

OPTIMIZATION OF SPECIAL PHYSICAL FITNESS OF SPORTSWOMEN - SUPER LONG DISTANCES RUNNERS BY MEANS OF RUN TRAINING

Karaulova S.I., Klochko L.I.
Zaporizhzhya National University

Abstract. *Purpose:* improvement of special physical fitness of sportswomen – super long distances runners by means of run training. *Material:* in the research 6 elite sportswomen of 25-27 years' age participated. We analyzed documents of training proves planning; analyzed sportswomen's diaries. *Results:* three cycle system of annual macro cycle's construction was put in the base of modern training system for elite marathon sportswomen. We found general and partial volumes of run load of different orientation in annual macro cycle. Optimal duration of maximal load's segments during anaerobic training was from 30 sec. to 3 minutes. Rest between segments was slow run during 3 – 8 minutes. With it, sportswomen fulfilled repeated run at segments of 15x200 m, 15x400 m, 12x600 m. *Conclusions:* effectiveness of system of sportswomen's special physical fitness improvement is determined by rational correlation of differently oriented run means, which were directed at increase of special fitness level in marathon.

Key words: marathon, elite sportswomen, macro cycle, training process, training load.

Introduction

Modern system of elite sportsmen's training is characterized by exclusive complexity. Every of its various structural components can substantially influence on sports result

In light athletics improvement of modern sports training is especially difficult. On the one hand we observe quick increase of sportsmanship, which characterizes modern competitions. On the other hand, sports training continue to become still more intensive and complex. Run at super long distances is the hardest kinds of light athletics. It requires high aerobic abilities of sportsmen's organism, formation of which takes very long period of time. That is why their first high results sportsmen began to achieve after 5-6 years of hard training. For this period of time they master rational technique and tactic of run, increase motor skills and improve organism's functional systems [8, 17, 22].

One of requirements of elite sportsmen's training system's improvement (for super long distances) is increase of training process's effectiveness at the account of optimization of total volume and intensity of differently oriented training loads; as well as owing to formation of training process's effective building in the frames of annual macro cycle structural elements [11, 15].

In our previous works we regarded rational building of training process in respect to the strongest sportswomen in conditions of Midlands and Highlands [5], effectiveness of speed-power training in marathon [6], specificities of cardio-respiratory system's functional state in super long distance' sportswomen's organism [7].

Nowadays, the problem of training loads' optimal distribution at annual macro cycle separate stages is rather urgent. Besides, the problem of importance of different energetic orientation loads and their contribution in sports results' change is still discussable.

Hypothesis: effectiveness of special physical fitness improvement of super long distances' sportswomen – runners is determined by selection of certain correlation of differently oriented run training means.

The purpose of the research: is improvement of special physical fitness of sportswomen – super long distances runners by means of run training.

Material and methods

Participants: elite sportswomen of 25-27 years' age, who specialize in marathon distance run (n=6). Three sportswomen were the members of light athletics combined team of Ukraine.

Organization of the research: in the frames of experiment we questioned (in the form of talks) leading coaches and sportswomen [1, 6, and 15]. The topic of talks was problems of training process planning in annual macro cycle. Analysis of individual training plans and sport diaries permitted to determine general and partial volumes of differently oriented run loads and their dynamic in the frames of preparatory and training meso cycles. Analysis of competitions' records [19, 20] permitted to find sportswomen's results in marathon. We made a model of training process for marathon within annual macro cycle.

Statistical analysis: all received data as well as experimental data were processed with the help of statistical package of Microsoft Excell with calculation of the following indicators: mean arithmetic (\bar{X}); mean square deviation (σ); variation coefficient (v).

Results of the research

At the beginning of the research we determined construction of training process's structural elements for sportswomen within the frames of annual macro cycle (see table 1). Annual macro cycle was divided into autumn –

winter preparatory period (September – November); winter competition period (December); spring preparatory period (January – March); spring - summer competition period (April – November); transitive period. Spring- summer competition period was divided into first competition meso cycle (csportswomen participated in control starts); pre-competition meso cycle; second competition meso-cycle (sportswomen started in main competitions).

