

PHYSICAL STATUS OF STUDENTS OF PRECARPATHIAN SPORT MILITARY BOARDING-SCHOOL

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Key words:

- physical state,
- physical training,
- physical development,
- somatic health.

Abstract:

The study is devoted to the investigation of physical state of students under the regular physical activity. Age dynamics (14-17 years) of an indicators of somatic health, physical development, physical fitness of sport military Lyceum students (experimental group, n = 120) comparing with students of secondary schools (control group, n = 110) is analysed. The positive effects of regular physical activity on indices of physical fitness (speed, speed-strength quality, flexibility), and hence the physical state of students of the experimental group is established. The acceleration of functional maturation of leading adaptive systems of a given group is established too. Already during the first year under the influence of regular physical activity a significant increase vital index and the decrease Robinson's index, that indicate the growth of functional reserves of respiratory and coronary circulation in schoolchildren is registered. A significant increase in these parameters in comparison with the control group is also observed in 16 and 17 years. The 15-year-old students showed the lowest growth of physical health components during analysed age period, that indicates a critical period of physical growth and development. Inadequate level of an exercise performance in representatives of all age groups was showed. It is known that given age period is characterized by the combination of organism intensive growth and development, and puberty processes, that cause a significant stress of regulatory systems. All aforesaid stipulates for the elaboration of adequate program of body aerobic capacity correction, that will lead to increased levels of somatic health, and therefore of the physical state of school children.

INTRODUCTION

The physical state of the person is the result of the manifestation of many factors. It is the presence of motor abilities (potential human predisposition to a particular manifestation of motor function), corresponding motor training (person mobility possibilities implemented in the physical education and sports training processes), physical development and health of the person. In recent years, according to statistics and researches, a significant decrease in the proportion of healthy children is observed. So among primary school children, their number is 12.7%, and among teenagers - only 5.3% [4, 13, 14]. Due to the congestion of the educational process, large computerization of society, contact with previously not-existing types of chemicals, eating artificial foods, the level of psychological and emotional tension of the students is growing [1, 5, 12]. Long-term effects of above-mentioned factors on the human body can cause the development of pathological changes in both the central nervous system and visceral systems. The processes of growth and development of the student body are characterized by

different rates. That is why the determination of critical periods of development that are determined by individual pace of biological maturation, with the purpose of developing of the ways to improve the functional reserves of an organism that grows and develops, is so important.

All of the above causes the topical interest in the studying of school children physical condition of and the impact of a variety of physical education and sport.

The aim - to identify the impact of regular exercises on physical fitness of Precarpathian region students.

ORGANIZATION AND METHODS

Research was conducted at the Precarpathian military sports boarding-school of Ivano-Frankivsk regional council. 120 pupils aged 14-17 from this school were involved in. The control group of the same age ($n = 120$) was formed from a male pupils population of secondary school number 18, 23, 24 of Ivano-Frankivsk town.

Assessment of physical health was carried out by the method of G. Apanasenko [3]. Physical development was judged based on Quetelet index (QI) [9] and skinfolds thickness [11]. To determine the level of physical qualities were used the tests (strength - handgrip dynamometry of stronger hand, speed-strength qualities – curl-up test in 30 seconds, flexibility - V-sit reach testing, speed quality - plate tapping test) [11]. The results were processed statistically using comparative and the descriptive analysis.

RESULTS

Our studies have shown that under the influence of regular physical activity 14-years schoolchildren showed a significant reduction in body mass index (BMI) and Robinson index (RI) in comparison with the control group. LI (life index) and PI (power index) values increased in comparison with the indicators of the control group. As a result, there was shown the LI increasing on 14,2% ($P < 0,05$) of in the experimental group during the first year of regular exercises. PI has reached a high level during the first year classes (Fig.1). Ruffier index both in the control and experimental groups during the studied age period was at "below average."

Thus, the assessment of somatic health level showed its increase in the experimental group at 14, 16 and 17 years in comparison with the control group (Fig.2). A significant increase in somatic health level was reported in 11 form (17 years) in relation to 10 form (16 years) in the control group, and in the experimental group at 16 years compared to 15 years. However, despite of the positive age dynamics, 17 years students of the control group had a low physical health level, and in the experimental group it was below average.

In assessing of physical development there was found a significant QI decrease in 14 years students in the experimental group relatively to the control group (Table 1). With age, QI value both in the control and experimental groups was significantly increasing. What about the skinfolds thickness, its decreasing in the subscapular area and in the area of the biceps was found in 14 years students compared with the control group, and in the triceps area - in 15 years students. The thickness of the abdominal folds was significantly lower in the experimental group of 14 and 15 years. The decrease of skinfolds thickness in the shank region was found in the group of 14, 15 and 16 years students. The skinfolds thickness in the hip region was smaller in the experimental group students of 14 and 15 years.

