

COMPATIBILITY OF SPORTSWOMEN AT SELECTION IN TEAMS OF CALISTHENICS GROUP EXERCISES CONSIDERING THEIR FUNCTIONAL STATE

Kozhanova O.S.

Borys Grinchenko Kiev University

Abstract. The degree of trained and predisposition of work is certain from data of mechanisms of energy-supply of sportswomen. 40 students took part in research. The degree of trained sportswomen was determined on results a vectorcardiography. On the level of functional possibilities of heart of sportswomen were up-diffused on three groups. It was set that most corresponds the specific of group exercises the first group of gymnasts the heart of which is in a greater degree predispositioned to implementation of loadings of anaerobic and mixed orientation. The first group of sportswomen is characterized optimum accordance of processes depolarization and repolarization of ventricles and normal functioning of auricles. For the sportswomen of this group a heart works in the economical mode without tension. It is set that the account of compatible functionality at a selection in commands on group exercises comes forward the factor of increase of efficiency of competition activity of sportswomen.

Keywords: group, exercises, artistic, gymnastics, selection, compatibility, energy-supply.

Introduction.

The quality of execution of highly difficult exercises, requiring skilled coordination, which are included in competition compositions, is one of the factors, determining sports results in calisthenics [2, 10]. To achieve high sports workmanship, speed of response, static equilibrium, speed-strength level, general endurance and force momentum are of great importance. The parameters of technical preparedness, such as difficulty and originality of exercises, technical equipping of compositions, skillfulness and the level of gymnasts' subjective preparedness characterize the specificity of trainings and competitions, both individual and group ones. Technical preparedness efficiency is determined by indicators of scope and intensity of intended training loads and by the development of physical abilities, gymnasts' special endurance in particular, connected with them [6, 11, 13]. That is why when selecting gymnasts for group exercises in calisthenics it is necessary to consider their functional potential. Criteria of functional compatibility are regarded as pre-conditions of team members' high efficiency and are of prior significance in achieving of competition results [3, 5].

The analysis of the problem showed that the problem of effective gymnasts' combined activity in teams has not been studied sufficiently yet. In connection with this, we consider urgent to ground the consideration of gymnasts' functional compatibility as a pre-condition of efficiency of gymnasts' competition activity when composing teams by calisthenics group exercises.

The work has been fulfilled as per subject 2.1.6 "Reasonable construction of training process in sports gymnastics at the stages of multi-years training" of aggregate plan of scientific and research works for 2006-2010, developed by Ministry of family, youth and sports of Ukraine; as per subject 2.12. "Creation of system of sportsmen's multi-year selection and orienting", of aggregate plan of scientific and research works for 2006-2010, developed by Ministry of family, youth and sports of Ukraine.

Purpose, tasks of the works, materials and methods.

The purpose of the research – foundation of gymnasts' functional compatibility as a criterion for selection in teams by calisthenics group exercises.

To achieve the set aim we used the following research methods: analysis of scientific-methodological literature, vector cardiography (VCG), methods of mathematical statistics.

In research, 40 girl-students of National University of physical education and sports of Ukraine (NUPESU) took part. There were involved for selecting into teams by group exercises. Among them there were 4 international level masters of sports of Ukraine, 28 masters of sports of Ukraine and 8 candidates to master of sports of Ukraine.

Results of research.

Inner processes of sportsman organism's adaptation to different physical loads in the course of training are the base of sports efficiency improvement [9]. Specificity of gymnasts organisms' adaptation responses, while fulfilling competition compositions, duration of which, as per competition rules, does not exceed 90 seconds for individual program and 150 seconds for group exercises, is characterized by great and maximum power (intensity). Heart rate quickly rises and nearly reaches its utmost and sometimes, reaches indeed. That is why, composition exercises of high coordination are carried out on the background of intensive bio energetic and psycho physiological processes and on high level threshold of anaerobic exchange and heart rate, which are connected with them [5, 6].

