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The variants of endurance development effective means among young track and field athletes

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Abstract: The article is about the realization of means and methods of endurance development, directed toward the needs of young track and field athletes. We created the variants of different means use during the objectives of general endurance increase realization. The article presents the variants of the used means volume for endurance development in percentage. We substantiated theoretically and checked practically the effectiveness of different variants of means for endurance development in sprint. We realized the variants of the training effects of a versatile general, aerobic orientation of a long-term influence and a long even running and anaerobic orientation realization owing to combination realization of an even and repeated running at a fixed parts of 100,150,200,250 meters. **Research methods and materials.** The article uses the methods of analysis, comparison and matching the results of scientific-methodical literature and the results of experimental studies analysis. The research was held during the following period: since 2018 till 2021. Young 12-14 year-old track and field athletes, who trained in the training groups, took part in the research. The research was held on the basis of a sports school in Izhevsk, Russia. We organized three training groups and one control group. Each group included 13 people. In the 1st group of young track and field athletes running with the developing exercises for all groups of muscles development prevailed. In the 2nd group athletes were trained including a long-term running in an even tempo with further increase of the volume and intensity. In the 3rd group the training included general physical training (GPT) exercises and even running. In order to reveal the effectiveness of the used running loads at the running distances (1,2,3,4,5 km) in the experimental group of athletes we revealed the intensity of running at a standard distance of 1000 meters. We received the results of the control testing during different variants of endurance development training complexes realization. **Results.** We tested physical readiness using the following control exercises: instant 20 meters running; crouch start 60 meters running; 500 and 1000 meters running; standing long-jump; flexibility revealing test in a form of a lean; 3 kg shot throwing. **Conclusion.** The results of three variants of the training influences realization showed physical working capacity increase and adaptation to long-term training effects. Track and field athletes, who realized three variants of the training influences, according to all indices in the control tests, had the advantage over the athletes from the control group.

Keywords: young track and field athletes, sports training, endurance, means and methods.

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Introduction

One of the main conditions of an effective level of training achievement among young track and field athletes is the ability to select means and methods of physical qualities development. It is important to take into account the volume of training loads depending on the direction of

the training classes. Yu.V. Vysochin in his work “Modern notions of athletes’ organism urgent adaptation physiological mechanisms to physical loads” underlines that it is necessary to take into consideration the functional reactions to physical loads, especially in terms of neuromuscular system. The scientist supposes that the volume of the physical

load is conditioned by the level of influence on the functional systems of athletes' organisms [1, p. 28-30]. General endurance development and training means and methods selection among track and field athletes in terms of sports specialization are not sufficiently characterized in present information sources [2,3,4]. It is especially connected with speed oriented kinds of track and field athletics. L.D. Nazarenko in her work "Factors, which influence the effectiveness of 400 meters running among qualified 17-20 year-old female athletes" defines the significance of specialized physical qualities level demonstration, especially special endurance. It should be developed at the initial stages of training young track and field athletes.

In our opinion, it is necessary to have scientifically substantiated and effective methodology of aerobic productivity of an organism increase among athletes, directed toward general and special endurance development [6,7,8,9,10,11].

The aim of the present research work was theoretical substantiation and practical effectiveness check of different variants of means realization for endurance development in sprint.

Materials and methods

The research was held at the basis of a sports school in Izhevsk, Russia. We organized three training groups. Each group included 13 people, young 12-14 year-old female track and field athletes. In the 1st group of young track and field athletes running with the developing exercises for all groups of muscles development prevailed. In the 2nd group the athletes trained including a long-term running in an even tempo with further increase of the volume and intensity according to HR till 160 beats/min. In the 3rd group the training included general physical training (GPT) exercises and even running. We also organized recurring and alternate running interchange.

In the EG-1 we realized the 1st variant of training during general-preparatory stage of the preparatory period of the 1st semi-annual cycle of sports training among athletes.

In order to reveal the effectiveness of the used running loads at the running distances (1,2,3,4,5 km) in the experimental group of athletes

we revealed the intensity of running at a standard distance of 1000 meters. We also defined the intensity of running for track and field athletes at the level of a moderate, even and optimal intensity.

For example, in order to get the value of a light run in terms of time of overcoming 1000 meters ($5,30 \pm 0,23$ min) with the intensity 50%, athletes from the EG have to run 5-6 km, when the athletes from the CG run only 2,5-3 km.

Fig. 1 presents block-scheme of the first variant of the diverse general orientation training influences. The objectives and means of young track and field athletes' sports training. Young athletes from the EG-1 worked according to this block-scheme. CG-1 included young athletes. They trained taking into account the demands of the model program of sports training in accordance with the Federal State Educational Standards (FSSES).

