

Original Research Article

Improvement of medical-pedagogical observation as a method for preventing the development of prepathological condition in young athletes

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ABSTRACT

Background: In the practice of training young athletes in recent years, there has been a tendency to one-sided development. Currently, existing protocols, medical-pedagogical surveillance (MPS) is imperfect, do not enable to collect complete information about young athlete in the course of training which required for the correction of the training process and optimise post-physical stressing recovery. Aim of the study is to assess the effectiveness of the improved protocol implementation- medical-pedagogical observations of children engaged in sport schools in Uzbekistan.

Methods: The study was performed over 120 sports school students. Medical-pedagogical supervision (MPS) was conducted in the morning and evening sessions in different periods of the annual cycle. Study participants were divided into 2 groups and each includes 60 people, depending on the applied Protocol MPS. During the training, led timing classes, noted what the athlete using a symbol. At the end of training calculated duration of physical stress and motor density lesson finding the percent of the time the physical stress to the total training duration. Special attention was paid to the nature of the training process: the number of lessons per week correct their location, the duration and structure of activities, their common and motor density. During exercise, every 10-15 minutes counting the pulse.

Results: Density of the training depended on the degree of preparedness of young athletes and in the elementary group it was 58%, middle- 63%, high- 70%. According to the current Protocol MPS failed to identify the presence of fatigue of young athletes and to assess its degree. In middle physical stress distributed such a way that the ratio of general physical training and special physical stress was equal parts, warm-up was 18-20%, the majority- 60%, final was 15-18%. In older group warm-up 10-15% of the entire training duration, the major part- 80% and the final 5-10%. The density classes are 65-80%. Reorganization showed that the number of basic groups of chronic diseases was decreased 1.2-2.5 times in most classes of diseases, whereas in control group these indicators in 2015, by contrast, has grown in 1.5-2.2 times in comparison with 2014.

Conclusions: Conduct medical-pedagogical supervision on advanced protocols and corresponding reorganization of the training process and rationalization of physical stress allowed to improve the dynamics of their physical development without deviations from age-related standards of physical fitness and reducing rates of infection.

Keywords: Medical-pedagogical surveillance, Physical stress, Reorganization, Sports medicine

INTRODUCTION

One of the priority programs in the Republic of Uzbekistan is a development of sports, involvement physical culture in all classes of the population with the aim of promoting health and healthy lifestyles. In the process of implementing government programs for the provision of the material and technical base of sport schools, the country has significantly increased the number of children and adolescents involved in sports and physical education. Today, in all regions of the country, there are more than 505 of sports schools in different directions.¹

In the practice of training young athletes in recent years, there has been a tendency to one-sided development. In the end, part of the training process remains the issue of preserving and strengthening a health of the younger generation. Classes in sport clubs can be an effective tool for optimization of physical activity and health promotion only if the competent, comprehensive and scientifically sound approach to the management of physical stress and planning of the training process.² In connection with the growth of children and adolescents involved in sports, remain especially relevant issues for the analysis and interpretation of results of monitoring physical development, the adequacy of physical activity and physical fitness amongst students in sports schools of the Republic of Uzbekistan.³

A detailed introduction of the doctor with the contents and regime of physical training and sports, and assess their effectiveness in enhancing health and improving the functional organism status were found profitable developing specific recommendations to the teacher (coach) for planning, building, and individualization of educational training.⁴ Currently, existing protocols, medical-pedagogical surveillance (MPS) is imperfect, do not enable to collect complete information about young athlete in the course of training which required for the correction of the training process and optimize post-physical stressing recovery. This necessitates, which the improvement of protocols for medical research, was the subject of this study.^{3,5}

The purpose of this study was to assess the effectiveness of improved protocol implementation- medical-pedagogical observations of children engaged in sport schools in Uzbekistan.

METHODS

The study involved 120 students child-youthful Sport School (CYSS) in Tashkent and they were at the age of 11-17 years, 72 boys and 48 girls, occupied for athletics, football and handball.

Medical-pedagogical supervision (MPS) was conducted in morning and evening sessions in different periods of the annual cycle. Each school held a medical-pedagogical

supervision in groups with different level of sports training: the initial (1-2 year from the start of classes), medium (3-4 years), senior (5-7 years). Study participants were divided into 2 groups and each includes 60 people, depending on the applied Protocol MPS.