In calisthenics such parameters of technical preparedness as difficulty and originality of exercises, technical equipping of compositions, mastery and the level of gymnasts' subjective preparedness characterize specificity of training and competition activity both in individual and in group exercises [2]. Efficiency of technical preparedness is determined by indicators of scope and intensity of training loads, which make high demands to gymnasts' state of health, their organisms' functional capabilities and, first of all, to the state of cardiac vascular system. Adaptation re-

constructions of heart functioning depend on the character of loads. Due to the fact that calisthenics is characterized by relatively low energy intensity of training and competition work, the prevailing energy supply source of physical exercises is anaerobic glycolysis, and, in some cases, creatine phosphor kinase mechanism [7].

In order to determine the training level of gymnasts by the given mechanisms of energy supply we used vector cardiography method. VCG method is more informative for determination of myocardium hypertrophy in comparison with other electro physiological methods. With the help of VCG ansate curves (P, QRS and T) are registered, which characterize the dynamics of electric field of different heart parts. All VCG loops have common zero point, from which the loop starts and in which it ends. Big outside loop QRS corresponds to the ventricles' depolarization process. Inside it small loop T is located, which reflects the process of re-polarization. The least loop P represents the process of atriums' excitement [1].

In total 40 gymnasts were examined in the state of relative relaxation. By the level of hearts' functional capabilities the gymnasts were divided into three groups. As per the data of qualitative and quantitative VCG evaluation (see table 1) the first group consisted of 13 gymnasts: 4 ones with hearts predisposed to anaerobic loads and 9 gymnasts with hearts predisposed to anaerobic and aerobic loads. Qualitative evaluation of gymnasts of this group was plotted as even combined myocardium hypertrophy with electric potential's prevailing both in the left and in the right sections of hearts. (fig. 1).

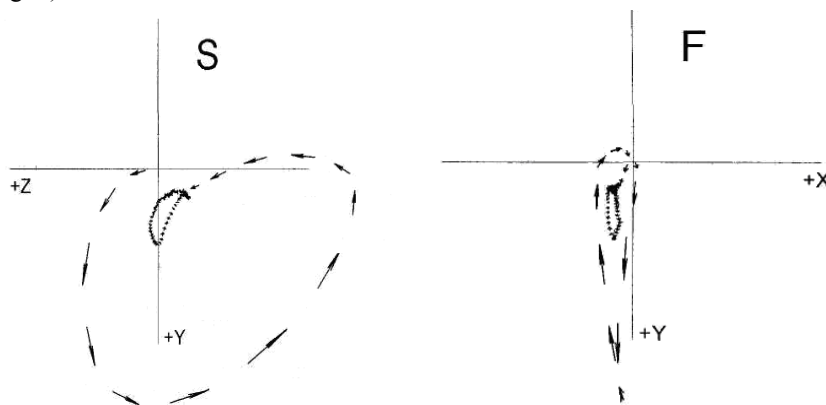


Fig. 1. Typical VCG graphs of gymnasts' ventricles, whose hearts were predisposed to anaerobic-aerobic loads. (n = 13)

This attests about myocardium predisposition to anaerobic-aerobic loads. These gymnasts had high anaerobic abilities and it permitted them to carry out short term work (up to 90 sec. and more) with high intensity. This characteristic is the most acceptable for group exercises, the program of which includes five exercises with skipping rope. Skipping rope exercises are characterized by prevailing of jumps, quick race and rhythm of work and it gives ground to suggest that here success will mainly depend on speed parameters.

