



EXPERIMENTAL VERIFICATION OF EFFECTIVENESS OF TAKING PART IN ADDITIONAL MOTOR ACTIVITIES IN CONNECTION WITH FEMALE ABILITY

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ABSTRACT

Achieving a health effect in sports activities within the Higher school is possible by applying a variety of targeted means and methods. The relevance of the study: Obtaining data on the impact of additional cyclic activity and gradual inclusion of exercises for general strength and resistance to the working capacity of students within the training process. Purpose of the study: Study of the reaction of the cardiovascular system and the achievements of female students after application of additional complexes of exercises in the syllabus of callanetics. At the beginning and at the end of the summer semester of 2018/2019 the female students were subjected to a 5-minute stepwise load of the cross trainer with a measurement of the frequency of cardiac contractions of the first, third and fifth minutes and the distance travelled distance of each of the three loading steps. For the realization of the research project a series of exercises with cyclic aerobic focus as well as static and dynamic strength exercises without and with aggravated. The applied exercises enhance the functional capabilities of the cardiovascular system and the level of total endurance and performance.

Key words: Capacity, pulse rate, callanetics, cross trainer

INTRODUCTION

A focal area of research and development of higher education lecturers (HEL) is development, measurement and control of motor skills. The Bulgarian female students' ability is defined as not complying with the requirements of the modern dynamic life (1).

The optimization of motor activity in students is directly related to the problem of improving their physical ability. Proper physical development and high degree of physical ability set the obligatory base, on which they build themselves as socially active individuals (2).

Achieving maximum health effect in high school sports is possible by applying focused means and methods directly improving aerobic and strength abilities of trainees (3, 4).

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Harmony in physical development is possible when specific exercises for speed, strength and endurance are applied. Endurance exercises, although focused primarily on the cardiovascular and respiratory systems, also affect muscle strength. Strength training workouts improve endurance and develop the neuromuscular apparatus. As a result of such training, an increase in strength abilities has been monitored in a much shorter time.

A person's resilience to stressful situations they encounter on a daily basis can be created in a training environment. Impact is effective when the activity is perceived as difficult, working in arranged in training area. Most suitable are strength and speed exercises of varying nature and intensity (5, 6).

It is recommended integrated development of endurance via a circular method (7). As a result of such motor activity, the body adapts by improving the neuromuscular tone.

The purpose of the curriculum content of the physical education and sport programs is to increase functional capacity of the

cardiovascular and respiratory systems. It aims at improving the level of working capacity of young people by increasing overall endurance. The practice of aerobics, step aerobics, cross, tourism is determined as medium and low intensity motor activity, which makes it suitable for the set goals at the beginning of preparation. Subsequently, strength endurance and strength work are also involved.

TOPICALITY OF RESEARCH: Obtaining data on the impact of additional cyclical activity and the gradual inclusion of exercises of general strength and endurance on the ability of female students within the educational process.

OBJECTIVE OF RESEARCH: To study the response of the cardiovascular system and the achievements of female students after taking part in an additional set of exercises in the current curriculum of Callanetics.

Tasks:

1. Studying of literary sources about physical ability and appropriate methods for studying the functional status of female students.

2. Determination of the level of the studied indicators characterizing the ability to work before and after the implementation of the extended curriculum.

3. Comparative analysis of the changes after the transformative pedagogical experiment.

METHODS

Two tests were conducted during the summer semester of the academic 2018/2019. The

female students underwent a 5-minute dosage step exercising on a cross-trainer. Heart rate index (HRI) was measured at the end of the first, third and fifth minutes. The distance actually run at the end of each of the three exercising steps was recorded.

For achievement of the objectives of the research project, a series of exercises were further applied to the experimental group based on our experience and the sources studied. Aerobic-oriented exercises, static and dynamic force light or intense exercises were included to compensate for the absence of such effects in the standard set of callanetics exercises.

The training with the control group was carried out in accordance with the curriculum of Callanetics.