In the current Protocol MPS notes the following: passport data of the athlete, sport type, category, venue of the training, a table to record heart rate and blood pressure throughout the exercise to construct the physiological-physical stress curve, and formulating the conclusion of the doctor for adequacy of the physical stress.

Unlike the current in the enhanced Protocol includes a number of additions:⁴

- Table for the minute duration of the workouts, what does the athlete during exercise, what is the nature of the exercises, their duration, allowing the doctor at the end of training to determine the nature of physical stress distribution and to calculate the motor density classes.
- Clinical part, which indicates the presence of any complaints on the health of the athlete before workouts and after physical stress.
- Evaluation of athlete emotional state before and after exercise.
- Assessment of the degree of fatigue by the end of the workout.

When carrying out MPS on improved Protocol was conducted following methods of research:

- Survey of young athletes for their condition before the training.
- Duration of training sessions.
- Determination of density training.
- Counting of heart rate at rest and during exercise.
- Construction of a physiological physical stress curve.
- Determination of effect of physical stressing during exercise on the driving system of the body using functional tests.
- Assessment of fatigue.
- Psycho-emotional state assessment of young athletes.

In the study of examined sportsman's history, it is revealed the following information: age, which began with sports, what sports they participate in competitions and with what results, whether the injury or illness, how quickly resumed training after injury or illness, whether currently any drugs. The data recorded in the enhanced Protocol.

During the training, led timing classes, noted what the athlete using a symbol (P- pause; S- stands; Si- sits; W- walk; R- running, wrestling; E- exercises; SH- shells; G- game, and etc.). At the end of training calculated duration of physical stress and the calculated motor density lesson

finding the percent of the time the physical stress to the total training duration.

During exercise, every 10-15 minutes counting the pulse of young athletes for 10 seconds and record information in the record. Based on the data, on the chart pulse was mentioned, and lined up the physical stress curve, which was making a judgment about the correctness of the physical stress distribution and reactions of hemodynamics of young sportsmen.

In the main and final parts of the training were revealed external signs of fatigue: skin colour, character sweating, coordination and balance, reaction to coach's different degrees in the 3-point system, points were summed up and established the degree of fatigue and physical stress (for Makarova GA. 2003).

Emotional state is one of the most important indicators of athlete health, additionally, characterizes the degree of fatigue and motivation of athlete to continue training. According to improved Protocol of MPS, in the conditions of deficiency of time, psycho-emotional state was determined by subjective self-assessment of young sportsman of their mood (happy, indifferent, busy, and distracted).

The evaluated used the forms and means of physical education, the percentage of involvement of students in different forms of physical education, the conditions for training. Special attention was paid to the nature of the training process: the number of lessons per week correct their location, the duration and structure of activities, their common and motor density.

To assess physical activity of children and adolescents used the timing of the activity at least 10 study sites in each age group for training. In summing up expected percent of time allocation for key activities.

At the end of the training, after the data analysis was done general conclusion and recommendations to the coach.

Statistical analyses

Processing of quantitative data was performed using the software package microsoft office excel 2003, including the use of built-in functions for statistical processing and "Biostatistics" for windows (version 4.03). The statistical importance of differences in measurements obtained when comparing the average quantitative values was determined by student's criterion (t) calculate the error probability (P). The differences were considered significant at $P \leq 0.05$.

RESULTS

In the analysis of the structure and density of workout, it was revealed that overall business has 3 parts

traditionally, the density of the training depended on the degree of preparedness of young athletes in the elementary group was 58%, middle- 63%, high- 70%. The ratio of different types of physical stress, so it was different in the initial group and was dominated by common developmental exercises with a small percentage specialized in middle group, percentage of specialized physical stress increased and the maximum was observed in older group (Table 1).

Table 1. The structure and density of the training according to the enhanced protocol MPS.