In assessing of the level of physical properties a significant increase in speed characteristics in all experimental groups relatively to the control group was showed (Table 2). Higher rates of flexibility were found in 16 and 17 years lyceum students, and speed-strength indices were significantly higher in 14, 15 to 16 years students. No significant differences in muscle strength hands in the experimental group relatively to the control were found. However, both

in the control and experimental group there was marked the increase in muscle strength in the studied age interval.

Table 1. Dynamics of physical development indicators of schoolchildren aged 14-17 (M ± m)

Indicators		Age, years							
		14		15		16		17	
		CG (n=30)	EG (n=30)	CG (n=30)	EG (n=30)	CG (n=20)	EG (n=30)	CG (n=30)	EG (n=30)
QI, g/cm		319,81 ±10,03	292,34 ±5,99*	343,40 ±9,68	333,17 ±7,22**	359,89 ±9,05●	352,98 ±5,94**●	375,56 ±9,21●◆	388,92 ±8,26**◆◆
skinfolds thickness, mm	biceps	9,03 ±0,45	8,17 ±0,14	9,67 ±0,64	7,94 ±0,35*	8,65 ±0,27	8,07 ±0,20	8,03 ±0,21	8,10 ±0,27
	triceps	14,13 ±0,52	12,87 ±0,55	13,93 ±0,69	12,20 ±0,62	14,35 ±0,66	12,20 ±0,48	12,00 ±0,58**◆◆	12,53 ±0,61
	subscapular	11,43 ±0,54	10,47 ±0,27	12,17 ±0,65	10,27 ±0,55	11,90 ±0,46	12,00 ±0,37**●	11,13 ±0,34	11,87 ±0,49●◆
	abdominal	13,13 ±0,71	11,33 ±0,32*	13,67 ±0,79	11,00 ±0,48	13,00 ±0,64	11,93 ±0,48	12,73 ±0,91	12,37 ±0,56◆
	shank	17,53 ±0,55	14,07 ±0,47*	16,60 ±0,81	14,07 ±0,63*	16,30 ±0,83	13,87 ±0,37*	12,73 ±0,63**◆◆	13,09 ±0,86
	hip	17,53 ±0,74	14,57 ±1,02*	16,23 ±0,95	13,20 ±0,58*	18,20 ±3,40	13,70 ±0,50	13,80 ±0,78**	14,43 ±0,77

Note: * - significant changes in relation to the control group are marked (CG - control group, EG - experimental group); ** - significant changes in relation to the relevant age group (14-15, 15-16, 16-17 years) are marked; ● - significant changes in relation to the respective age groups 14-16 and 14-17 years are marked; ◆ - significant changes in relation to the relevant group of 15-17 years are marked.

Also, a significant increase of strength and endurance in age aspect was observed in the control group. Along with it there was an undeniable increase of flexibility and speed in the studied age range.

Thus, present studies have shown a significant positive dynamics of physiometric and somatometric indicators of physical development, and as a result - the level of physical health in the first year of regular exercise in relation to the control group. The positive effect of regular physical activity on indices of physical fitness (speed, speed-strength quality, flexibility), and hence the physical condition of experimental group students were established.

As you know, physical development, somatic health and physical readiness characterize the physical state of the individual and it is one of the most important indicators of student health. Morpho-physiological capacity of the body is the basis of achievement of the optimal physical fitness and, as a consequence, the safe level of somatic health. Today the processes of growth and development of the child's body are characterized by different rates and the degree of regulation mechanisms stress [7, 8]. The terms of anthropo-ecological stress inherent in our present time, lead to the increasing of the percentage of children with disharmonious physical development, increasing of the proportion of children with diverse somatic pa-

thology, erasing clear limits of growth "jumps", disturbance of puberty [6, 10, 14]. All this greatly reduces the number of healthy children at the present stage of society development. It is uncontroversial that regular physical activity that meet the functional status of the individual, lead to the optimization of psycho-physiological adaptation processes, improve the growth and development of the body and the health of the student [2, 12]. That is why the selection of adequate means of physical state optimization of school children and their practical implementation are so important.

Table 2.Development of physical qualities of 14-17 years old students (M ± m)

Indicators	Age, years							
	14		15		16		17	
	CG (n=30)	EG (n=30)	CG (n=30)	EG (n=30)	CG (n=20)	EG (n=30)	CG (n=30)	EG (n=30)
Sit-up test, times in 30 s	26,97 ±0,86	32,10 ±0,69*	28,40 ±0,60	32,27 ±0,69*	29,15 ±0,79●	33,83 ±0,78*	32,90 ±0,49**●◆	34,27 ±0,48●◆
Muscle wrist strength, kg	29,83 ±1,11	30,73 ±1,10	37,73 ±1,23**	37,90 ±1,25**	41,75 ±1,80●	43,87 ±1,08**●	45,20 ±1,48●◆	48,50 ±1,16***●◆
Flexibility, cm	21,90 ±0,95	24,47 ±0,98	21,53 ±0,93	24,63 ±1,34	24,80 ±1,49**	32,63 ±1,40***●	28,25 ±1,03**●◆	32,57 ±0,67*●◆
Speed, s	12,23 ±0,23	11,38 ±0,25*	11,24 ±0,27**	10,16 ±0,15***	11,29 ±0,28●	9,70 ±0,22*●	10,17 ±0,15***●◆	9,38 ±0,17*●◆

