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A Quality Factor Of Cardiovascular System Reaction On A Daily Physical Exertion Of Students.

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ABSTRACT

Due to the fact that the period of the student body coincides with the final maturation of the cardiovascular system, the active reproductive period, the formation of moral and social values, the question remains about the next generation's health - the health of the nation. To assess the level of physical performance and to determine the mechanisms of tolerance violations to the load are the cardiopulmonary exercise test, based on the use of tests with increasing load on a treadmill or bicycle ergometer. The basis was taken SWT (shuttle test) with an increasing rate of walk test, which is modified by changing the walking tempo. Purpose: To study the rate response of the cardiovascular system among the students on daily physical activity. Aim: to study the rate response of the cardiovascular system at the students on daily physical activity. Results: the study involved 88 students, aged 17-19 years, of which 42 girls and 46 boys. SWT performed using a treadmill, the test was modified by changing the walking tempo. In 17% of students are boys and 24% of girls have been signs of irrational reaction of the cardiovascular system on physical activity, only 12% and 10% of boys and girls, respectively, dominated a good reaction. The reaction of the cardiovascular system to the load may indicate autonomic dysfunction in students. During the walk test, starting with the 7 level, both in boys and girls identified external changes: 11% and 10% - shortness of breath, 7% and 11% - expressed tachycardia, respectively, 15% of girls have been complaints of dizziness .

Keywords: students, cardiovascular system, step test with the increasing pace of walking.

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INTRODUCTION

The functional state of the cardiovascular system in young men and women, due to the deterioration of the health and physical development, is becoming increasingly important in recent years. In all civilized countries, the public is concerned about the negative environmental, economic and other factors will inevitably affect the younger generation. High mental, physical and psycho-emotional stress, violation of working and resting and feeding, changing moral values, lack of confidence in the future require students to mobilize forces to adapt to new living conditions and education, the formation of interpersonal relationships outside the family and overcome difficult situations. In adolescence (16-21 years) is enhanced muscle growth, sharply increasing their strength; brain and spinal cord mass reach the level observed in adult, practically completes the maturation of the cardiovascular system, circulatory function reaches optimal level and stabilized onset of puberty. Period of studies coincides with the active reproductive period, thus, any negative impacts could adversely impact on the health of future generations [1-3].

As a result of all the above factors, the students can come psychological strain or exhaustion, in consequence of which there are various neurotic symptoms, often "target" becomes the cardiovascular system.

Purpose of the research:

To study the quality index of the reaction of the cardiovascular system at the students on daily physical activity, according to the results of the test step with the increasing pace of walking.

METHODS AND ORGANIZATION

To assess the level of physical performance and to determine the mechanisms of tolerance violations to the load are the cardiopulmonary exercise test (cardiopulmonary exercise testing - CPET), based on the use of tests with increasing load on a treadmill or bicycle ergometer, the measurement of functional and laboratory parameters alone, under a load and recovery period. At the same CPET they require expensive equipment, are quite complex to perform and therefore not widely used in practice [4-7]. In this regard, in recent years the active development was the development of a simple, do not require difficult equipment functional tests with walking (Functional Walk Tests — FWT) [7], while estimated exactly the kind of load, which is used in everyday life, that is, walking [8,9]. There are different types of tests with walking, but recently scientists in cardiopulmonary diagnostics are increasingly focused on the shuttle test with the increasing pace of walking (incremental shuttle walk test - SWT), the conditions of which allow you to greatly reduce the influence of subjective factors. SWT is held in a room with the indicated route section (shuttle) length of 10 m. test includes 12 levels of walking tempo, duration of each level - 1 min. The rate is determined by the distance tape recorder beep. With every minute the speed increases: an initial (1st level) - 1.8 km / h, the maximum (12th level) - 8.53 km / h. 1 level 3 includes the shuttle walk (30 m), 2 nd - 4 shuttle (40 m), 3 rd - 5 th shuttles (50 meters)and so on. As a result, the number of shuttles and traveled a total distance in meters [7].

The study was conducted on the basis of scientific-research laboratory HSAPC among the students of 1-2 courses. Total number of students participating in the study was 88 people aged 17-19 years, of which 42 girls and 46 boys. SWT was carried out using a treadmill ("Kettler"), the test was modified due to the change of pace walk: speed on the 1st level - 2.5 km / h every minute speed increased by 0.5 km / h; 12 correspond to the speed level of 8.0 km/h. During the test stops is not provided. As a result of the test the total distance covered in 12 minutes of 1049.4 m.