The mathematical and statistical processing of the research data was carried out by means of variational and comparative analysis. Reliability of differences in mean values was verified by Student's t-test for dependent and independent samples at $P > 95\%$.

RESULTS

The data from the two tests of the control group (CG) and the experimental group (EG) are presented in **Table 1**. The CG students start the workout at a heart rate of 75 bpm. In the next five minutes it ranges from 130 to 172 bpm. The initial pulse rate of the EG is 72 bpm. Throughout the workout, it remains slightly lower (from 121 to 161 bpm) compared to that of the CG.

Table 1. Information about HRI (heart rate index) values registered in both groups at the beginning and at the end of the transformative pedagogical experiment.

Testing	Groups	Total cases	Pulse rate at three-step exercising bpm			
			Start	First minute	Third minute	Fifth minute
At the beginning of the semester	control	30	75	130	158	172
	experimental	30	72	121	144	161
At the end of the semester	control	30	73	140	155	165
	experimental	30	74	137	148	158

At the end of training through the standard and extended curriculum indicate that a positive development of aerobic abilities has been achieved. The specifics of part of the callanetics exercises stimulate the development of strength and endurance. When performing

the three-step workout, the female students of the CG has reached a pulse rate of 140 bpm in the first step, 155 bpm in the second step and 165 bpm in the third step. The female students involved in additional motor activity aimed at developing aerobic and ngth ability at the end

of the transformation experiment perform standard workout in a more economically efficient way. This is evident by the average HRI values. They are 137 bpm in the first step, 148 bpm in the second step and 158 bpm in the third step. The higher HRI in both groups at the end of the first minute as of the period of the end of training is striking. After that the response of the cardiovascular system to the applied exercising is more moderate.

As concerns the values of the pulse at the end of the third step we can define the applied exercising as submaximal (HRI for CG = 165 bpm and for EG = 158 bpm). It is common knowledge that training in the range of 50-75% of maximum intensity corresponds to

submaximal exercising (8, 9). They provoke a pulse of not less than 130 bpm and no higher than 170 bpm. We believe that in the last two minutes of exercising, the female students of the CG activated their aerobic capacity at 72.79% and were close to the upper limit of submaximal exercising and those of the EG worked at 69.70% intensity.

The applied effects of the standard and extensive curriculum in Callanetics show that a positive development of the aerobic and power abilities of the two groups was generally achieved (**Table 2**). The specifics of some exercises in Callanetics stimulate the development of strength and endurance of many of the muscles of the lower limbs.

Table 2. Values of indicators for distance actually run for 5 minutes on cross-trainer at the beginning and at the end of the studied period and verification of the hypothesis Student's t-test.

Groups	Number of Students	First testing			Second testing			Increase	Statistical dependence	
		x	s	v%	x	s	v%		d	temp.
Experimental	30	1806	115	6,36	2135	88	4,12	329	3,17	> 95%
Control	30	1760	180	10,23	1910	61	3,19	150	1,98	< 95%
Difference	d	46			225			179		
Statistical dependence	t emp.	1,50			2,68			2,08		
	P (t)	< 95%			> 95%			> 95%		

