba V.P. Individualizatsiya podgotovki yunykh sportsmenov / V.P. Guba, P.V. Kvashuk, V.G. Nikitushkin // M.: Fizkul'tura i Sport. – 2009. – 276 s.

2. Liguta V.F. Otsenka sostoyaniya konditsionnoj fizicheskoy podgotovlennosti shkol'nikov / V.F. Liguta, A.V. Liguta // Problemy sovremennogo pedagogicheskogo obrazovaniya. – 2016. – № 53(4). – S. 42-53.

3. Platonov V.N. Dvigatel'nye kachestva i fizicheskaya podgotovka sportsmenov / V.N. Platonov // M.: Sport. – 2019. – 656 s.

4. Morozov A.P. Osobennosti postroeniya kompleksnogo trenirovochnogo zanyatiya na etape nachal'noj podgotovki v legkoj atletike / A.P. Morozov, N.A. Semenenko, A.A. Dotsenko // Natsional'naya Assotsiatsiya Uchenykh. – 2015. – № 9-1 (14). – S. 49-50.

5. Tabakov A.I. Osobennosti podgotovki yunykh legkoatletov / A.I. Tabakov, V.N. Konovalov // Legkaya atletika. – 2020. – №3-4 – S. 22-26.

6. Sokolova N.M. Sravnitel'nyj analiz effektivnosti dvukh variantov programmy nachal'noj podgotovki yunykh sportsmenov: avtoref. dis. ...kand. ped. nauk / N.M. Sokolova // Yaroslavl' – 2009. – 24 s.

7. Platonov V.N. Dvigatel'nye kachestva i fizicheskaya podgotovka sportsmenov / V.N. Platonov // M.: Sport. – 2019. – 656 s.

8. Matishev A.A. Faktory riska i mery profilaktiki travmatizatsii oporno-dvigatel'nogo apparata u yunykh legkoatletov / A.A. Matishev, G.A. Makarova, S.A. Loktev, S.M. Chernukha // M.: Izdatel'stvo «Sport». – 2018. – 128 s.

9. Konovalov V.N. Fizicheskaya podgotovka khokkeistov s ispol'zovaniem tekhnicheskikh sredstv: uchebno-metodicheskoe posobie / V.N. Konovalov, D.A. Bernatavichyus, A.I. Tabakov, A.N. Martynenko, V.A. Blinov // Sibirskij gosudarstvennyj universitet fizicheskoj kul'tury i sporta. – Omsk. – 2020. – 188 s.

10. Nikolaeva O.O. Optimizatsiya trenirovochnogo protsessa v lyzhnykh gonkakh na osnove spetsial'nogo funktsional'nogo treninga / O.O. Nikolaeva, E.A. Liskovskij, P.D. Dobrenko // Sovershenstvovanie professional'noj i fizicheskoj podgotovki kursantov, slushatelej obrazovatel'nykh organizatsij i sotrudnikov silovykh vedomstv: materialy mezhdunarodnoj nauchno-prakticheskoj konferentsii. – 2014. – S. 382-385.

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