The procedure for the registration of research include heart rate (HR, 1 min), systolic and diastolic blood pressure (SBP and DBP, mm. Hg.), The calculation of the pulse pressure (PP).

From the change in heart rate and blood pressure were performed calculation indicator of quality reaction (IQR), cardio - vascular system to the load according to the Kushelevsky formula:

$$IQR = PP_2 - PP_1 \div P_2 - P_1, \text{ where}$$

PP1 - pulse pressure to a load; PP2 - pulse pressure in the first minute of recovery; P1 - pulse to the load (per minute); P2 - the pulse of the first minute of recovery (for minutes).

Assessment of the value of IQR is from 0,1 to 0,2 - irrational reaction; 0,3–0,4 - satisfactory response; 0,5–1,0 - a good reaction; more than 1,0 - irrational reaction. Deviations in either direction are regarded as a sign of the deterioration of the functional state of cardio - vascular system [10].

Statistical analysis of the numeric data was performed using a general-purpose package Statistica for Windows version 6.0 data processing software. Data are presented as a mean value ± standard error(M ± m).

RESULTS

All study boys and girls perform the test in its entirety - 12 levels, the distance (SWD) -. 1049,4 meters Table 1 shows the performance changes in the cardiovascular system before and after exercise.

Table 1: Indicators of the cardiovascular system in young men and women before and after the step test

Boys (n=46)				Girls (n=42)			
Before loading							
HR M±m	SBP M±m	DBP M±m	PP M±m	HR M±m	SBP M±m	DBP M±m	PP M±m
70±4,7	126,3±14,4	72,5±17,1	53,8±17,5	85,3±11,7	106,7±7,6	63,3±7,6	43,3±11,5
After loading							
117,8±24,9	147,5±9,6	70,1±8,2	77,5±9,6	154,1±6,9	120,1±18,1	61,7±2,9	58,3±17,5

Before the walk test is drawn to the attention of fluctuations in blood pressure and heart rate: 24% (10) of girls with index AD 90/60 - 105/55 mm Hg was an increase in heart rate to 95-100 beats per minute. In 9% (4) of boys in the primary measurement showed an increase in blood pressure up to 145/100 mm Hg.

During the test, starting with level 7 at a speed of 5.5 km / h, the exterior changes were observed in the general condition of the students. Figure 1 shows the signs of change in students.

