A method for personalizing the training regimen for elite female athletes in modern pentathlon over an annual training cycle

PhD, Associate Professor **S.V. Sevdalev**[1]
Associate Professor **V.A. Borovaya**[1]
Dr. Hab., Professor **E.P. Vrublevskiy**[1,2]
[1]Skorina Gomel State University, Gomel, Belarus
[2]Smolensk State University of Sports, Smolensk

Abstract

Objective of the study was to create and support a method for personalizing the year-long training of elite athletes in modern pentathlon.

Methods and structure of the study. The research was conducted at the Gomel Olympic Reserve Center for Applied Sports and the Scientific Research Laboratory of the Gomel State University named after F. Skorina. The study aimed to establish a systematic approach to personalizing the training of female athletes in modern pentathlon. The developed algorithm was implemented in the training of six elite athletes.

Results and conclusions. A series of steps has been devised to tailor the training of athletes in the sport of modern pentathlon, which encompasses a range of activities. These include:

a) Identifying the collective and personal characteristics of the athletes' competitive performance and readiness, which serves as the foundation for creating personalized training plans.

b) Establishing the individualized approach to training, selecting the appropriate tools, and determining their distribution within the annual training cycle.

c) Considering the interplay between training load, physical attributes, psychological factors, and biorhythms, we design a personalized training program for the athlete, spanning an entire annual cycle.

The final phase of this process involves monitoring the planned and actual performance indicators, making adjustments to the training regimen, and evaluating the athlete's performance in both training and competition.

The efficacy of the algorithm we developed is evident from the substantial enhancement in the physical and athletic performance of the athletes who participated in the study, as well as the improvement in their results in the events of modern pentathlon.

Keywords: qualified female athletes, modern pentathlon, algorithm, modeling, planning, individualization.

Introduction. Tracing the dynamics of views on the process of training highly qualified female athletes and trying to identify the main central link, we certainly encounter the problem of individualization. The latter is justified by the fact that the highest result in sports is a singular and unique phenomenon, and preparation for it requires each time the search for new ways. Therefore, the transformation of general patterns of growth of sports skills through the prism of individual characteristics of an athlete is an extremely difficult task, and an active search for reserves of sports training puts the individualization of the training process among the most priority researched problems.

Sports all-around events are distinguished by increased demands on athletes due to the need to show high results in motor actions that vary in kinematic and dynamic structure. Thus, representatives of the modern pentathlon must have a whole complex of seemingly incompatible motor abilities, characteristic of athletes specializing in swimming, fencing, equestrian sports, shooting and running. The mutual, not always positive, influence of the types included in complex sports all-around events requires a special approach to planning the training process. In addition, the coach

must take into account the biological characteristics of the female body [1, 8].

Experts attribute the following to the main areas of individualization of training of qualified female athletes: modeling the competitive structure and level of special training, adequacy of the content of training and competitive loads to the morphofunctional characteristics of athletes, taking into account the current state of athletes and fluctuations in performance in connection with the phases of the OMC, correction of training, competitive and non-training effects in accordance with the individual characteristics of athletes [2, 7].

An analysis of specialized literature shows that almost all modern literary sources available to us, considering the features of individualization of the training process in women's sports, are devoted to individual types (athletics, swimming, rowing, etc.), less often to sports games. Research studying this problematic field in complex types of all-around events is represented by isolated publications. It should be emphasized that recent years have been marked not only by changes in competition rules, but also by the indefinite suspension of Russian and Belarusian athletes from participation in international competitions. All this seriously complicates the process of planning the training process.

Objective of the study was to create and support a method for personalizing the year-long training of elite athletes in modern pentathlon.

Methods and structure of the study. The research was conducted at the Gomel Olympic Reserve Center for Applied Sports and the Scientific Research Laboratory of the Gomel State University named after F. Skorina. The study aimed to establish a systematic approach to personalizing the training of female athletes in modern pentathlon. The developed algorithm was implemented in the training of six elite athletes.