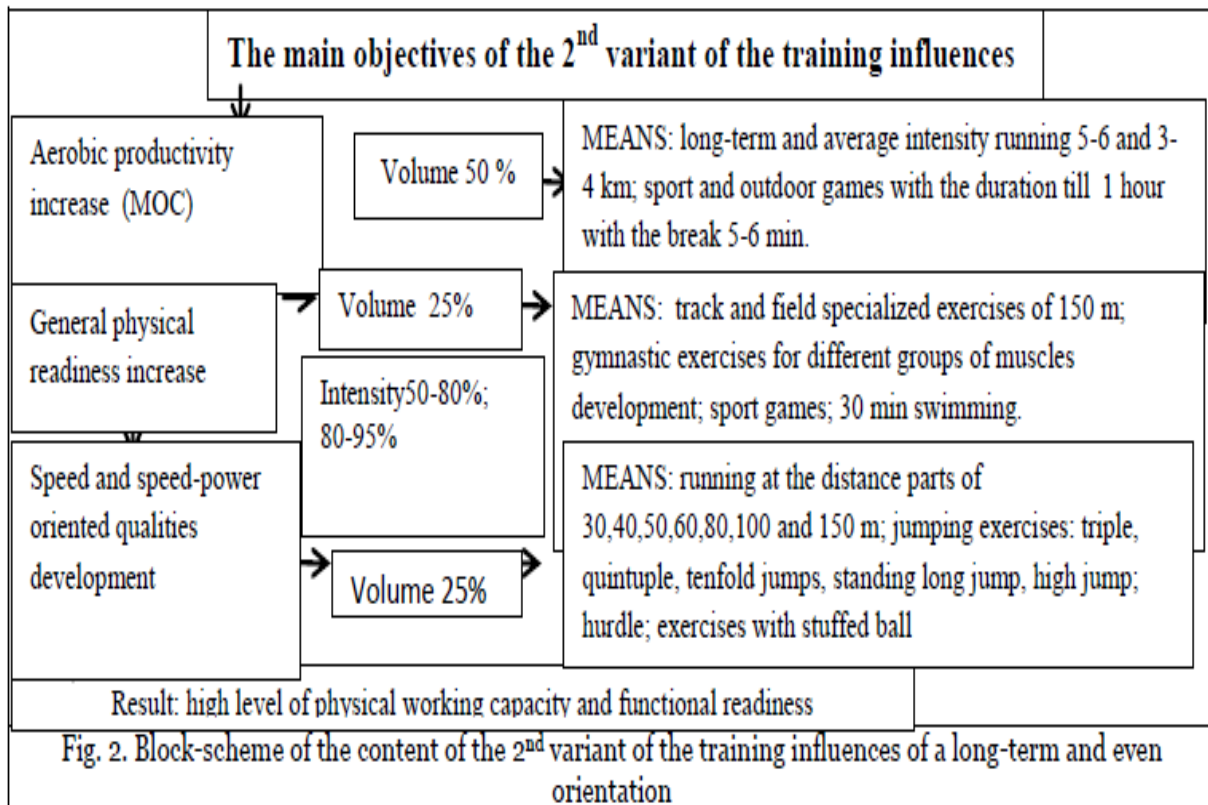
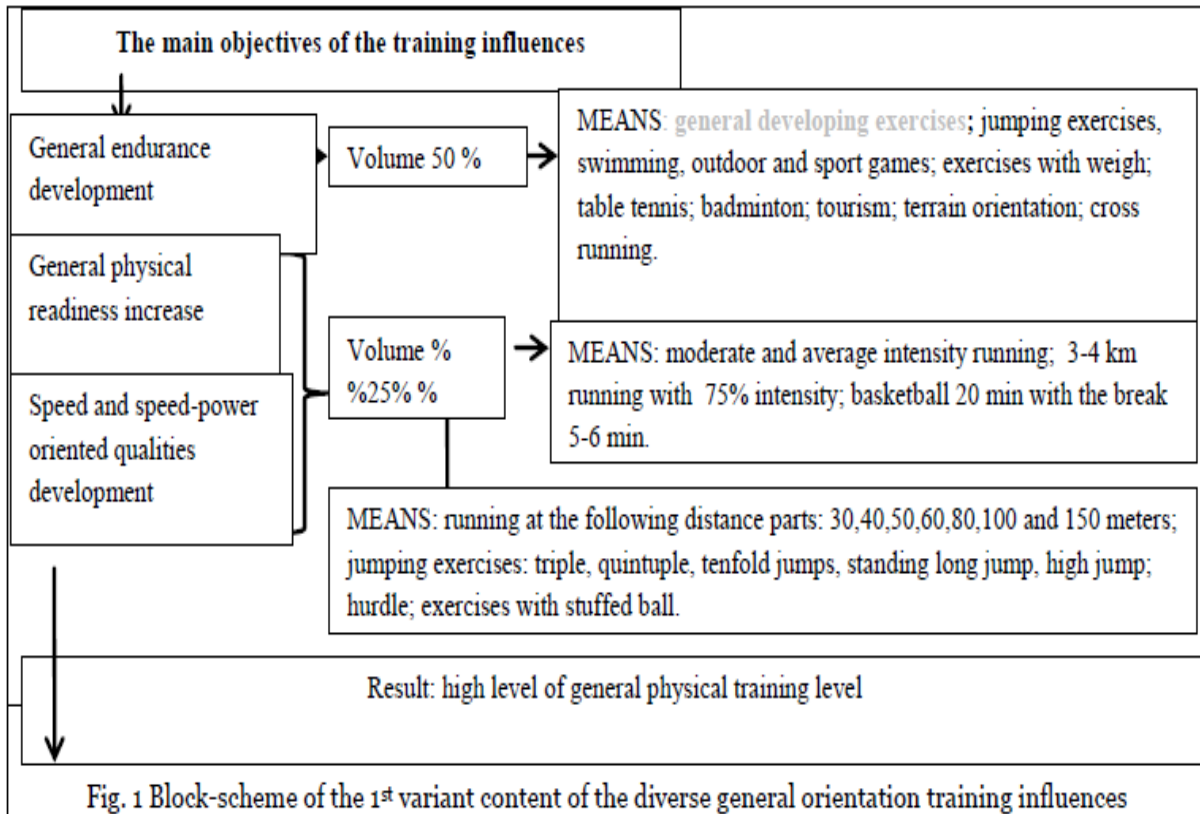
Fig. 1 shows that the training influences solve the problems of general endurance development, physical and functional readiness increase and speed and speed-power oriented qualities development. They are held gradually and systematically. The methodology of running intensity determination is well-known and helps to differentiate the training influences taking into account the initial level of physical readiness and physical qualities development among track and field athletes.