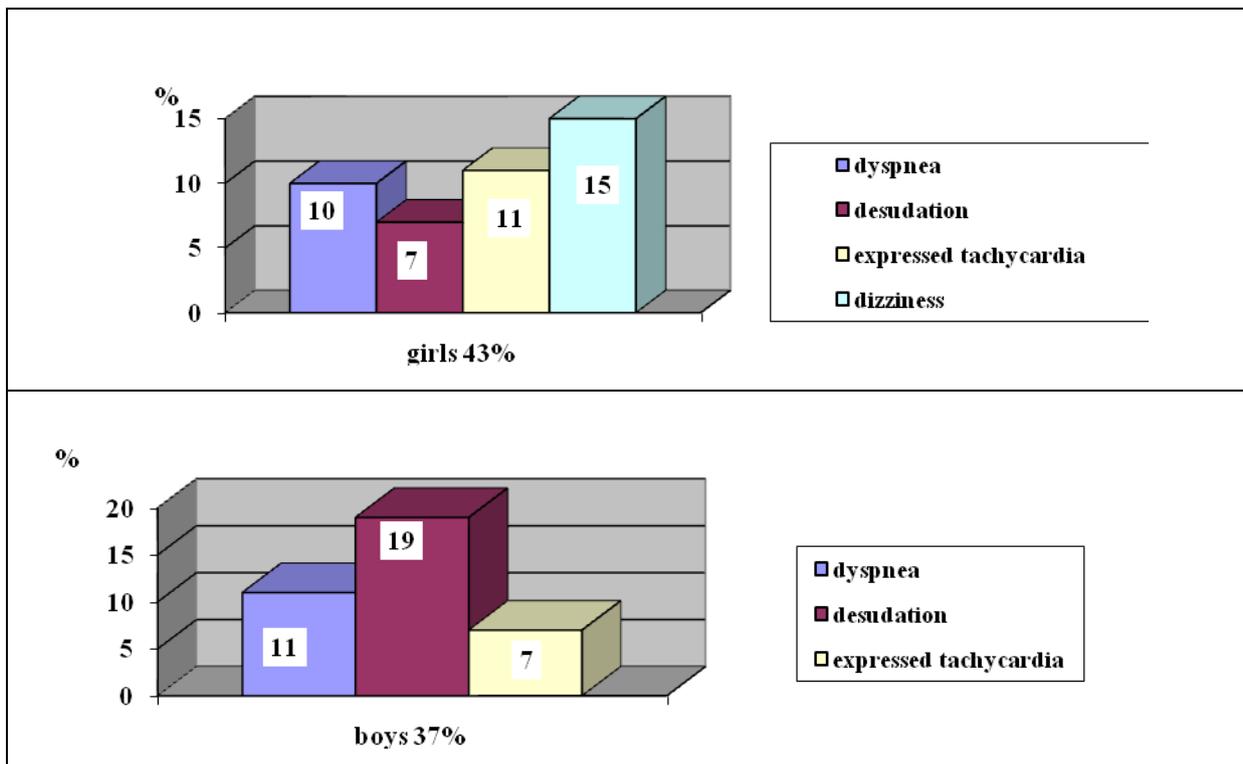


Fig 1: Indicators of changes in the functional state of the students during the walk test (%)

In terms of the dynamics of the cardiovascular system on the daily load carried count QIR. Quality Indicator reaction of the cardiovascular system to the load is shown in Table 2.

Table 2: Quality Indicator reaction of the cardiovascular system to load of students

No	Evaluation values QIR	Boys (n=46) % / person	Girls (n=42) % / person
1.	from 0,1 to 0,2 – irrational reaction	17% (8)	24% (10)
2.	from 0,3 to 0,4 – satisfactory response	71% (33)	66% (28)
3.	from 0,5 to 1,0 – good reaction	12% (5)	10% (4)

To evaluate heart rate and PD response to functional tests with physical activity need to be evaluated pulse indicators and blood pressure at rest and immediately after the change of the load, as well as recovery time. Focusing on the type of load Letunov 2 samples (3-minute run), the maximum heart rate recovery time 3 minutes, blood pressure - for 4-5 minutes. The faster recovering heart rate and blood pressure figures to the initial level, the better the functional state of the cardiovascular system.

The recovery time of heart rate and blood pressure in students after the test step with the increasing pace of walking are shown in Table 3.

Table 3: Indicators of recovery heart rate and blood pressure in students after the load

No	Recovery time, min	Boys (n=46) % / person	Girls (n=42) % / person
1.	HR		
	3 min	78 % (36)	64% (27)
	4 min	13% (6)	24% (10)
	5 min	9% (4)	12% (5)
2.	BP		
	4 min	-	-
	5 min	78 % (36)	64% (27)
	6 min	13% (6)	24% (10)
	7 min	-	-
	8 min	-	12% (5)
	9 min	-	
10 min	9% (4)		

DISCUSSION

Summing up the results of the study of the reaction indicator of quality, the functional state of the cardiovascular system of students on daily physical activity, according to the step test with the increasing pace of walking, you can state the following.

In 17% of students are boys and 24% of girls have been signs of irrational reaction of the cardiovascular system on physical activity, only 12% and 10% of boys and girls, respectively, dominated a good reaction. During the walk test, starting with the 7 level, both in boys and girls identified external changes: 11% and 10% - shortness of breath, 7% and 11% - expressed tachycardia, respectively, 15% of girls have been complaints of dizziness.

We noted the duration of the recovery time, heart rate and blood pressure after the test. All of the above may indicate autonomic dysfunction in students. Statistics indicate that nearly 80% of the population

suffer from autonomic dysfunction, the cause of which may be a sedentary lifestyle, addiction to fatty foods and an abundance of menu extractive components, chronic fatigue syndrome. Provoke autonomic dysfunction may be bad habits, frequent infections, including chronic (tonsillitis, sinusitis, dental caries), allergic reactions.

The most important factors out of the situation for the younger generation is a healthy lifestyle, avoiding harmful habits, good nutrition, avoiding stressful situations and timely action taken to exit from them. In the continuation of this study is planned to examine the dynamics of the physical activity of students in the application of rehabilitation programs.

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