

ACTIVE GAMES IN PHYSICAL EDUCATION STUDENTS OF SPECIAL MEDICAL GROUP WITH LIMITED CAPACITY OF CARDIOVASCULAR SYSTEM

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Annotation. It is considered the directions of the development an effective methods of usage moving elements of sports and games in exercises. The experiment involved students of special medical groups that have various abnormalities of the cardiovascular system. The study was conducted in four stages: a search, the first experimental, the second experimental, final. We used questioning and education registry books of academic work. Found that the use of sports and outdoor games is students' interest, and increasing motivation for physical activity. Justified by the possibility of using games and exercises performed their adaptation by changing the pulse value. The resulting modification of gaming exercises are divided into three groups: the game in the area of heart rate to 110, 110-130 and 130-150 beats per minute. The first version of the experimental procedure at a heart rate of 110 and 110-130 beats per minute was ineffective for the emergence of significant positive changes in the functional state of the cardiovascular system students. Recommended experimental procedure based on the alternation and equivalence ratio of mobile elements and sports games and increases the heart rate to 130-150 beats per minute. Application of the method increases the overall level of physical health, improves the functional state of the cardiovascular system, health, activity and mood of the students.

Keywords: special, medical, group, student, cardiovascular system, physical education, outdoor games, sports games.

Introduction

At present time, specialists note practically equal correlation of students' quantity of main and special departments in most of Russian Federation higher educational establishments (HEE) [17], that substantially increase the importance of development and introduction of "Physical culture" methodological ground in educational process of physical education departments, which could be addressed to the students of different nosological groups. With it, the program material of the discipline shall be oriented on solution of all main tasks of special health group (SHG) students' physical education, as well as be in compliance with their personal preferences and interests [13, 18].

The section of outdoor games relates to main parts of Model program of discipline "Physical culture" (2000, 2011) and it, by the opinion of specialists, causes great students' interest [23, 7]. At main academic department (MAD) outdoor games are represented, mainly, by volleyball, basketball, ping-pong, football and handball. At special academic department (SAD) the range of outdoor games is rather wider. With it, from sport oriented outdoor games ping-pong, badminton, volleyball are preferred. However, if for MAD the arsenal of outdoor games and the methods of their training are proved by practice and usual, then for SAD the problem of methodological basis of this program section has not been studied sufficiently yet.

In particular, teachers, who deal with SHG students with cardio-vascular problems (CV) have extremely cautious attitude to outdoor games, that can be explained by difficulty if physical loads dozing in this kind of activity, owing to its high emotionality. At the same time, many specialists in therapeutic and health improving physical culture witness about positive influence of outdoor games on functional state of persons with cardio-vascular problems, including those who were after myocardial infarction, and stress, that observation of optimal physical loads is a determining factor for such trainings [21, 22, 8, 14, 25, 10, 11, 6; et al.].

Thus, urgency of the research is conditioned by acute necessity in development of efficient methodic of outdoor games application, which could be adequate to nosological characteristics of students with CV problems by value of physical load. One more argument, which witnesses about practical importance of such methodic, is the fact that 40-60% of SHG students have diagnose – different cardio-vascular abnormalities [1, 4].

The present article has been prepared by results of work on project №6.2093.2011 "Kinesiotherapy in the system of HEE students' health improvement", which is fulfilled within the frames of Governmental task, given by Ministry of education and science of Russia to higher educational establishments for execution of scientific & research works.

Purpose, tasks of the work, material and methods

The problem's urgency and demand in ways for its solution conditioned creation of working *hypothesis*, which was constructed on the following assumption:

It was assumed to be purposeful to introduce elements of outdoor games with pulse not exceeding 150 beats per minute, into physical culture trainings of SHG students, who have CV problems. The efficiency of outdoor games' application can be ensured by the following conditions:

- selection and adapting of different game exercises in compliance with the required intensity of physical load;
- application of the following methodic techniques of game exercises' adapting: reduction of game duration; including of rest breaks in the course of game; reduction of game site's size; varying of quantity of players; change of

game rules and conditions according to self-feeling of the players; replacing of game motions by less active; excluding short-term tensions and sharp loads shifting;

□ division of game exercises into three zones of intensity (up to 110 b.p.m, 110-130 b.p.m., 130-150 b.p.m) in order to gradually lead the trainee's organism to game load of the first training zone (130-150 b.p.m);

□ application of game exercises within the frames of game block of 40 min. duration, included in main part of training classes.