During a semi-annual sports season we organized 32 training classes with the 1st variant of planning. The content of the educational-training lesson parts, apart from the experimental methodology, was the same in both groups. Then we paid attention to tiredness among the athletes. It was controlled according to HR rehabilitation indices. We had regular Ruffier Dickson test and the control testing at 60,100 and 500,1000 meters distances.

The 2nd variant of planning training classes in the EG-1 included a long-term even running, directed toward aerobic productivity and physical working capacity increase.

Picture 2 shows a block-scheme of the 2nd variant content of the training influences of aerobic orientation and a long-term even running realization. EG-2 worked according to this scheme.

In CG-2, the same as in CG-1 the lessons were organized taking into account the demands of the model program of sports training in terms of sports school in accordance with the Federal State Educational Standards (FSES).

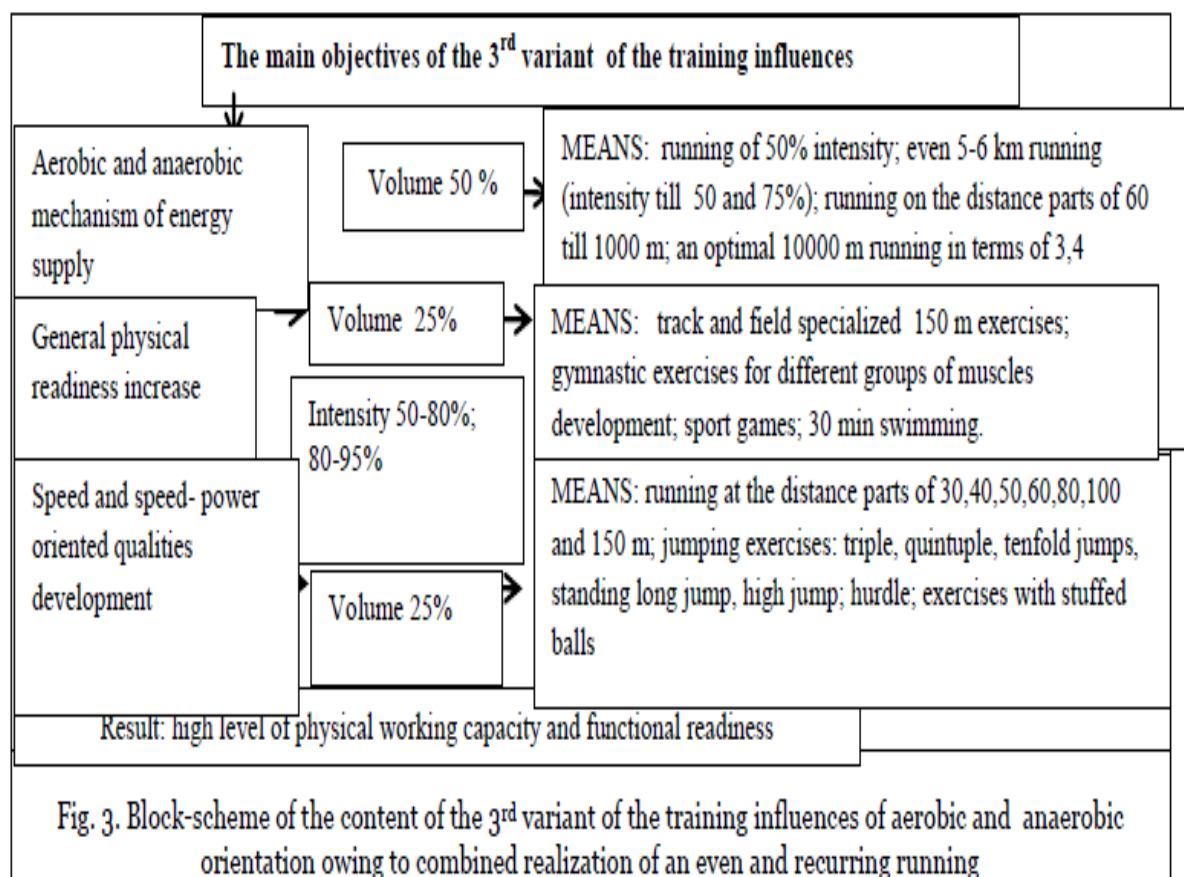


In the second variant of the aerobic orientation training influences a long-term influence and a long-term even running realization was held in terms of easy, even loads with optimal and great loads inclusion till 5-10%.

The third variant of the training influences for the athletes from EG-3 included both even and recurring influence owing to a long-term, alternating and recurring running realization. The volume of general developing and special running exercises gradually increased and is included into all parts of the training class. General volume of an even running was from 3 to 20-24 km in EG-3 and 15 km in CG-3 during the week. Alternate running was realized in the volume of 10 km, in CG till 8

km. It was mentioned that a long-term running realization influences functional indices of track and field athletes from the EG-3. Speed and speed-power oriented abilities development during recurring and alternate running realization turned out to be higher owing to endurance and speed increase.

Fig. 3 presents a block-scheme of the 3rd variant content of an aerobic and anaerobic orientation training influences owing to combination of an even and recurring running at the fixed distance parts 100,150,200,250 m. The EG-3 worked according to this scheme. In the CG-3 the same as in the CG-1, the CG-2 the lessons were held taking into account the demands of sports training program model.



The third variant of aerobic and anaerobic orientation training influences owing to combined realization of an even and recurring running at a fixed distance parts of 100,150,200,250 m was substantiated with the help of indices control at the distance parts of 60,100 and 500 m. The results of 1000 meters running were considered as optimal ones in terms of the result from 4,20 till 4,55 min.

Results and discussion

3 variants of the training influences realization was organized in the experimental groups of young athletes. In spite of the fact that there was the probability to have a negative influence of a long-term even and recurring running on the athletes organisms, we supposed that physical loads,

directed toward general endurance development in terms of the considered age range, has a negative influence on nervous system lability and it would lead to speed qualities decrease. The received results of physical and functional readiness showed that the technique of motor actions improved, physical and functional readiness increased and the effectiveness of competitive performances improved.

We tested physical readiness using control tests: instant 20 meters running; crouch start 60 meters running; 500 and 1000 meters running; standing long-jump; flexibility revealing test in a form of a lean; 3 kg shot throwing.

In the 1st variant the training influences organization showed increase in 20 m running - 3,36%; in 60 m running - 2,46%; 500 m running - 5,02%; in standing long jumps - 10,5 %; in 3 kg shot throwing - 10%; in flexibility - 23%.

It is mentioned that the training means, directed toward general endurance development, help to increase speed, power, endurance and flexibility.

