Parameters of training load in mountain runing as a factor of training process management

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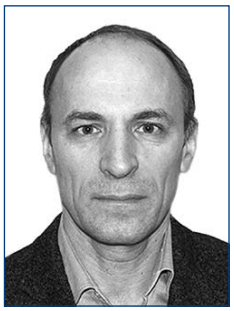

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Abstract

Objective of the study was to increase the efficiency of pre-competition training of mountain running athletes through adaptation to extreme specific factors of competitive activity.

Methods and structure of the study. The parameters of the training activity of eight qualified mountain running athletes aged 26.5±0.5 years were studied. The use of training loads was based on accentuated running uphill with a height gain of 1360 m in one workout. The principle of load specificity in mountain running has been implemented.

Results and conclusions. The use of load indicators allows us to stimulate the deployment of additional reserves for increasing functional readiness in mountain running. The use of a two-peak variant of increasing the mountain running load in the content of a training session makes it possible to maintain the overall magnitude of the impact of the load on the athlete's body while reducing the partial contribution of the total running intensity.

Keywords: *mountain running, mountain running loads, density of climbs, load specificity.*

Introduction. Mountain running, as a dynamic athletics discipline, places high specific demands on the functional preparedness of athletes [3]. The methodological basis for building pre-competition training in long-distance mountain running (26-30 km) is the concentration of high-intensity partial loads when performing training volumes comparable to the duration of the competitive distance, which has an exceptionally stressful effect on the functional systems of the athletes' body [5]. This necessitates an increase in the period of active rest in order to achieve an optimal state of recovery [6].

The magnitude of the total impact on the athletes' body is achieved both by the volume and intensity, and by the specificity of the load [2]. The specific factors of the mountain running load are the height, steepness, length of the climbs, the density of their distribution per distance segment, the nature of the ground support, the angle of the lateral slope of the route sections, the nature and correspondence of the descents and ascents [4, 8].

Varying the emphasis of pre-competition preparation will presumably make it possible to control the resonances of adaptation to the competitive load in mountain running [7]. In particular, updating the impact of the lifting factor will make it possible to reduce the distance volume of an individual workout, shorten breaks for recovery and speed up adaptation to peak specific loads [1].

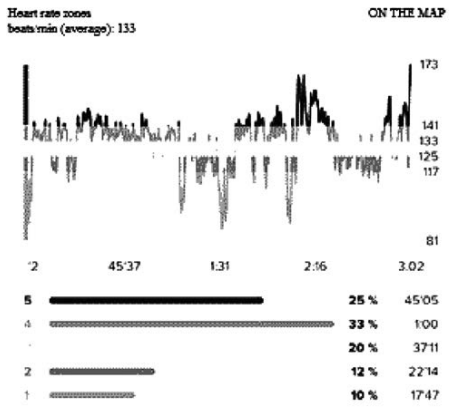
Objective of the study was to increase the efficiency of pre-competition training of mountain running athletes through adaptation to extreme specific factors of competitive activity.

Methods and structure of the study. The parameters of training and competitive activity were screened for eight qualified mountain running athletes aged 26.5±0.5 years with basic training in the classical running disciplines of athletics.

Athletes were trained for the target competition distance of 28500 m (+1545; -1545) under trail running conditions. The fractal application of training loads was based on an accentuated uphill run with

a height gain of 1360 m in one workout, which approximately corresponded to the total height gain in the main competitive exercise. The total length of the training route was about 50% of the competition route. The intensity of the load increased by maintaining the speed of running uphill at the level of running speed on the plain. An example of training parameters is presented in table 1.

An important factor in the content of the training was the passage of two peaks of lifts with an increase in the intensity of the load during the lift; running speed was maintained constant. The density of climbs was 138 m per 1 km of distance, which was 38 meters higher than the density of climbs on competitive routes recommended by the Mountain Running Federation. An increase in load intensity manifested itself in an increase in functional indicators of heart rate (see figure).



Distribution of pulse zones in training content

The structure of the microcycle of the pre-competition training module provided for a two-time training session with a special mountain running focus. The training algorithms included increasing the energy intensity of training stimuli through the use of high-intensity mountain running loads.