Introduction of outdoor games methodic into academic discipline "Physical culture" for SAD will facilitate improvement of CV functional state, increasing of somatic health level, self-feeling, activity, students', having CV problems state of spirit.

The purpose of the work is to scientifically ground the methodic of outdoor games application at SHG students', having CV problems, trainings.

The tasks of the work:

- 1) Determination of peculiarities of physical culture trainings of SHG students, who have CV problems;
- 2) Generalization of experience of outdoor games' application in physical culture academic classes in HEE and experience of health improving trainings of different population categories;
- 3) Foundation of the possibility and purposefulness of outdoor games application in physical culture trainings of SHG students' having CV problems;
- 4) To develop the methodic of outdoor games' application in physical culture trainings of SHG students' having CV problems.

Results of the researches

Analysis of special literature resulted in stating, that alongside with dozed walking, running and breathing exercises, outdoor games are rather widely used, in health improving trainings of persons, who have CV problems [21, 22, 14, 10, 11, 2; et al.]. According to normative documents outdoor games are compulsory kinds of physical exercises in students' physical education; with it, the methodic of their application at SAD is developed by departments of physical education, considering their indications and counter-indications for SHG students [24]. At the same time, it is known, that owing to the fact that it is very difficult to doze load in outdoor games, due to their emotional components, there is rather cautious attitude to its application at SHG students' physical culture classes, especially if it concerns the students with CV problems. Very often outdoor games are not used at all at classes with such contingent of students, that obviously is an oversight. This is because, according to the data of well known Therapeutic physical culture (TPC) specialists – I.B. Tiomkin, A.G. Dembo, V.A. Yepifanov, V.I. Dubrovskiy et al., with a number of health states, when physical culture training are aimed to increase blood circulation and respiratory systems' functional abilities, without differentiated influence on their separate parts, outdoor games turn out to be the main training mean, because, being involved in the game, the trainees fulfill much more movements with greater load than in the process of other exercises' execution. In other words, outdoor games permit to switch on and use sufficiently great reserves of the trainees' organisms, that is usually rather difficult with other forms of muscular activity, owing to fear, which, by the word of A.M. Vishnevskiy [5], can not be fully justified, when speaking about SHG students.

In scientific literature there are works, in which there are presented the results of researches, proving positive influence of outdoor games on students', having CV problems, state of health [5, 26, 16, 12, 9, 19, 20, 3, 15, 4]. However, in no of the studied sources concrete methodic of outdoor games application in trainings of students with CV problems has been presented. At the same time it is obvious that there is a lot of game exercises, which can be used in the trainings with students of the mentioned nosological group, in order to make such training more various and interesting.

The students' interest to physical culture trainings was studied with the help of questioning (480 respondents in total; 250 – from MAD; 230 – from SAD) and with the help of analysis of academic registers (data of 2480 students of 1-3 years). Generalization of the obtained data permits to make the following conclusions:

- the quantity of MAD students, having additional physical culture trainings reduces with reaching senior years of study;
- the quantity of SAD students, having additional physical culture trainings on the contrary increases with reaching senior years of study;
- interests of MAD and SAD students to the kinds of motion activity are, mainly, the same; with it, most of them are attracted by outdoor games;
- great majority of the questioned MAD and SAD students wish that outdoor games should be included in academic physical culture classes.