Note 2*: the same as in the Table 1

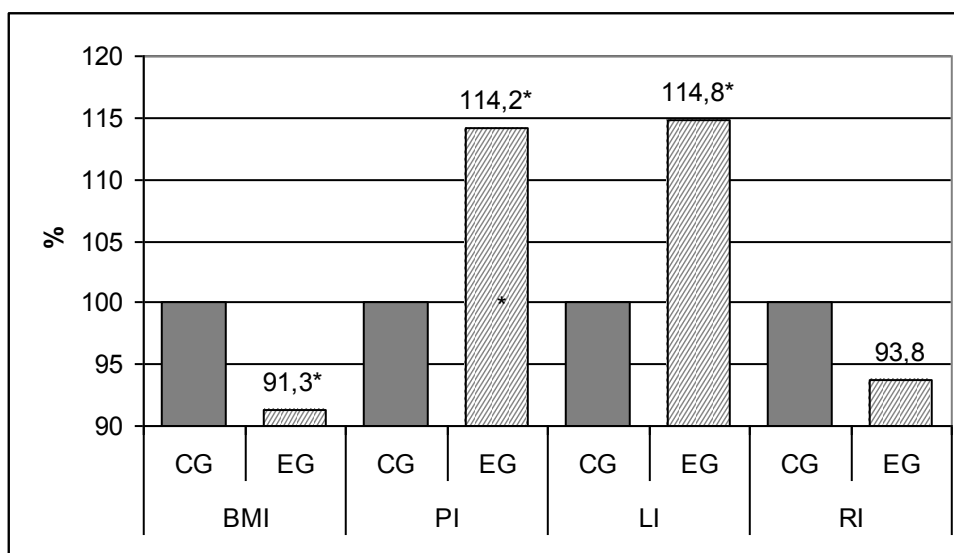


Fig.1. Influence of physical activity on somatic health components of students 14 years: CG - control group, EG - experimental group:

* - significant changes in relation to the control group.

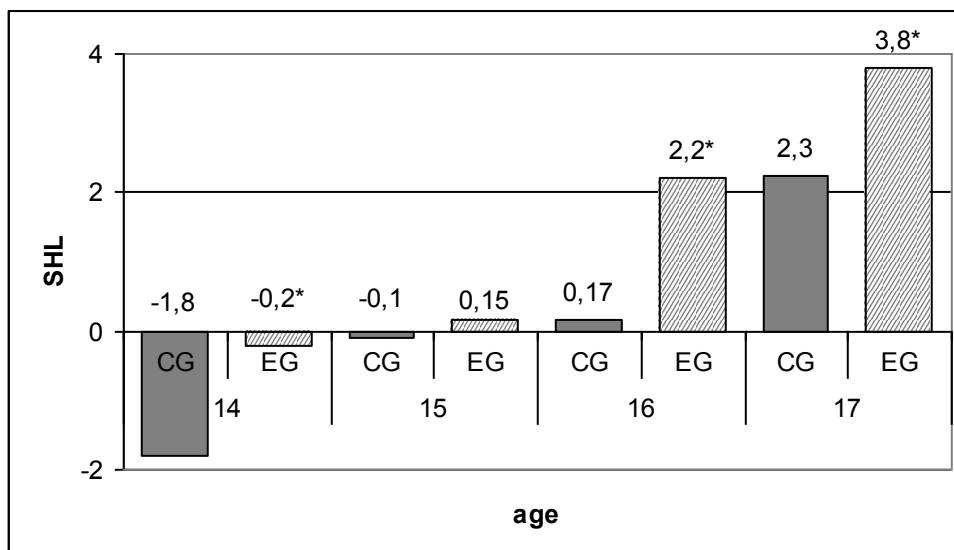


Fig.2. Influence of exercises on the level of somatic health (SHL): CG - control group, EG - experimental group:

* - significant changes in relation to the control group.

CONCLUSIONS

1. Regular exercises lead to accelerated functional maturation of major adaptive systems of the students' organism, and as a result to the somatic health increasing.

2. Low growth indicators of somatic health in 15-year-old students of the experimental group indicates the existence of a critical period of body development and requires careful dosage of physical activity in accordance with the functionality of a growing organism.

3. Students of all groups have inadequate level of physical disability that causes low reserves of schoolchildren' cardiorespiratory system.

4. The developing and inculcation of adequate means of correction aerobic possibilities of the organism would lead to increased physical health, and therefore the physical state of schoolchildren.

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