In the 2nd variant the of the training influences organization showed the increase in 20 m running - 4,6%; in 60 m running -7,46 %; in 500 m running -5,12 %; in 500 m running- 6,5 %; in 3 kg shot throwing- 13,5%; in flexibility - 19,7%.

It is mentioned that in this variant we see speed, speed-power oriented qualities, flexibility and endurance level increase.

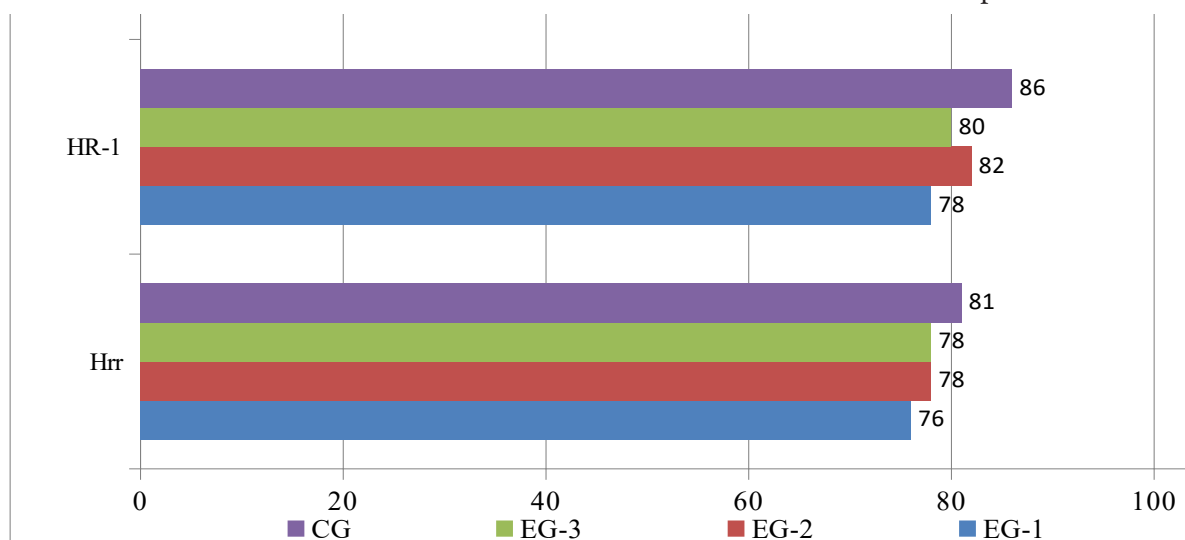
The third variant turned out to be more effective, than the 2nd and the 1st variants. There we have more significant increase in control testing exercises. The training influences organization showed the increase in 20 m running - 16,6%; in 60 m running - 4,46%; in 500 m running - 11,32%; in standing long jumps - 8,57 %; in 3 kg shot throwing-23,3%; in flexibility - 24,4%.

It is seen that the third variant is more effective for physical and functional readiness increase among track and field athletes.

In the control group we revealed insignificant increase in the following control tests: in 20 m running- 1,6%; in 60 m running - 0,46%; in 500 m running -1,62%; in 500 m running- 12,57 %; in 3 kg shot throwing - 21,3%; in flexibility - 18,4%. Significant valid results increase turned out to be in the following tests: standing long jump, shot throwing and flexibility and it characterized the training influences of speed and speed-power orientation.

In order to characterize functional readiness we used HR indices. They were registered before the training class and after the main running loads and during rehabilitation period.

Picture 1 presents HR dynamics in the studied groups during the period of a long-term even running realization. In CG HR dynamics was more significant, as the index of lack of even running, directed toward endurance development.



Notes.: HRr – heart rate at rest; HR-1 – heart rate before the training; HR-2 – heart rate after running; HRrh – heart rate of rehabilitation

Fig. 4. Dynamics of HR indices among the athletes from CG and EG before and after an even long-term running

Thus the process of three variants of training influences realization showed physical working capacity increase, an effective adaptation to long-term training influences. The athletes, who trained in three variants according to all indices in control testing exercises had the advantage over the athletes from the control group.

Conclusion

The held analysis of control tests results showed that the athletes' from the experimental group had physical working capacity increase in terms of a complex means realization with the intensity 50, 60, 80 and 95% from maximal one.

The running program realization using an even tempo had a positive influence on the work of athletes' cardiovascular system. Aerobic productivity increases parallel in case of speed and speed-power oriented qualities development. Systematic training classes, directed toward general endurance development, don't decrease speed qualities of athletes. It is important to take into account the indices, which characterize the activity of respiration and heart, as the condition of functional readiness increase.

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