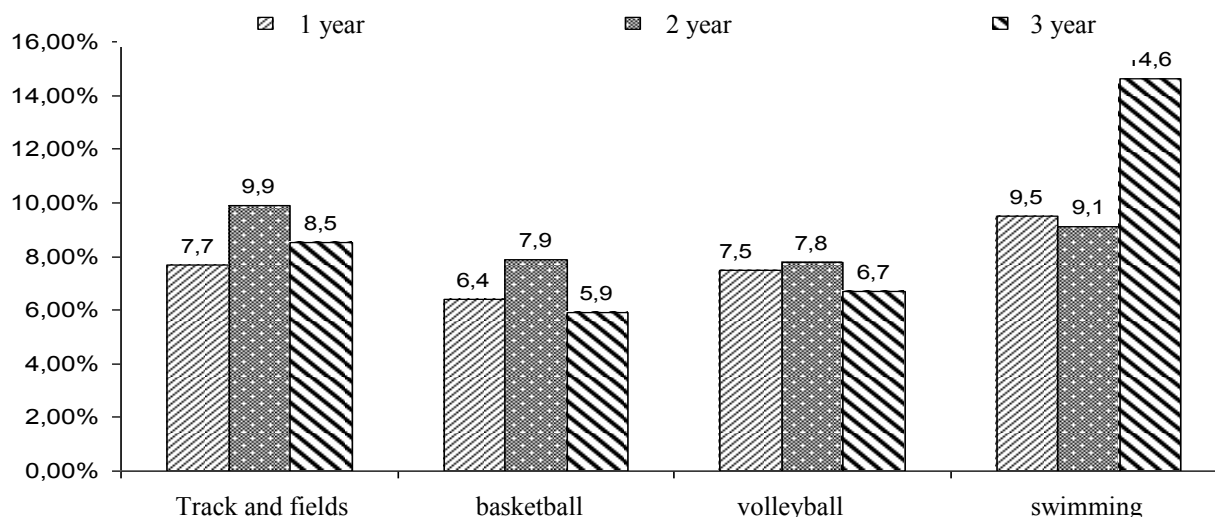


Fig.1. The quantity of classes, missed by NRU "BelGU" in the period of mastering of different curriculum's sections in discipline "Physical culture".

The series of pedagogical observations (10 in total) at academic classes on physical culture, which were carried out by teachers of physical education department No.1 of NRU "BelGU", was fulfilled in order to study the specificity of SHG students' practical physical education. The obtained data permitted to mark out some common for SAD trends. In particular, academic classes on physical culture for students with weakened health consist of three parts: preparatory (20 minutes), main (50-60 minutes) and final (10-20 minutes). Preparatory part is based on walking, running exercises and OPV. The main part can be different by content, that often is connected with nosological non-uniformity of groups, but, as a rule includes complexes of exercises for development of physical abilities and TPC complexes. Final part is mainly based on relaxation and breath-restoration exercises. HBF curve of SHG students implies reaching of values 90-110 b.p.m. in preparatory part; rising up to 120-150 b.p.m. in the main part and reduction to 90-100 b.p.m. in final part. Indicators of self-feeling are the most positively influenced by aerobics, dancing, yoga and outdoor games.

One of the key tasks of search stage of our work was revelation of outdoor games' elements with pulse value not exceeding 150 b.p.m., when they are fulfilled by students with CV problems. In parallel, alongside with the selection of games, which are characterized by low physical load intensity (e.g. "slalom", "hold the stick", "agile swing" and so on) there was conducted the work on grounding of adapting methodic techniques of game exercises in order to reduce their pulse value. As a result the following techniques were selected:

- reduction of game duration;
- including of rest breaks in the game process;
- reduction of the game site's size;
- change of players' quantity;
- change of game's conditions and rules according to the players' self-feeling (replacement of leading player, finishing of game without final result and in case, if it lasts more than it was planned and etc.);
- replacement of game motion actions with less active (e.g. run – with quick walking);
- exclusion of short-term tensions and sharp motion changes (jumps, dismounts, accelerations, etc.).

The selected variants of games exercises and applied to them methodic adapting techniques are presented in table 1.

In order to exclude the risk of sharp pulse change during game we conducted examinations of the selected and already adapted students for determination of their pulse curves by continuous HBF registration with the help of device «Polar RS300X». HBF monitoring was carried out at every game with 20 students (10 boys and 10 girls). With instrumental pulse metering no HBF indicators higher than 150 b.p.m. were found. At the same time an interesting fact was established: execution of most of game exercises was characterized by higher HBF indicators at the first minute of game that, may be, is connected with emotional factor.