Table 1

Quantitative VCG indicators of gymnasts of the first group
n = 13

Initials of gymnasts	Indicators					
	Vector H (initial) mm	Vector Γ (main) mm	Vector K (final) mm	Loop area P, mm/sec	Loop area QRS, mm/sec	Loop area T, mm/sec
V.D	4,316	18,608	4,506	243,22	648,69	42,27
P.N.	9,615	22,248	13,963	382,72	1155,54	41,77
B.M.	13,797	22,671	18,509	367,37	1079,42	23,64
P.V.	14,652	26,289	9,567	286,63	1794,18	71,75
K.Ya.	14,357	29,829	12,960	339,81	1569,01	44,41
B.I.	10,701	25,618	18,301	507,98	1094,81	75,65
Ch.K.	10,194	22,048	10,085	311,46	640,74	25,68
R.Yu.	11,429	25,399	13,590	385,59	1114,96	51,43
S.Al.	7,992	32,982	11,728	610,77	1997,01	38,18
O.Al.	6,524	18,160	13,362	757,24	685,07	31,33
T.A.	7,853	34,121	24,883	394,73	1144,13	67,76
\bar{X}	24,6	24,7	12,9	450	1094	49,2
$\pm S$	4,7	5,5	1,4	66	456	18,3

$\pm n$	1,3	1,7	5,3	238	127	5,06
V, %	19,1	22,3	10,8	14,6	41,6	37,2

The second group consisted of 27 gymnasts: 19 of them were predisposed to anaerobic and aerobic loads and 8 gymnasts – predisposed to aerobic loads on the base of quantitative and qualitative VCG evaluations. Aerobic energy supply mechanism is less by its efficiency than energy supply by lactate and alactate speed of switching in supply of muscular activity, but exceeds manifold by capacity and efficiency. It should be noted that gymnasts with sufficiently expressed aerobic component of energy supply are able to carry out loads of medium intensity for long time (up to several hours) and this is also a positive indicators for group exercises. In this group the increase of electric potentials of the right ventricular septum, front right ventricle wall and posterobasal sectors of right ventricle were noticed to a lesser degree than in the first group and it also attests the heart's disposition to anaerobic loads.

The third group consisted of 14 gymnasts, who had changes, which indicated inefficient functioning of heart in tensed mode (significant non restoration). Ten gymnasts were in the aerobic and anaerobic mode and 4 – in anaerobic and aerobic. For this group of gymnasts, the fluctuations of myocardium functioning can be a limiting factor in achieving of high sports results. The functional reserves of gymnasts' hearts are reduced and execution of training and competition loads will require more energy expenses. This fact permits to regard the third group the least preferable for competitions of groups in calisthenics.

Thus, by the results of quantitative and qualitative VCG evaluations the most favorable indicators were noted ($n=40$) on the base of which gymnasts were divided into three groups – sports teams by the level of their functional adequacy. The first group of gymnasts, composed by the VCG data of myocardium bio electrical potentials, turned out to be the most preferable for group calisthenics exercises of combined team of NUPESU. It was characterized by optimal coincidence of depolarization and re polarization processes of ventricles and by normal atriums' functioning. The hearts of first group gymnasts worked in economic mode without tension. That is why, energy expenses connected with the fulfilled loads, will be minimal.

Summary.

Thus, high level of calisthenics gymnasts' preparedness mediates competition results, both individual and group ones. With selecting of gymnasts into teams for group exercises it is necessary to consider similarity of gymnasts' functional readiness levels because these parameters significantly influence on the efficiency of their training and competition activity.

Analysis of gymnasts compatibility ($n = 40$), considering their functional preparedness on the base of VCG registration of bio electrical myocardium potentials showed that gymnasts can be divided into three groups by the level of functional adequacy. By VCG results, the most preferable for group exercises was the first group of gymnasts who were inclined to anaerobic-aerobic loads; less preferable – second group gymnasts, who were inclined to aerobic-anaerobic loads; the third group consisted of gymnasts with non efficient and tensed mode of heart functioning.

Besides, it should be noted that in order to improve gymnasts' selection to calisthenics group exercises teams it is necessary to carry out complex evaluation of gymnasts' different compatibility kinds.

The prospects of further researches in the given direction lie in foundation of efficiency of gymnasts' selection to calisthenics group exercises teams on the base of complex evaluation of gymnasts' compatibility.

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Information about the author:

Kozhanova O.S.: kozhan_olya@mail.ru; Borys Grinchenko Kiev University; Marshal Timoshenko str. 13-B, Kiev, 04205, Ukraine

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