Table 1. Structure of training process's construction and parameters of differently oriented training loads' volumes in annual macro cycle

Periods	Autumn-winter preparatory period (months) (3)	Winter competition period (month) (1)	Spring preparatory period (months) (3)	Summer competition period			General volume of run, km
				CM 1 1 month	PCM 4 months	CM 2 3 month	
Loads of aerobic character (km)	1622.2	248.0	1391.8	384.0	1886.0	1449.2	6981.2 (0.85%)*
Loads of mixed aerobic-anaerobic character (km)	411.5	62.0	311.0	91.0	423.0	319.0	1617.5 (1.46%)
Loads of anaerobic character (km)	54.6	8.0	43.4	31.3	92.3	49.1	278.7 (2.16%)

Notes: CM 1 – first competition meso cycle; PCM – pre-competition meso-cycle; CM 2 – second competition meso-cycle; * – variation coefficient in brackets (v).

Analysis of correlations of different character run means during annual cycle permitted to determine:

- Volume of aerobic character run load – 6981.2 km (that was 78.6 % from general volume in annual training cycle);
- Volume of aerobic-anaerobic character run load –1617.5 km (that was 18.3 % from general volume of run);
- Volume of anaerobic character run load – 278.7 km (that was 3.2 % from general of run).

Detail analysis of structure of partial run loads volumes' distribution in preparatory and competition periods permitted to determine their wave-like dynamic (see fig.1). Different fluctuations of volumes were characteristic for every period of macro cycle. Sportswomen's training was based on model of three cycle system of annual cycle construction. In this connection the highest reduction of run loads' volumes was determined in competition periods (December, April, September and November). In these periods sportswomen started at international and Ukrainian competitions.

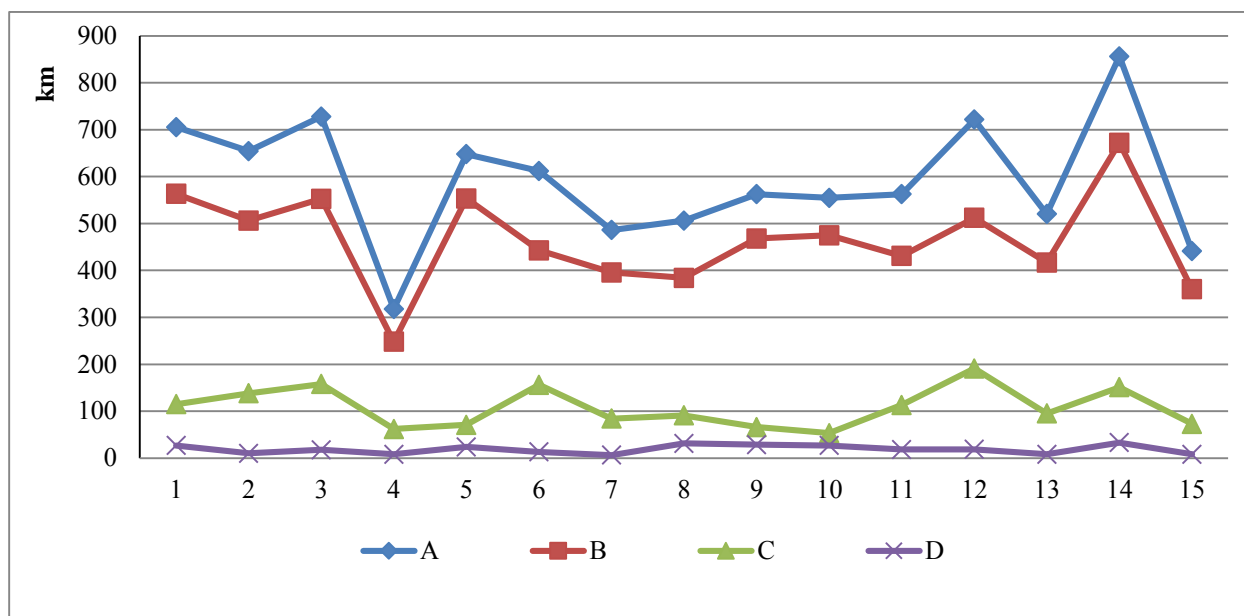


Fig.1. Distribution of differently oriented run loads' partial volumes in annual training macro cycle
Notes: 1-15 – months of macro cycle (September-November); km – kilometers; A – general volume of run; B – volume of aerobic loads; C – volume of aerobic-anaerobic loads; D – volume of anaerobic loads.

Significant increase of run loads' volumes was realized in November (autumn-winter preparatory period); in January (second preparatory period); in August and October (summer-autumn competition period). After significant volume it was planned to gradually reduce loads. These data are explained by the fact that before competitions sportsmen followed such correlation of differently oriented run loads. The found correlation of training run means for increase of special physical fitness permitted for sportswomen to achieve high sports results at competitions from 2.31'30" to 2.40'20" [19, 20].