On the base of analysis of the obtained pulse curves we selected game exercises and conventionally divided their modifications into three groups: games in HBF zone up to 110 b.p.m.; games in HBF zone up to 110-130 b.p.m.; games in HBF zone up to 130-150 b.p.m. The given distribution was conditioned by the purposefulness of gradual players' organisms' leading to the game load of the first by intensity training zone (130-150 b.p.m.). In the whole, all variants of game exercises corresponded to the recommendations of specialists and ensured load in zone of 50-75% from HBF max (see table 2). The selected, adapted and systemized game exercises were the base for development of experimental methodic of outdoor games' application at the trainings of SHG students, who have CV problems.

Table 1

Adapting methodic techniques of outdoor games and indicators of physical loads, which are recommended for SHG students, who have CV problems

GAMES	Adapting techniques
Active games	
“Run by teams “	Reduction of distance up to до 5-6 m; reduction of repetitions
“Fight for ball”	Rest breaks in the process of game , with external signs of tiredness; increase of players quantity; reduction of ball passes
“Carry quicker”	Reduction of distance up to 9 m; movement by added steps; exclusion of accelerations
“Call number”	Reduction of distance up to 6-7meters;movement by quick steps; exclusion of accelerations
“Defend your friend”	Reduction of game duration; increase of players quantity; if required, replacement of leading players
“Labyrinth”	Reduction of game duration; Rest breaks in the process of game , with external signs of tiredness; if required, replacement of leading players; exclusion of accelerations
“Flying Dutchman”	increase of players quantity; if required, replacement of leading players; exclusion of accelerations
“Agile swing”	Reduction of game duration; Rest breaks in the process of game to remember the rules of game; exclusion of jumps
“Catching couples”	Reduction of game duration; reduction of game site’s size; if required, replacement of leading players; exclusion of accelerations
“Molecules”	Quick step movement or slow run; exclusion of accelerations
“Ball in circle”	Rest breaks in the process of game to remember the rules of game; if required, replacement of leading players;
“Ball in goal”	Reduction of game duration; Rest breaks in the process of game , with external signs of tiredness; exclusion of accelerations and jumps
“Numbers”	if required, replacement of leading players; exclusion of accelerations
“Hunters and ducks”	Rest breaks in the process of game, with external signs of tiredness; increase of players’ quantity; finishing of game without final result and if its duration exceeds the planned time
“pass ball”	Was used without changes of conditions
“Ball passing with runs”	exclusion of accelerations
“Skirmish”	Reduction of game duration; reduction of game site’s size;
“Duel with racket”	Was used without changes of conditions
“Empty place”	Reduction of covered distance owing to reduction of distance between players; if required, replacement of leading player;
“Tag”	Reduction of game duration; Rest breaks in the process of game , with external signs of tiredness; reduction of game site’s size; finishing of game without final result and if its duration exceeds the planned time; exclusion of accelerations
“Tag with ball passing”	Reduction of game duration; Rest breaks in the process of game , with external signs of tiredness; reduction of game site’s size; finishing of game without final result and if its duration exceeds the planned time; exclusion of accelerations
“Slalom”	Was used without changes of conditions
“The third is extra”	Increase of players’ quantity; if required, replacement of leading players; exclusion of accelerations
“Hold stick”	Was used without changes of conditions
“Pick up quickly”	Was used without changes of conditions
“Chain”	Rest breaks in the process of game , with external signs of tiredness; reduction of game site’s size; finishing of game without final result and if its duration exceeds the planned time; slow running; exclusion of accelerations
“Ball school”	Was used without changes of conditions
“Relay race with ball”	Reduction of distance up to 4-5 m; exclusion of accelerations
Elements of sports outdoor games	
Volleyball	<p><u>Elements of game:</u> ball’s passes from above, from below by two hands; low direct serve; upper direct serve; game by simplified rules.</p> <p><u>Adapting techniques:</u> reduction of game elements’ duration and the game by simplified rules; Rest breaks in the process of game , with external signs of tiredness; reduction of distance: to partner, when passing, to net, when serving; reduction of game site’s size to 10-12 m; changing</p>

