Physical development of athletes of cyclic sports specializing in athletics and cross-country skiing

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Abstract

Objective of the study is a comparative assessment of the development of physical qualities and anthropometric indicators of athletes specializing in athletics and cross-country skiing.

Methods and structure of the study. 35 athletes took part in the study process. The level of sportsmanship of the studied - youth and adult sports categories; the average period of studies is 3.1±0.46 years.

Results and conclusions. Athletes training in middle-distance running have a lower percentage of fat and a higher percentage of the muscle component of the body relative to cross-country skiers, however, the differences do not have a statistical significance of the results. In the diagnosis of physical qualities, it was revealed that athletes-athletes are more physically developed than skiers. The greatest differences are reflected in the indicators of flexibility and strength. At the same time, in terms of the main quality of endurance for these specializations, cross-country skiers slightly, but surpass track and field athletes in terms of performance.

Keywords: *athletics, cross-country skiing, physical development, physical qualities, anthropometric indicators.*

Introduction. Studies show [1] that general and special endurance is the leading physical quality in middle-distance running and cross-country skiing. However, despite the fact that training of this quality is given considerable attention in sports training, experts note the need for the development of other physical qualities at all stages of training activity. The relevance of the study is also due to the possible influence of the appearance of muscle asymmetries [2, 3, 5] as a result of sports specialization, which are detected in high-class athletes. Regular assessment of the dynamics of the studied indicators will identify periods of the greatest change in the results.

Objective of the study is a comparative assessment of the development of physical qualities and anthropometric indicators of athletes specializing in athletics and cross-country skiing.

Methods and structure of the study. The study involved 35 athletes aged 12-13 years old involved in athletics (17 children: 7 boys, 10 girls) and cross-country skiing (18 children: 9 boys, 8 girls). The diagnostics was carried out among runners who train at medium distances (200 m, 400 m, 800 m) and cross-country skiers who train at distances of 3 km and 5 km. The level of sportsmanship of the studied - youth and adult sports categories. The average period of studies is 3.1±0.46 years.

Assessment of anthropometric parameters included: measurement of body length, weight, measurement of body girth (girth of the thigh, lower leg, shoulder and forearm) and skin-fat folds (folds in the scapula, chest, shoulder, forearm, on the abdomen, above the iliac crest, in thigh and calf areas).

Measurement of body girths and skin-fat folds (Fig. 1) was carried out according to the method of Martirosov E.G. (1982). The data were calculated using the following formulas: to determine the absolute and relative values of the fat component, the formulas of Parizkova and Roth (1972) were used, the average thickness of subcutaneous fat together with the skin was studied using the Matejka formula (1921), to determine the amount of muscle tissue, we used the

Matejka formula (1921), body mass index was determined by the Quetelet index [5].

The assessment of the state of development of physical qualities was carried out through motor tests: 30 m run, 6 min run, shuttle run 3x10 m, standing forward bend, torso lifting from the supine position for 1 min, flexion/extension of the arms in the lying position, long jump with places.

Results of the study and their discussion. The average body length index of athletics athletes was 163.27±2.12 cm; cross-country skiing - 163.9±2.23 cm. Average weight of runners - 48.31+1.92 kg; ski racers - 51.6 + 2.66 kg. The values of anthropometric indicators are shown in Figure 1.

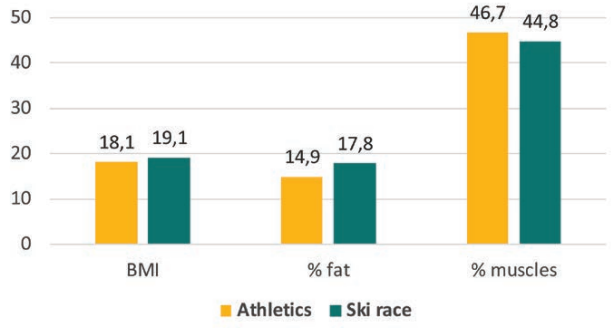

Figure 1. *Anthropometric indicators of athletes*

The results reveal the absence of statistical differences between the studied groups, the differences are insignificant, however, we note that the percentage of fat in athletes is less, in turn, the percentage of muscles is greater. The body mass index of skiers is in the normal range (18.5-24.99), athletes have a body mass deficit (<18.5).

The results of the diagnosis of physical qualities are presented in table 1. For visual representation, the percentage difference is shown in figure 2.

The greatest differences were found in the forward bending flexibility test: track and field athletes

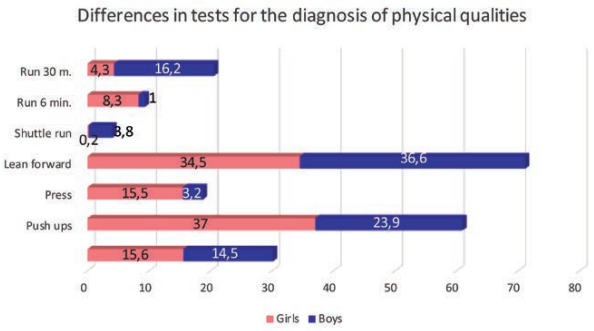

Figure 2. *Percentage of differences in motor tests between runners and cross-country skiers (%)*

have the best development of this quality and outperform girls by 34.5% in cross-country skiing, and 36.6% outperform boys. Significant differences are observed in strength indicators in female athletes - 37% higher in the push-up test and 15.5% higher in the abdominal test. The only test in which skiers showed results slightly higher than athletes was the 6-minute run test for endurance: by 8.3% in girls, by 1% in boys.

Conclusion. Athletics (middle distances) and cross-country skiing are similar in their resources. For athletes of both specializations, the leading physical quality is endurance, and in the technical performance of a profile sports motor action, coordinated work of the upper and lower extremities occurs.

As the study showed, middle-distance track and field athletes have a lower percentage of fat and a higher percentage of the muscle component of the body relative to cross-country skiers, but the differences are not significant. In the diagnosis of physical qualities, it was revealed that athletes-athletes are more physically developed than skiers. The greatest differences are reflected in the indicators of flexibility and strength. At the same time, cross-country skiers, especially girls, slightly outperform track and field athletes in terms of endurance.

Table 1. *Results of diagnostics of physical qualities, (M±m)*

Test	Girls		Boys	
	Athletics	Ski race	Athletics	Ski race
Run 30 meters, s	4.85±0.08	5.07±0.34	4.46±0.06	5.32±0.18*
Run 6 min., m	1197.14±28.51	1305±45	1421.25±29.47	1436.36±40.59
Shuttle run,s	8.14±0.21	8.12±0.48	7.75±0.11	8.06±0.23
Tilt forward, cm	19.86±2.5	13±3.39	7.75±2.78	4.91±1.73
Press, quantity	45.29±1.71	38.25±7.47	46.5±3.8	45±3.24
Push-ups, quantity	21.43±3.4	13.5±1.19	30±0	22.82±2.48*
Jump from a place on two legs, cm	209.14±5.06	176.5±9.14*	229.5±7.89	196.27±6.13*

Note: *p≤0.05 changes are significant in relation to the track and field athletics specialization.

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