Indicators	Initial group	Middle group	Older group
Motor density classes, %	58.4±3.2	63.4±2.8	68.6±3.2
General physical preparation, %	86.2±2.9	62.6±3.5	38.7±4.6
Specialization, %	12.8±3.3	27.4±2.8	61.3±3.7

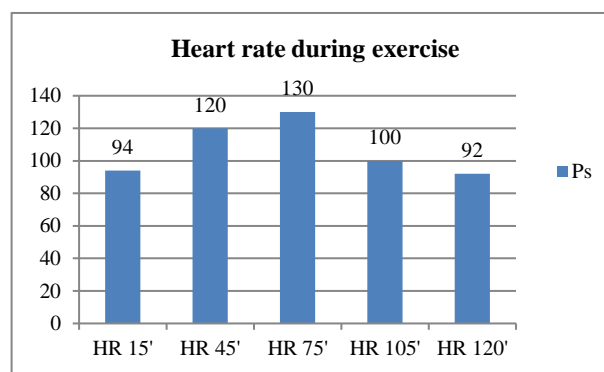


Figure 1: Physiological curve under the current protocol.

In the analysis of the physiological curves according to the current protocol revealed the following: gradual growth in physical stress in the initial part, the main pulse has reached a maximum and stayed at the same level, then decreased in the final part (Figure 1). However, there was no information on the detail of the physical stress during training and density training.

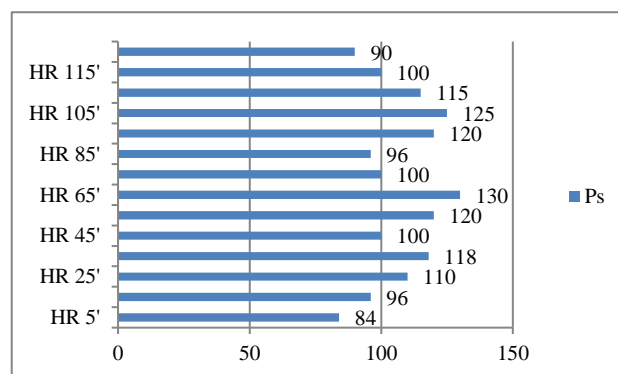


Figure 2: Physiological curve for advanced protocol.

In the analysis of the physiological curves on an improved protocol was revealed the detailed reaction of the pulse on physical stress in different parts of the workout, while accurately stated, what physical stress have caused this reaction. In the main part of the physical stress curve should be wavy lines, the upgrades reflect the increased physical stress, reducing the periods with lower physical stress, with the aim of improving the adaptive mechanisms in the body and prevent fatigue and overexertion.

According to the current protocol MPS failed to identify the presence of fatigue of young athletes and to assess its degree.

Table 2: Exponents with longing.

Indicators	Initial group	Middle group	Older group
Colour of the skin (on a scale 1-3)	1.9±0.43	1.4±0.27	1.1±0.34
Sweating (on a scale 1-3)	1.8±0.63	1.5±0.32	1.1±0.28
Coordination and balance (on a scale 1-3)	1.2±0.34	1.1±0.13	1.4±0.64
Reaction to coach (on a scale 1-3)	1.3±0.56	1.2±0.18	1.56±0.76

According to improved MPS protocol, indicators of the degree of fatigue in elementary, middle and high groups are shown in Table 2.

According to the current protocol MPS failed to assess the mental status of young athletes. According to the improved protocol of MPS, the highest percentage in elementary group made a joyful mood, and in the middle and older group more often mentioned physical stress and ambient mood to the end of your workout, indicating a medium degree of fatigue (Table 3).

Table 3: Indices of the psycho-emotional status of young athletes.

Indicators	Initial group	Middle group	Older group
Glad %	7	14	31
Indifferent %	44	54	62
Tense %	36	26	6
Dispelled %	13	6	1

According to the results of medical-pedagogical observations on advanced protocols MPS, recommendations were made to the coaches for changing the training process. The coaches carefully analyzed the provided data MPS and reorganized training and streamlining of physical stress. In primary groups, great attention was paid to physical training beginners of young athletes, the variety of exercises and tools, full physical

stress, a presence of psycho-emotional component. Warm-up accounted for 25% of the length of the entire workout, in the main part increased the proportion of breathing exercises and relaxation exercises.

In middle physical stress distributed in such a way that the ratio of general physical training and special physical stress was about equal parts, warm-up was 18-20%, the majority- 60%, final was 15-18%. In the older group warm-up 10-15% of the entire training duration, the major part- 80% and the final 5-10%. The density classes are 65-80%. With the purpose of development of fatigue and tenseness prevention were held scrimmages with elements of other sports. The athletes who had shown medium to high degree of fatigue was conducted individualization physical stress to optimize the recovery processes.