	of net height; increase of players' quantity; traveling by added steps in game; exclusion of accelerations; exclusion of jumps; finishing of game without final result and if its duration exceeds the planned time; slow running; change of times' quantity
Badminton	<u>Elements of game:</u> service, passes, game by simplified rules. <u>Adapting techniques:</u> rest breaks in the process of game, with external signs of tiredness; reduction of distance: to partner, when serving; reduction of game site's size to 6-7 m; exclusion of accelerations; exclusion of jumps; finishing of game without final result and if its duration exceeds the planned time; slow running; change of games' quantity
Ping-pong	<u>Elements of game:</u> serving, cutting techniques, splash, strike; game by simplified rules. <u>Adapting techniques:</u> reduction of game elements' duration and the game by simplified rules; rest breaks in the process of game, with external signs of tiredness; exclusion of accelerations; finishing of game without final result and if its duration exceeds the planned time; change of games' quantity

Table 2

Systemizing of game exercises, adapted for physical loads, which are recommended for SHG students with CV problems

Games in HBF zone to 110 b.p.m.	Games in HBF zone to 110-130 b.p.m.	Games in HBF zone to 130-150 b.p.m.
Outdoor games		
“Agile swing”, “Duel with racket” “Hold stick” “Pick up quickly” “Slalom” “Molecules” “Pass the ball” and so on.	“Flying Dutchman”, “Labyrinth”, “Empty place”, “Carry quicker”, “Tag”, “Fight for ball”, “Ball passing with change of place”, “Ball school”, “Ball in circle” and so on.	“The third is extra”, “Run by teams”, “Defend your friend”, “Skirmish” “Tag with ball passing”, “Chain” “Catching couples”, “Ball in goal” and so on.
Elements of sports outdoor games		
- ping-pong – elements of game; -volleyball –elements of game; -badminton –elements of game.	- ping-pong – elements of game; - ping-pong – game by simplified rules; -volleyball –elements of game; -volleyball – game by simplified rules; -badminton –elements of game; -badminton – game by simplified rules; - relay races	- ping-pong – elements of game; - ping-pong – game by simplified rules; -volleyball –elements of game; -volleyball – game by simplified rules; -badminton –elements of game; -badminton – game by simplified rules; - relay races

Experimental methodic was developed on the base of “Model program of discipline” physical culture” (2000), which stipulates independent preparation of program-methodic complexes for SAD by physical education departments. As per FGOS VPO of the third generation, which came in force in 2011, federal and national research universities (to which BelGU relates) have right to independently develop academic programs, physical culture programs inclusive.

As per approved by “Model program of discipline” physical culture” (2000) annual planning, experimental methodic was developed, considering the scope of academic hours – 136 hours a year – 68 hours (34 classes) every semester. For full fledged control of students' with CV problems state of health it was planned to test their physical and functional level, somatic health at first and last two classes. Thus, the content of the developed methodic was constructed, considering 32 classes (64 hours) in every semester.

Basing on the data, given in manual “Theory and methodic of physical education”, under general editorship of professor T.Yu. Krutsevich (2003), according to which in initial period of people's with weakened health training it is necessary to use exercises with HBF increment by 55-60% from max. and load increase shall be gradual up to 60-65% from HBF max., we selected two groups of game exercises: games in HBF zone to 110 b.p.m. and games in HBF zone to 120-130 b.p.m. The first game group was applied in the 1st semester, the second – in the 2nd semester. Load distribution at each training was carried out in compliance with commonly accepted three-part structure; warming up, main and final parts of the class.

Warming up (20 min.) included the following exercises: walk with special tasks, slow running, running alternating with walking, running at alternative speed; general exercises in spot, in motion, with sports items, in couples.