Examination of the effectiveness of the two-peak microcycle construction model was assessed using replicators of technical, functional and result indicators. Training and testing of athletes was carried out in mid-mountain areas (1000-1800 m above sea level) in the pre-competition and competitive training module.

Research results and discussion. Based on the results of factor analysis, partial components of development were identified that determine the achievement of peak mountain running performance.

Table 2 presents the dynamics of technical and functional indicators of mountain running readiness within the framework of the pre-competition training module.

According to the results of the study, the most significant factor identified was the specificity of mountain running load during ascent (44.3% of the sample variance), which ensures the occurrence of basic and additional processes of adaptation to the specific load when climbing at high running speeds, as well as maintaining the rhythmic and tempo indicators of running at high density distribution of climbs along the distance. The structure of the factor emphasizes the specific focus of mountain running training on functional changes in the 4th and 5th zones of energy supply to muscle activity. The total amount of time spent working in these zones amounted to more than 50% of the training time. The metabolic profile of mountain running provided a selectively accentuated development of the power of the anaerobic-glycolytic and anaerobic-alactate mechanisms of energy supply.

A significant increase in the speed of overcoming climbs with a decrease in step frequency and an increase in step length indicates a parametric adjustment of the individual boundaries of the qualitative state of the technique of mountain running athletes.

The content and direction of the factor of transformation of general functional readiness into special mountain running readiness (22.1% of the sample variance) provided several directions for adaptive restructuring of functional and energy systems. The achievement of a higher speed mode for overcoming mountain climbs is due to a change in the standard incentives for increasing the level of fitness through the use of specific mountain running loads.

The operational focus of the replication factor ensured the systematic application of mountain running loads and the associated processes of activating the neurophysiological state of mountain running athletes. Repetition of the peak of a special load in uphill running within the framework of training while maintaining the speed of movement provides parametric regulation of the training effects of prolonged tension of adaptive

Table 1. *Ergometric characteristics of training in mountain running*

13030 m Distance	04.31 min, s/km Average running pace	1:56.44 Total ascent time	1:03.25 Total descent time
3:02.27 Total time	133 beats/min Average heart rate	1234 m Total lift length	1193 m Total descent length
14.00 min, s/km Average running pace	173 beats/min Maximum heart rate	1822 m Highest point of ascent	704 m Lowest point of descent

Table 2. *Technical and functional indicators of athletes' mountain-running readiness*

Index	Stages		t
	Pre-competition	Competitive	
Running speed in the ascent of 5%, m/s	2,6±0,8	2,9±0,5	1,8
Time to climb 100 m, s	39,8±2,7	35,5±0,29	0,6
Step length, cm	189,7±23,6	197,4±18,9	2,3
Cadence, steps/min	59,5+5,3	57,3±6,2	1,7
Reactivity, arb. units	0,64±0,04	0,87±0,04	1,9
Mountain running 28500 m, min	172,6±6,9	165,4±7,8	4,6

mechanisms and regulatory systems. The internal commonality of work at the peak sections of mountain running determines the synergy in the development of high-speed movement capabilities uphill.

A consequential sign of the effectiveness of duplicating peak performance in uphill running segments is an increase in the reactivity of the athletes' body and a significant increase in sports results. A significant improvement in the time to complete the competitive distance in mountain running at 28500 m (+1545; -1545) under trail running conditions was 5%.

The use of load indicators as a factor in project management fixes the connections between the specificity of the load and the dynamics of achieving sports form by mountain running athletes as an object of management. The implementation of the principle of load specificity in mountain running determines the innovative approach to achieving peak indicators of the functional state of mountain athletes.

Conclusions. The use of load indicators allows us to stimulate the deployment of additional reserves for increasing functional readiness in mountain running. An increase in the volume of training aids in uphill running causes tension in the adaptation mechanisms and regulatory systems. The results obtained prove the effectiveness of varying the partial components of the development of athletes' readiness in mountain running.

The use of a two-peak version of increasing the mountain running load in the content of a training session makes it possible to maintain the overall magnitude of the impact of the load on the athlete's body while reducing the partial contribution of the total running intensity. This shortens the recovery periods for athletes and makes it possible to increase the number of impact mountain-running sessions in the structure of the microcycle of the pre-competition training module.

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