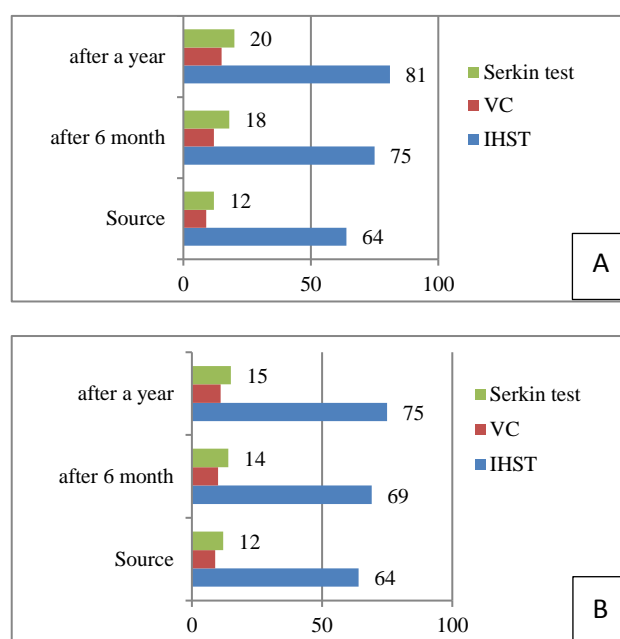


Figure 3: The dynamics of adaptive changes of the body during training. A: Main group, B: Control group.

Efficiency of application of improved protocol MPS and reorganization of the training process was carried out according to the following criteria: dynamics of adaptive changes of the organism during the training process, indexes of physical development, analysis of the incidence of young athletes, the degree of fitness according to the Harvard step test (IHST).

During the Harvard step test, students' pulse were counted for 30 seconds on the 2nd, 3rd and 4th minute after the physical stress (climbing a step at a pace of 30 times for 1 minute for 3 or 5 minutes) with the subsequent calculation of the index of Harvard step test (IHST) by the conventional method. The beginners were recorded low rates IHST, in the intermediate group 2-3 years of regular training IHST increases, and in the older group,

the level of IHST corresponds to above average and a good level of fitness. The study of the dynamics of adaptive changes of the organism in the process of training was conducted after 6 months and 1 year during the MPS. Thus, we analyzed the indicators of physical development of vital capacity (VC) and performance indicators 3rd phase samples Serkin and IHST (reflecting the degree of adaptation of the organism to physical stress). In the "main" children-youth sports schools, where the results of the improved MPS Protocol was carried out reorganization and correction of the training process compared to control there was a significant increase in indicators of VC, 3rd phase samples Serkin and IHST in all three groups (elementary, middle and high). The results are shown in Figure 3. Health indicators of children and adolescents are the main indicators characterizing the optimality conditions of

their education and training. In large measure, these indicators are determined by the nutrition and physical education (PE) of children, especially in a period of rapid formation of the protective properties of the organism, typical for school-age children: nutrition and well-designed physical education can achieve a significant positive impact on the development of these properties.

We studied indicators of morbidity by appeal ability, and according to in-depth examinations of boys and girls in the age group of 11-14 years.

The structure of diseases of schoolchildren in materials uptake represented 15 classes of diseases (ICD- 10). Before the reorganization of the training structure (thus morbidity), according to classes of disease between compared groups had no significant differences.

Table 4. Primary morbidity of schoolchildren based on the material of uptake before and after reorganization of the training process. per 1.000 children.

Age group (years)	Gender	Main group		Control group	
		Year			
		2014	2015	2014	2015
11-14	Male	297.7±26.9*	181.8±22.8*	216.0±24.3	257.8±25.8
	Female	224.0±19.8	138.0±16.4***	197.3±18.9	229.0±20.0

Note: *differences related to the control group. significant data (*-P<0.05; *** - P<0.001)

Table 5. Comparative levels of some forms of pathology in boys 11-14 years according to the materials of overtake and data of physical examination. per 1000 children.