Main part (60 min.) consisted of two parts: the first part (40 min.) = game block, which included elements of active and sport outdoor games in HBF zone to 110 and 110--130 b.p.m.; the second part (20 min.) – complex training for development of physical qualities. Game exercises in this part of training were the main HBF correction mean. In the 1st semester games in HBF zone to 110 b.p.m. were applied. Since November, the content of the main part of

training included ping-pong – the trainees were acquainted with the techniques of the game. In the 2nd semester students practiced games in HBF zone to 110 and 110-130 b.p.m. and ping-pong, besides, they mastered volleyball techniques. In April-May the trainings were conducted outdoors and the main part included training of volleyball (without jumps).

The block of complex training was introduced in main part of classes in order to improve physical level of the trainees, and consisted of exercises for development of strength, coordination, flexibility and quickness. In the 2nd semester, the second part of trainings also included: in the first half of the semester (February and March) – TPC complexes for CV cases; in the second half of the semester (April-May) – breathing exercises in the open air.

The duration of the main part of trainings did not change in both semesters. HBF in the 1st semester did not exceed 110-120 b.p.m. and in the 2nd semester it was 110-130b.p.m. .

Final part of training (10 min.) included exercises for relaxation and breath's restoration.

Thus, elements of active and sports outdoor games in HBF zone to 110 and 110-130 b.p.m. were the main mean of students' somatic state correction. The scope and intensity of game exercises were gradually increased in compliance with principle of training dosing.

Evaluation of experimental methodic efficiency was fulfilled with the help of comparative pedagogical experiment, which was conducted at physical education department No.1 of BelGU from September 2008 to June 2009. It covered 80 1st and 2nd year students - members of SHG owing to CV problems, among which the most frequent were vegeto-vascular dystonia, hypertension, arrhythmia, mitral valve prolapse of I grade without regurgitation. We formed 2 groups: experimental (n = 25 girls, 15 boys) and control (n = 25girls, 15 boys). Control group (CG) was trained by general program which was developed for MAD student, without considering any nosological types. Experimental group (EG) was trained by the developed methodic.

Comparison of the results of initial and final tests did not reveal any noticeable advantages of experimental methodic over existing physical culture program for MAD concerning students' with CV problems health improvement. Positive changes were registered in both groups. In particular, EG students improved physical workability, strength, coordination, raise general level of somatic health, which was evaluated by methodic of Apanasenko. CG students confidently increased aerobic abilities of organism, physical workability, strength. And at the same time with this, seemingly, equally positive results of both groups, it should be noted that in CG the reduction of organism resistance to hypoxia was fixed at the end of experimental period, while in EG we found confidently higher indicators of optimal myocardium's functioning, improvement of organism's aerobic abilities, physical workability, strength, coordination. Special attention should be paid to the fact that general total points for five indicators is higher in EG. At last, one cannot but note stable positive influence of game exercises on self-feeling, activity and mental state of students (test CAN).

The obtained data permit to conclude that application of active and sports outdoor games at physical culture classes with students, having CV problems, is expedient, however the developed methodic needs correcting, because physical load in intensity zone of 110-130 b.p.m. turned out to be insufficient for obtaining of confident positive changes in CV functional state of the trainees.

We chose *three correction methods* of game block:

- intensification of game exercises;
- increase of sport games' elements at the account of active games;
- differentiated introduction of active games and sport games' elements into game block.

Intensification of game exercises was achieved at the cost of game rate increasing, as well as due to increase of exercises' complexity, in particular: make initial positions more complex, increase of amplitude, adding of sports items, complication of game rules; exclusion of previously applied in HBF zone up to 110 b.p.m. games and introduction of new game variants in HBF zone up to 130-150 b.p.m.; increase of scope and intensity of sport games; introduction of new relay races' variants with elements of sport games.

The change of correlation of active games and sport games elements was fulfilled in the following way: once a week in game block only active games were used; once a week – only elements of sport games. Such approach permitted to increase the share of sport games in classes; to spare more time for mastering of technique of the trained games, and, further – for game itself as well as make classes more various.

The efficiency of the made corrections was evaluated in the course of the second pedagogical experiment, which was carried out at physical education department No.1 of SRU "BelGU" from September 2009 to June 2010 (the conditions of which were the same as of the first one).

