The dynamics of the condition of athletes depending on organization of training activities high-speed power orientation

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Postgraduate student **Pan Yuantsyuan**[1]
M.S. Kozhedub[1]
Dr. Hab., Professor **E.P. Vrublevskiy**[1, 2]
[1]Skorina Gomel State University, Gomel, Belarus
[2]Smolensk State University of Sports, Smolensk

Corresponding author: vru-evg@yandex.ru

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Abstract

Objective of the study was to discern objective trends that reveal the correlation between the performance of female sprinters and the extensive training regimen they undergo in speed and strength training during the initial phases of the annual cycle.
Methods and structure of the study. Seven young sprinters, aged between 15 and 17, were observed for a period of thirteen weeks. Their specific physical abilities were evaluated through a series of tests, including a ten-fold jump from a standing position and measurements of muscle strength in the isometric mode while extending the leg at the knee and hip joints. The frequency of these tests was two to three times a month, and it was adjusted to coincide with the phases of each athlete's OMC.
Results and conclusions. It was discovered that during the initial six weeks of the program, the athletes experienced a statistically significant decrease in both absolute and explosive strength in the leg extensor muscles, as well as a decline in their performance in the tenfold jump. The subsequent reduction in the jumping and strength training (from the seventh to the thirteenth week) resulted in a substantial improvement in speed and strength indicators. The observed phenomenon in the course of the study aligns with a general biological pattern observed when applying substantial training effects that require a substantial mobilization of energy resources and can disrupt the body's homeostasis, leading to the development of long-term adaptive changes.

Keywords: *short-distance runners, speed-strength training, dynamics of condition, training load, preparedness, indicators.*

Introduction. The effectiveness of the training process largely depends on the competence of the trainer in establishing the relationship between the dynamics of the athlete's condition and the specified training load on various structural units of the annual cycle [2, 3, 6]. At the same time, objective management of the training process is possible only when identifying the individual reaction of the body of those involved to the specific effects of training means [1, 6].

Objective of the study was to discern objective trends that reveal the correlation between the performance of female sprinters and the extensive training regimen they undergo in speed and strength training during the initial phases of the annual cycle.

Methods and structure of the study. Seven short-distance runners (aged 15-17) were observed for 13 weeks. Their level of special training was assessed based on the results of a ten-fold jump from the spot and indicators characterizing the athlete's ability to demonstrate "explosive efforts" that are inaccessible to direct measurement using traditional means. The following were determined on a dynamograph stand: Fmax - the maximum value of force demonstrated in explosive isometric effort (kg); Tmax - the time to reach the maximum force (sec); P0 - absolute muscle strength demonstrated in isometric mode (kg) during leg extension at the knee and hip joints. The frequency of control tests was two to three times a month and was correlated with the phases of the ovarian-menstrual cycle (OMC) of each athlete.

Results of the study and discussion. Figure 1, 2 show how during the performance of a large

volume of speed-strength load (the first 6 weeks) the athletes statistically significantly ($p<0,05$) decreased the indicators characterizing the absolute and explosive strength of the leg extensor muscles. In particular, in the 5th week, when the volume of exercises with weights and jumping exercises was the greatest (Figure 2), the absolute muscle strength decreased by an average of 9,7%, the explosive muscle strength decreased by an average of 11,1%, compared with the background level (Figure 1). Considering the low level of speed-strength training, it can be assumed that at this time not only are the prerequisites for productive work on improving special running training not created, but also conditions arise for injuries to the musculoskeletal system of athletes. After the subsequent decrease in the volume of the load (from the 7th to the 13th week), the athletes showed an intensive increase in the indicators of speed-strength fitness. In the last (13th) week of the study, the explosive power of the leg extensor muscles increased by 13,5%, the results in the 10-fold jump from the spot increased by 7,1%, compared with the initial level in the first week of observation (Figure 1). Thus, the increase in the level of speed-strength fitness of the runners after volume loads of a strength and jumping nature is a phenomenon of the delayed cumulative training effect (DCTE), repeatedly noted in the theory and practice of sports as a natural manifestation of the aftereffects of performing a large training load [2, 3, 5]. The high level of motor potential of the athletes during this period creates a favorable functional background for targeted work on improving special running fitness.

Conclusions. The temporary decrease in speed-strength preparedness recorded during the study

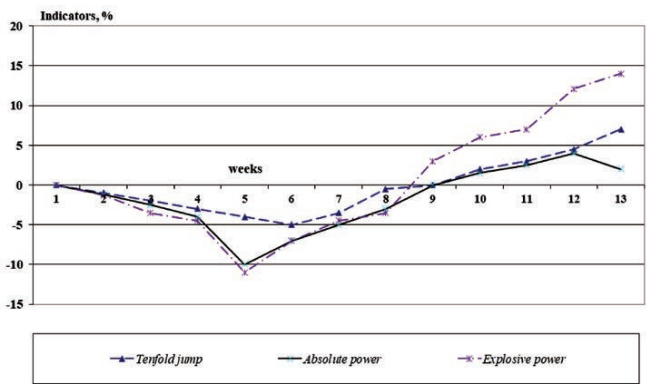

Figure 1. Dynamics of control indicators in short-distance runners during pedagogical observations

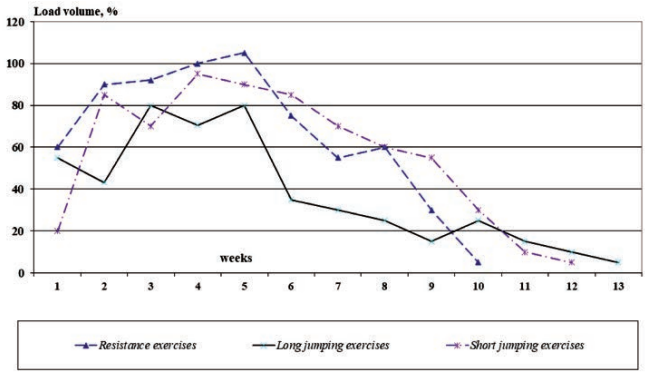

Figure 2. Dynamics of the volume of speed-strength load in short-distance runners during pedagogical observations

reflects the general biological regularity of the body, observed when using significant training effects that can cause a violation of the body's homeostasis and, thus, cause the development of long-term adaptive changes [2, 5]. In this case, the depletion of the body's energy resources caused by physical activity is compensated by exceeding the initial level, as a result of which the functional capabilities of the body increase, which brings it to a higher level of performance [5]. It is also important that after an intense training load, the athlete's body needs a certain period of time to adapt to the level of load and consolidate the required adaptive changes [2, 3]. The obtained results, characterizing the dynamics of the recorded indicators from the biorhythmics of the OMC course of runners, are also noteworthy. Thus, the highest level of strength capabilities in the observed athletes was recorded in the postmenstrual and postovulatory phases ($p < 0.05$). This fact should also be taken into account when planning speed-strength work in women's training. Thus, the conducted pedagogical observations have sufficiently fully characterized the features of training structure for short-distance runners in the preparatory period of the macrocycle, and also showed the existence of a relationship between the dynamics of the indicators of special training of athletes and the speed-strength load performed. Based on this, their training process should be planned with the expectation, first of all, of a very specific (and pre-supposed!) orientation in the individual dynamics of the level of special training of the athlete and organized in such a way as to achieve the desired level of the corresponding indicators by the time of the most important competitions in the upcoming season [4, 7].

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