Materials of the study	Ear and mastoid process disease (VIII class)		Digestive diseases (XI class)		Skin and subcutaneous tissue disease (XII class)	
	Main group	control	Main group	control	Main group	control
2014 year						
based on uptake	7.0±1.5	7.0±1.5	21.0±2.4*	13.9±2.0	14.0±2.1*	7.0±1.5
based on medical examination	10.5±1.8	13.9±2.0	28.0±2.7*	10.5±1.8	35.0±2.8*	13.9±2.0
2015 year						
based on uptake	3.5±0.7*	10.5±1.8	10.5±1.8*	17.4±2.2	7.0±1.5*	13.9±2.0
based on medical examination	7.0±1.5*	17.4±2.2	17.5±2.2	13.9±2.0	21.0±2.4	24.4±2.5

Note: *differences relative to the control group significant data (*- P<0.05)

We conducted an in-depth examination of the studied contingent of pupils of sports schools in September and October 2014 and in September and October 2015, i.e. a year after the beginning of the reorganization of the training. The conducted research allowed revealing the forms of pathology, which are not always taken into an account in the medical assistance. The level of prevalence for children and adolescents in these forms of diseases detected during a medical examination was higher than the level of morbidity by uptake, indicating the presence of latent forms of diseases among the studied population of children and adolescents. Thus, it is noted that the

main groups of these forms of the disease and after the reorganization of the training affected is higher than according to the uptake. As an example, Table 5 shows the comparative figures of the incidence of boys 11-14 years according to overtake and the results of the medical examination in respect of those diseases, the frequency of which was higher than the results of the examination.

The data in the table show that for most studied groups of children in these groups of diseases are not always the reason for seeking medical help. To the greatest degree, it concerns to diseases of the skin and subcutaneous tissue,

which according to the medical examination in study and control groups was 1.7 times higher than for uptake.

DISCUSSION

However, the results of medical examination on children carried out in the “basic” school before and after workouts. Reorganization showed that the number of basic groups of chronic diseases was decreased 1.2-2.5 times in most classes of diseases, whereas in control group these indicators in 2015, by contrast, has grown in 1.5-2.2 times in comparison with 2014.⁶

The analysis of morbidity of students of sports schools and assessment of significance of the indicators of the complex health measures allows drawing the following preliminary conclusions:

- Traditional system of carrying out MPS used in sports schools, is not conducive to the health of children and adolescents, in particular, manifested by the absence of positive dynamics (2014-2015) in the incidence in the group control according to appealability and the results of medical examinations.
- Implementation of measures for the rationalization and reorganization of the training process (basic group) for the 2014-2015 academic year allowed us to significantly reduce the incidence of children and adolescents in comparison with the dynamics of the indicators in the control groups. The overall morbidity rate in 2015 compared to 2014 decreased 42.1-49.2 percent.
- Reducing the incidence of students with the implementation of health activities was primarily due to a decrease in the number of diseases of the eye, the ear and mastoid process, diseases of the respiratory system, skin and subcutaneous tissue, diseases of the genitourinary system and diseases of the digestive system. A large part of these diseases is closely connected with level of resistance; this allows concluding that implementing Wellness events have nonspecific effects on children and adolescents, increasing the resistance to the body.⁵⁻⁷

In the study of the incidence of investigated contingent identified some features that you should pay attention to when medical control of these contingents:

- The overall morbidity of children and adolescents based on medical examinations was lower than the uptake. This is evidence in children and adolescents hidden forms of pathology, or their unwillingness to seek medical help.
- In the implementation of measures for the reorganization of the training process in the school revealed an unexpected problem- the increase in diseases of class XIII (diseases of bones and joints). In our opinion, this is due to the use of physical exercises, not taking into account the intensive

processes of formation of the skeleton in this age, which necessitates a more careful selection of these exercises.^{8,9}

CONCLUSION

The study of the specific impact of physical stress on young athlete's organism during training and the analysis of actual organization and conduct of training showed that the current system has, in general, the same characteristics and cannot provide its basic function-improving health of students, improve the functionality of their body and achieving significant sports results. The traditional system of MPS used in sports schools is not conducive to the health of children and adolescents, in particular, manifested by the absence of positive dynamics in the indicators of physical development, physical fitness and morbidity in the groups of control according to appealability and the results of medical examinations. The above description results in all age and gender groups. Conduct medical-pedagogical supervision on advanced protocols and the corresponding reorganization of the training process and rationalization of physical stress allowed improving the dynamics of their physical development without deviations from age-related standards of physical fitness and reducing rates of infection.

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