Results of the study and discussion. An analysis of literary data, recommendations from experts, our own practical experience and experimental research made it possible to develop an algorithm for individualizing the annual training of qualified female athletes in modern pentathlon.

The developed algorithm has three blocks: analysis, development and management. It highlights two most significant objects of individualization – competitive activity, reflecting the totality of the athlete's actions during the competition and the training process

- the main way of preparing athletes for competitive activity.

The analysis block includes an assessment of the integral components of individual competitive activity and the leading specific qualities and abilities that ensure the effectiveness of its manifestation. Thus, based on the analysis of the competitive activity of the world's strongest athletes [3, 5, 7], group models are created, from which a model is selected that is closest to the individual characteristics of the competitive activity of a specific athlete, including the possible range of results in various types of pentathlon. Then a promising model of the individual level of development of the motor potential and functional characteristics of the athlete's body, parameters of technical skill that determine and limit the components of her competitive profile in the following year is developed.

The development block assumes an individual focus of the training process, for which the necessary training effects are selected and their distribution in the structural units of the annual cycle is specified. The model of the annual cycle planning structure is developed based on traditional, generally accepted theoretical approaches to planning the training process [2, 5], taking into account the features of the competition calendar and individual adaptive capabilities of the athlete, a detailed analysis of previous training cycles. When building a training process in various all-around events, specialists recommend paying special attention to the types to which athletes have a pronounced predisposition [3, 5]. The annual training cycle we developed included two macrocycles. The first (September-March) consists of a general preparatory (3 mesocycles) and special preparatory (2 mesocycles) stage, a competitive (1 mesocycle) and a transitional period (1 mesocycle). The second (March-August) includes a general preparatory (1 mesocycle) and special preparatory stage (2 mesocycles), a competitive stage (5 mesocycles) and a transition period (1 mesocycle).

The training process management unit involves organizing individualized training of the all-around athlete in an annual cycle, which is based on taking into account the relationship between the training load and the condition, morphological, psychological and biorhythmological characteristics of the athlete. In turn, the final stage of training process management is monitoring the planned and actual indicators, with subsequent correction of the training effects and

competitive activity of the all-around athlete. The effectiveness of the training program was ensured by a feedback system, the function of which was to regularly (two to three times a month) control assessment of the current state of the athlete, the level of her technical skill, comparison of real characteristics with model ones and correction, if necessary, of the training program. For this purpose, the most informative physical tests, indicators of functional and technical readiness were selected, having a high correlation with the competitive result [4, 6]. At the same time, the training program acted as the main technological basis for turning the target setting into reality. The organization of the training process for female athletes requires taking into account the biological cycle of their body's biorhythmics [1, 8]. In this case, special attention is paid to the premenstrual and menstrual phases of the OMC, in which physical performance is at a relatively low level. As a rule, in these phases, an "unloading" week of the mesocycle should be planned.

Conclusions. The practical implementation of the developed algorithm in a pedagogical experiment made it possible to significantly reduce the total annual volumes of training loads of various types, since its organization was more efficient and individualized. In addition, the developed content and distribution of training effects made it possible to streamline and facilitate current and stage control. Analysis of the data obtained based on the results of competitive activities in the 2022-23 season revealed a statistically significant improvement in the results in such pentathlon disciplines as fencing and combined relay, as well as in the final pentathlon total. Thus, the basis of the methodology for individualization of training in modern pentathlon should be an integrated approach that helps to combine into a single whole different aspects of an athlete's preparedness, components of her athletic skills for the implementation of effective competitive activities. The organization of individualized preparation of a multi-event athlete in the annual macrocycle should be based on the consideration of the adequacy of the magnitude and direction of the assigned training effects to the athlete's condition, her morphological, psychological and biorhythmological features. At the same time, the central place in the individual preparation system should be occupied by exercises that are the main elements of competitive disciplines and are as close to them as possible in form, kinematic and dynamic structure, the mode of operation of the neuromuscular apparatus and the activity of the functional systems of the multi-event athlete's body.

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