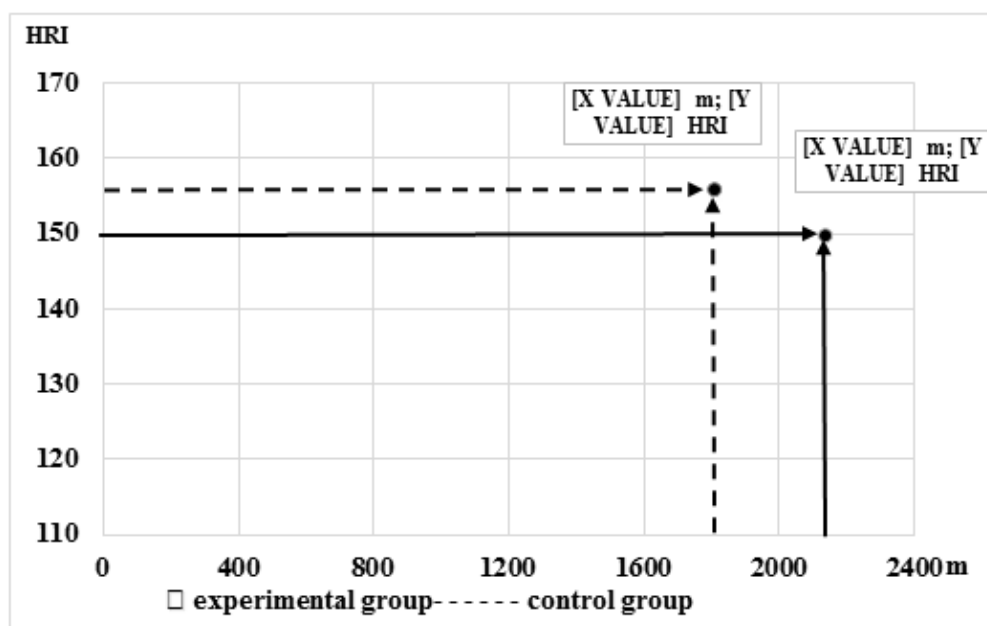


Figure 1. Average group achievements after a five-minute step exercising on a cross- trainer.

The distance ran for the time of exercising is 1760 m for the CG and 1806 m for the EG at the beginning of the semester. CG trainees ran

46 m less in 5 minutes compared to the EG. This difference is insignificant. This is also confirmed by the value of P(t) < 95%. At the

end of the training period, more visible differences in the level of students' ability can be noted. CG improved their result at the end of the semester by 150 m and recorded an increase of 8.52%, running 1910 m. The EG with a performance of 2135 m is significantly better. A significant increase of 329 m was registered, which is 18.22% better than the initial achievement at $P(t) > 95\%$. **Figure 1** presents the average pulse rate at which female students from both groups run in the final test and the result obtained.

The average HRI at the CG for the five-minute run is 156 bpm, running a distance of 1910 m. The achievement of 2135 m of the EG is at HRI of 150 bpm. In a more economically efficient way of work, the female students

taking part in the extended program have a result of 9.70% better than those who took part in the standard curriculum of Callanetics.

CONCLUSIONS

1. The average level of pulse rate at the end of training the female students reached at the dosed exercising is within the submaximal exercising.

2. A higher level of physical ability is found in female students who took part in the experimental program.

3. The results obtained have significant practical value. They make it possible to optimize the process of motor preparation of students in other sports and not to focus mainly on technical skills and learning games.

Table 3. Content of the set of exercises in the sport - pedagogical experiment

Type of motor activity	Academic weeks						
	I - II	III - IV	V - VI	VII - III	IX - X	XII - XII	XIII - XIV
1. Step-aerobic series	6 min	8 min	10 min	12 min	14 min	15 min	10 min
2. Exercises for arms and shoulder girdle (without weights) from standing position, horizontal slope	3 exer x 10 reps	5 exer x 14 reps	3 exer x 10 reps				
3. Exercises for arms and shoulder girdle (with weights) from standing position, horizontal inclination, lying rear			3 exer x 10 reps	3 exer x 12 reps	3 exer 2 x 7 reps	3 exer 2 x 8 reps	3 exer 2 x 10 reps
4. Exercises for lower limbs and bottom muscles							
4.1 Dynamic Strength Exercises (own weight) jumps, lunges, side lunges without and with body rotation, crouches or plie squats, from legs apart with toes pointing outwards	3 exer x 8 reps	3 exer x 10 reps	3 exer x 12 reps	2 exer x 10 reps		3 exer x 12 reps	
4.2 Dynamic Strength Exercises (with weights) jumps, back lunges, side lunges without and with body rotation, crouches or plie squats, from legs apart with toes pointing outwards				2 exer 2 x 8 reps	3 exer 2 x 10 reps		3 exer. 2 x 12 reps

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