Analysis of experimental results (see tables 3-4) proved efficiency of using of the corrected methodic, aimed to improvements of students' having CV problems, somatic health. In spite of the fact that positive results were observed in both groups, more noticeable results, first of all in CV functional state, were shown by EG.

Table 3

Evaluation of EG (n=25) and CG(n=25) girls somatic health before and after the second pedagogical experiment

Indicators	Test procedure	EG			P EG CG	CG		
		Index M ± m	pointsM ± m	P		Index M ± m	pointsM ± m	P
Mass index (by Kettle)	Before	17,25±0,37	17,35±0,4			17,38±0,45	17,6±0,45	
	after	-1,16±0,15	- 1,16±0,1			- 1,28±0,16	- 1,24±0,17	
Power index	Before	36,12±1,15	36,89±1,0			35,83±1,51	34,79±1,3	
	after	-0,76±0,09	- 0,76±0,1			- 0,72±0,09	- 0,88±0,09	
Life index	Before	47,70±0,44	51,53±1,3			47,94±1,98	51,25±1,5	
	after	0,96±0,25	1,48±0,22			1,04±0,29	1,52±0,25	
HBF restoration time after 20 squatting for 30 sec. (min.)	Before	117,2±10,03	114,8±9,8			124,4±7,28	142,8±6,9	
	after	1,92±0,52	1,92±0,52			1,4±0,36	0,88±0,32	
Robinson's index	Before	100,76±2,77	91,71±2,4	*	**	101,3±2,85	88,27±3,5	*
	after	-0,72±0,17	- 0,24±0,2			- 0,76±0,19	0,12±0,22	
Total points	Before	0,24±0,53				-0,32±0,42		
	after	1,24±0,49				0,40±0,43		
Health level	Before	low				low		
	after	low				low		

Table 4

Evaluation of EG (n=15) and CG(n=15) boys somatic health before and after the second pedagogical experiment

Indicators	Test procedure	EG			P EG CG	CG		
		Index M ± m	pointsM ± m	P		Index M ± m	pointsM ± m	P
Power index	Before	21,43±0,65	21,48±0,6			20,75±0,85	20,99±0,8	
	after	-0,40±0,21	- 0,4±0,16			- 0,80±0,30	- 0,73±0,28	
Life index	Before	51,36±3,05	60,49±2,0		*	53,22±4,02	50,9±2,76	
	after	-0,93±0,07	- 0,07±0,3			- 0,33±0,29	- 0,73±0,21	
HBF restoration time after 20 squatting for 30 sec. (min.)	Before	52,67±2,67	61,2±1,69	**	*	56,97±2,92	53,86±2,4	
	after	0,40±0,35	1,67±0,33			0,80±0,40	0,40±0,39	
Robinson's index	Before	98,00±9,01	78,0±5,71	**	*	108,0±7,05	126,0±8,4	
	after	2,87±0,41	3,80±0,42			2,07±0,38	1,53±0,36	
Total points	Before	116,82±3,65	100,1±2,9	*		115,2±3,43	109,2±3,3	
	after	-1,67±0,19	- 0,67±0,2			- 1,53±0,17	- 1,20±0,17	
Health level	Before	0,27±0,63			***	0,21±0,55		
	after	4,33±0,72				-0,73±0,65		
	Before	low				low		

	after	Below than low		low
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*- differences are confident by Student's criterion ($p \leq 0,05$)

** - differences are confident by Fisher's criterion ($p \leq 0,05$)

*** - differences are confident by Student's and Fisher's criteria ($p \leq 0,05$)

In particular, the students of this group showed confidently saving myocardium activity, more stable BP; improved vegetative indicators; increase of physical workability; improvement of oxygen-tracts and aerobic abilities of organism, increase of VCL, chest mobility, strength, flexibility, coordination; increase of general level of somatic health. With it boys manifested more confident positive changes than girls.

CG students showed confidently improved physical workability indicators, organism's resistance to hypoxia, coordination. However in the same group there were certain negative changes: reduction of organism's aerobic abilities, vegetative indicators de-stabilized, general state of cardio-respiratory system became worse.

