

# Comparative analysis of the general physical fitness of qualified polyathletes

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## Abstract

**Objective of the study** was to identify differences in the indicators of physical fitness of polyathletes of the 1st sports category and masters of sports and to evaluate their impact on sports results.

**Methods and structure of the study.** More than 20 young men and juniors with the 1st sports category and 15 men who are active masters of sports in polyathlon took part in the scientific work. The research methods in this scientific work were the analysis of scientific and methodological literature, pedagogical testing, as well as mathematical and statistical data processing. As control tests, tests were selected that are most often covered in scientific research literature and used in the theory and practice of physical education and sports to determine the level of general physical fitness of athletes.

**Results and conclusions.** The analysis made it possible to establish the level of general physical fitness of qualified Krasnoyarsk polyathletes. In this scientific work, the reliability of differences between the studied parameters of polyathletes with the I sports category and polyathletes with the sports title of master of sports was evaluated, and a correlation analysis was carried out in order to identify the influence of the studied indicators on the sports results of athletes. The study allows us to correct the basis of scientifically based model characteristics for the further growth of the sports qualification of polyathletes in the Krasnoyarsk Territory, as well as to determine the main factors for the effective management of the training process of athletes of different age categories.

**Keywords:** *polyathletes of the 1st category, masters of sports, general physical fitness, reliability of differences, correlation analysis.*

**Introduction.** Polyathlon in the Krasnoyarsk Territory is gaining more and more popularity every year and is becoming a truly national sport. The history of the development of polyathlon in the Krasnoyarsk Territory originates from the GTO complex - a system of mass physical education that existed in the USSR and is being revived today in Russia [2]. In the region, the number of sites for the popularization of polyathlon, the preparation of a sports reserve for the national teams of Russia, from the 1st category to the masters of sports of international class, is increasing. Polyathlon departments of children's and youth sports schools of the Krasnoyarsk Territory are located in the cities of Krasnoyarsk, Divnogorsk, Zheleznogorsk, Zelenogorsk, Norilsk, in the districts - Taseevsky, Ermakovsky and Yenisei, as well as in the Evenki municipal district and closed administrative-territorial entity

village of Solnechny. More than 1000 students are engaged in sports clubs in the cities of Achinsk, Lesosibirsk, Minusinsk, as well as in the Pirovsky district. The participation of athletes from the Krasnoyarsk Territory in the championships, cups and championships of Russia and the world in polyathlon is becoming more traditional and massive in terms of the number of participants.

The intensive development of polyathlon all over the world and the acquisition of a socially significant status by it, changes in the rules and refereeing of various disciplines of this sport, the emergence of new types of competitive disciplines, as well as the gradual "erasing" of the boundaries between summer and winter sports bring certain changes to the models of physical fitness of athletes, and also lead to the need to update a large amount of regularly updated data.



To achieve high sports results by people involved in sports training, model characteristics in the form of proper standards of physical and special fitness are a guideline for the pedagogical justification of the training process of athletes. Improving the efficiency of managing the training process of polyathletes is due to the constant improvement of the model characteristics of competitive activity, reflecting, among other things, physical, functional and psycho-functional readiness [3].

**Objective of the study** was to identify differences in the indicators of physical fitness of polyathletes of the 1st sports category and masters of sports and to evaluate their impact on sports results.

**Methods and structure of the study.** The study involved 20 young men and juniors with the I sports category and 15 men - active masters of sports in polyathlon. As control tests, which form the basis of pedagogical testing, tests were selected that are most often covered in scientific research literature and used in the theory and practice of physical education and sports to determine the level of general physical fitness of athletes. The complex of control tests with a sufficient degree of informativeness reflected the necessary general specialized physical fitness of athletes of the studied age and qualification [1].