Discussion

The fulfilled researches [3, 4, 9, 21] determined that effective control over super long distances sportswomen's physical training can be realized only under conditions of rational content and construction of annual training cycle.

The conducted research permitted to substantiate demand in further improvement of sportswomen's special physical fitness by means of differently oriented run training. A number of authors [8, 18] note that composing of optimal training program in marathon run is possible only with knowledge of organism's energy supply principles. The work of marathon runner is ensured by aerobic energy by 95% and by anaerobic energy – by 5%. Such correlation of training run loads of different orientation is explained by the fact that endurance of marathon type is conditioned to large extent by organism's aerobic potentials. That is why the highest volume of run load (6981.2 km) was realized by sportswomen at the accounts of aerobic means. The main means of aerobic trainings during annual cycle were:

- Durable, continuous run from 20 km to 50 km in even and variable temp (heart beats rate – HBR - 140-150 bpm⁻¹ in preparatory period and 160-170 bpm⁻¹ in competition period) in training and extensive zones of loads;
- Slow run in recreational zone of loads.

When realizing such means organism's ability for complete realization of aerobic potentials in competition functioning is increased and improved.

For training of organism's anaerobic potentials we used means of simultaneous anaerobic glycolytic and aerobic influence. Lactate system is better trained by interval method. Maximal lactate concentrations are achieved at distances from 400 m to 800 m. Thus, optimal duration of maximal load's segments at anaerobic training was from 30 sec. to 3 minutes. The rest between these segments was slow run during 3-8 minutes. With it, sportswomen fulfilled repeated run at segments 15x200 m, 15x400 m, 12x600 m.

Sportswomen also used anaerobic-aerobic loads: temp run, fartlek – “speed game”. By character of energy supply temp run is the most close to competition. In opinion of most of specialists temp run is the main mean of specific endurance training. Temp run was fulfilled in variable and continuous ways. Temp runs were realized at distances from 20 to 40 km and more. Speed of such run was 80-90% from competition marathon speed.

Run with acceleration at short distances from 50 to 100 meter in gym took in sportswomen-marathon training process only 3.2% of total run scope. Run with acceleration was fulfilled for training of quickness and speed endurance.

Theoretical analysis of the questioned coaches also permitted to determine that for increase of marathon results it is necessary to have high results at stayer distances. That is why, during annual cycle sportswomen participated in competitions at distances from 6 km to 30 km.

Results of the research supplement also theoretical ideas [13] about organization of qualified super long distances sportswomen's training process at modern stage. Three cycles planning of annual training, completing by main competitions of the cycle is rational structure of training process construction for elite marathon sportswomen. Such planning is conditioned by sportswomen's participation in 4 marathon competitions. It is optimal quantity of performances. Higher quantity of performances at marathon competitions results in over-tension of nervous system and failure of organism's adaptation processes [8, 17]. Specific feature of training process is realization of the achieved fitness level in long term training system (macro cycle), which is concentrated on sportswomen's participation in main starts.

Our own data prove researches of specialists [2, 12, 14] about wave and variable character of loads, which are characteristic for different structural elements of training process. It permits to find dependence between scope and intensity of work, correlation of differently oriented loads, dependence between periods of tensed training and relative recreation. Besides, we supplemented the data of authors [2, 9, 16] about modern approaches to optimization of special physical fitness of elite sportswomen.

Conclusions

On the base of analysis of elite sportswomen's annual macro cycle structure we substantiated conception of sportswomen training process's construction. Such conception was based on main principles of periodization system.

1. We showed that the found correlation of run means for special physical fitness improvement is the main factor of marathon achievements.
2. Increase of effectiveness of sportswomen's special physical fitness improvement is possible at the account of rational correlation of differently oriented run loads' mean. Application of exercises, directed at marathon sportswomen's special endurance improvement will be of first priority.

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Conflict of interests

The authors declare that there is no conflict of interests.

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Information about the authors:

Karaulova S.I.; <http://orcid.org/0000-0003-1582-2368>;
karaulova@mail.ru; Zaporizhzhya National University; Zhukovsky str.
66, Zaporizhzhya, 69000, Ukraine.

Klochko L.I.; <http://orcid.org/0000-0003-2372-6130>;
lubachaclo@rambler.ru; Zaporizhzhya National University; Zhukovsky
str. 66, Zaporizhzhya, 69000, Ukraine.

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