By a number of indicators EG students showed confidently more positive results in final test. In particular, final values of systolic and minute blood volume, organism's aerobic abilities, physical workability, general state of cardio-respiratory system, strength, coordination are better. In boys group confidently much higher level of somatic health was registered.

The additional researches, which were conducted in EG and included regular SAN testing and dairying of self-feeling, confirm positive influence of game exercises on self-feeling, activity, mood of the trainees, as well as on their resistance to physical loads, indicators of pulse metering and dynamics of tiredness.

Thus, it can be concluded that the developed and corrected methodic, basing on alternating and equal correlation of active games and sport games' elements, which cause increase of HBF up to 130-150 b.p.m. facilitate positive correction of CV functional state of SHG students and as a result improve general level of their somatic health.

Summary

1. At the present time, in HEE of Russian Federation there is practically equal correlation of students of main and special health departments. The main task of physical education of students of special health department is preservation and improvement of health. The main ways of this task's solution are selection of optimal mean of academic groups' completing and introduction of efficient, nosologically oriented physical culture means into the content of classes.
2. With conducting physical culture trainings of SHG students, having CV problems, observation of optimal values of physical loads, within the range of 50-75% from HBF max. is a determining factor. The most efficient kind of motion activity are cyclic exercises of aerobic orientation, including running, walking, swimming as well as acyclic exercises of moderate intensity, including power, breathing and game exercises.
3. Sport games are the part of compulsory curriculum material of "Physical culture" discipline in RF HEE. At main academic department sport games are represented, mainly, by volleyball, basketball, ping-pong, football, handball. At special health department sport and active games are used in equal extent. Among sport games ping pong, badminton, volleyball are the most preferable. With it trainings of students with CV problems cause cautious attitude to game exercises owing to difficulties in physical loads dozing.
4. In educational establishments, sport and active games are used, mainly, within the frames of academic or recreational classes, in order to develop physical qualities, form motion skills, and skills of active leisure. For adult population this kind of motion activity is, mainly, a recreational and health improving mean. Wide using of game exercises is noted at enterprises, rest homes, health resorts. In particular, games are one of the main rehabilitation means of persons, having cardio-vascular disorders, including persons after myocardium infarction.
5. Application of active and sport games at classes on physical culture attracts students' interest and facilitates motivation to motion activity. So, game activity attracts 71,7% of boys and 41,4% of girls of main academic department; 49,7% of boys and 32,2% of girls of special health department; Besides, this section of curriculum is characterized by the least quantity of classes missing - 7% in average, while such sectors as track and fields and swimming - 8,7% and 11,1% consequently. 95,7% boys and 82,4% girls of the main department would like to increase the scope of outdoor games; the same concerns 74% boys and 70,3% girls of special department. 95,7% boys and 88,1% girls of main department would like to introduce active games into content of academic classes; the same concerns 90,7% boys and 78,7% girls of special department.
6. The offered methodic techniques of active games and sport games elements' adapting permit to ensure for students with CV problems optimal physical load (50-75% from heart rate max). With it the received modifications of game exercises can be conventionally divided into three groups: games in HBF zone to 110 b.p.m., games in HBF zone to 110-130 b.p.m., games in HBF zone to 130-150 b.p.m.,
7. The first variant of experimental methodic, which was based on games in HBF zone to 110 and 110-130 b.p.m., turned out to be inefficient for obtaining confident positive changes in SHG students' CV functional state, that may be connected with insufficiency of physical load in intensity of HBF zone to 100-130 b.p.m.
8. The corrected experimental methodic, based on alternating and equal correlation of active games and sport games' elements, which cause HBF increase up to 130-150 b.p.m., proved its high efficiency in improvement of CV functional state of the trainees, ($p \leq 0,05$), in rising of general level of somatic health ($p \leq 0,05$), in improvement of self-feeling, activity, mood.

9. The peculiarity of application of active games and sport games' elements at classes in physical culture with SHG students, who have CV problems, is using of such exercises, which are not traumatic-hazard, do not require high physical loads, exclude short-term tensions and sharp changes of movements (games can be carried out in moderate mode and by simplified rules).

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