**Results of the study and their discussion.** A comparative analysis of the physical fitness of qualified polyathletes revealed significant differences in control tests for assessing strength endurance - pull-ups on

a high bar without time limit (184%) and flexion and extension of arms in a lying position (31.48%), a test for assessing maximum effort - bench press (66.66%) and speed-strength form - throwing a projectile at a distance (39.39%). Less significant changes in the results were noted in swimming at 100 meters (23.17%) and flexibility tests (13.33% towards I-dischargers). There were no significant changes in the results in the 100 meters (6.81%) and 3000 meters (7.57%), shuttle run 3 10 meters (5.79%) and long jump from a place (5.91%) and running (6.03%) (see table).

Correlation analysis made it possible to establish the degree of influence of the studied indicators on the sports result. According to the obtained results, Spearman's rank correlation coefficients determine the high impact on the sports result of such indicators as pull-ups on a high bar ( $R=0.95$ ), flexion, extension of the arms in the lying position ( $R=0.86$ ) and 3000-meter running ( $0.81$ ). A moderate correlation dependence of the sports result on the studied variables is observed in the tests - swimming 100 meters ( $R=0.73$ ), running 100 meters ( $R=0.65$ ), throwing a projectile for a distance ( $R=0.57$ ) and jumping length from the spot ( $R=0.53$ ). Low statistical significance of the influence on the sports result was noted in the long jump from a run ( $R=0.44$ ), bench press ( $R=0.34$ ) and forward bend from a standing position ( $R=0.27$ ).

**Conclusions.** One of the most important areas for the development of polyathlon in the Krasnoyarsk Ter-

*The results of a comparative analysis of the indicators of physical fitness of polyathletes of the 1st category and masters of sports*

Type of control tests	I category	Masters of sports	Differences in indicators, %	p	R
	$\bar{X} \pm m$	$\bar{X} \pm m$			
Bench press, kg	60 $\pm$ 1,33	100 $\pm$ 1,33	66,66	< 0,05	0,34
Standing long jump, cm	237 $\pm$ 1,31	251 $\pm$ 1,05	5,91	> 0,05	0,53
Long jump with a run, cm	431 $\pm$ 1,66	457 $\pm$ 1,39	6,03	> 0,05	0,44
Throwing a projectile weighing 700 g at a distance, m	33 $\pm$ 1,30	46 $\pm$ 1,18	39,39	< 0,05	0,57
Run 100 m, s	13,2 $\pm$ 0,23	12,3 $\pm$ 0,15	- 6,81	> 0,05	0,65
Run 3000 m, min	10,30 $\pm$ 5,7	9,52 $\pm$ 4,62	- 7,57	> 0,05	0,81
Shuttle run 3x10 m, s	6,9 $\pm$ 0,11	6,5 $\pm$ 0,09	- 5,79	> 0,05	0,64
Tilt forward from a standing position, cm	15 $\pm$ 0,41	13 $\pm$ 0,37	- 13,33	< 0,05	0,27
Swimming 100 m, s	82 $\pm$ 3,72	101 $\pm$ 2,89	23,17	< 0,05	0,73
Pull-ups on the high bar (number of times)	25 $\pm$ 1,17	71 $\pm$ 1,32	184,00	< 0,05	0,95
Flexion extension of the arms in an emphasis lying down (number of times)	73 $\pm$ 1,01	105 $\pm$ 1,25	31,48	< 0,05	0,86

Note:  $\bar{X}$  is the average value of the sample,  $m$  is the standard error,  $R$  is the level of parameter influence on the sports result,  $P$  is the level of significance.



ritory is the preparation of a sports reserve for the national teams of Russia and the Krasnoyarsk Territory.

The analysis of the research literature has made it possible to establish that the successful growth of the skills of athletes is possible only if there is specific knowledge of the laws of age dynamics and its results. As competition increases and new disciplines are introduced, both the system of the training process and the physiological prerequisites for achieving maximum sports results by polyathletes change.

In this regard, the problem of comparing the physical fitness of leading polyathletes is relevant and serves as the basis for the development of evidence-based model characteristics, further growth of sportsmanship, as well as a factor in the effective management of the training process of athletes of different age categories.

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