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МУАММОЛАРИ

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РЕСПУБЛИКИ УЗБЕКИСТАН

**PROBLEMS OF
BIOLOGY AND MEDICINE**

**БИОЛОГИЯ ВА ТИББИЁТ
МУАММОЛАРИ**

**ПРОБЛЕМЫ БИОЛОГИИ
И МЕДИЦИНЫ**

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THE ROLE OF NUTRITION AND DRINKING REGIMEN IN TRAINING YOUNG ATHLETES IN THE CONDITIONS OF A HOT CLIMATE



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ИССИҚ ИҚЛИМДА ЁШ АТЛЕТЛАРНИ ТАЙЁРЛАШДА ОЗИҚ-ОВҚАТ ВА ИЧИМЛИКЛАР ТАРТИБИНИНГ ЎРНИ

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РОЛЬ ПИТАНИЯ И ПИТЬЕВОГО РЕЖИМА В ПОДГОТОВКЕ ЮНЫХ СПОРТСМЕНОВ, ТРЕНИРУЮЩИХСЯ В УСЛОВИЯХ ЖАРКОГО КЛИМАТА

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Резюме. Тадқиқотнинг мақсади: Иссиқ иқлим шароитида ёш спортчиларни тайёрлаш учун ўқув жараёнини қайта таъкил этиши ва жисмоний фаолиятни рационаллаштириши, овқатланиши ва ичиши режимини ўрганиши самарадорлигини баҳолаш. Тадқиқот материали ва усуллари. Тошкент шаҳридаги 14 ёшдан 17 ёшгача бўлган болалар ва ўсмирлар мактаблари футбол мактабларидан 8-10 ёшгача спорт тажрибасига эга 56 нафар спортчи текширилди. Барча спортчилар Мартин тести ёрдамида юрак-қон томир тизимининг функционал ҳолатини баҳолаш, Гарварднинг синов синови бўйича яроқлилигини аниқлаш, машғулотларнинг характерини, юкламаларнинг тақсимланишини, тиббий ва педагогик кузатув пайтида спортчиларнинг чарчаш даражасини баҳолашни ўтказдилар. Тадқиқот натижалари. Тиббий-педогогик кузатувлар ва функционал синамалар натижаларига асосан мураббийларга иссиқ мавсумда ўқув жараёнини ўзгартириши, шунингдек овқатланиши ва ичимлик режимини ўзгартириши бўйича тавсиялар берилди. Хулоса. Ўқув жараёни, парҳез ва ичимликларни рационализация қилиши иссиқликга чидамликни оширишига, тикланиши жараёнларини оптималлаштиришига ва иссиқ иқлим шароитида юқори жисмоний кўрсаткичларни сақлаб туришига ёрдам берди.

Калим сўзлар: ёш спортчилар, футболчилар, функционал ҳолат.

Abstract: Purpose of the study. In order to assess the effectiveness of the reorganization of the training process and the rationalization of physical activity, nutrition and drinking regimen for young athletes training in hot climates. Material and methods. 56 athletes from football schools of children and youth schools in Tashkent aged 14 to 17 years with a sports experience of 8-10 years were examined. All sportsmen were evaluated: assessment of functional state of cardiovascular system with the help of Martin's sample, determination of training by Harvard step-test method, assessment of nature of training process, distribution of loads, degree of fatigue of athletes during medical and pedagogical observation. Results. Recommendations were made in order to correct training process in a hot period of the year, as well as diet and drinking regime were changed according to the results of the carried out medical and pedagogical observations and functional tests. Conclusion. Rationalization of the training process, diet and drinking regime contributed to elevation of the heat tolerance, optimization of the restoration process and conduction of the high index of the physical work capacity in the condition of the hot climate.

Key words: young athletes, football players, functional state.

The growing body of the child is also given increased requirements for sports, but we do not take into account that the necessary increase in the adaptation potential of functional capabilities in childhood, as well as adolescence with constant physical activity occurs not only with a scientifically sound, but also adequately organized training process, modern and timely medical support. In this process, the rational nutrition of young athletes can play a key role [2].

A feature of the training of young athletes in our republic is the fact that training takes place in a hot climate. The features of the hot climate of the region (midland, high average daily temperatures, low air humidity, etc.) in which we live have a certain impact on the leading systems of the body, ensuring the performance of physical activities, which must certainly be taken into account during training. Since overextended training in childhood and adolescence, especially in our hot and dry climates, a rapid increase in their intensity and volume without sufficient scientific justification and taking into account criteria for assessing the functional state of the heart can lead to overstress and have a serious, sometimes even irreversible, effect on the body. This in turn will lead to the limitation of further improvement in the chosen sport.

The factors that reduce performance are for the most part: overheating of the body, rapid dehydration, reduced oxygen transport capabilities of the cardiovascular system during training [3].

Leading to a decrease in the total volume of circulating blood, intense sweating contributes not only to an increase in blood viscosity, but also to a decrease in cardiac output. The fact is known that a decrease in blood volume by only 3% already leads to a deterioration in the well-being of athletes and a decrease in sports performance. A progressive increase in body temperature and an increase in load on functional systems due to dehydration leads to an increase in heart rate and a decrease in systolic volume. As a result, due to an increase in the proportion of cardiac output directed to the skin vessels to enhance heat transfer, athletes also have a violation of the blood supply to working muscles. Due to this redistribution of blood supply, the volume of intercellular as well as intracellular fluids decreases. Reduced water content and change of electrolyte equilibrium in cells leads to disruption of their normal vital activity [2,4,5,6,8].

Increased glycogen consumption and accumulation in lactic acid muscles is further confirmation of this. Development of hypoxia, obstruction of cardiac activity and blood thickening, except for the above-mentioned conditions, leads invariably to overheating of the body and causes increased blood flow in the skin, while reducing it in internal organs [3].

The aim of the study is to assess the effectiveness of the reorganization of the training process and rationalization of physical activity, nutrition and

drinking conditions in young athletes training in hot climates.

Materials and methods. Under supervision were 56 young athletes of football players aged 14 to 17 years who are students of youth schools in Tashkent. Sports experience 8-10 years.

The following examination methods were carried out: assessment of the functional state of the cardiovascular system using the Martin sample, determination of training by the Harvard step test, assessment of the nature of the training process, distribution of loads, the degree of fatigue of athletes during medical and pedagogical observation (MPO).

The study was conducted in the summer months of the year. The ambient temperature in a hot period during morning training was 33.2 ± 1.56 °C, humidity 40%; during evening training, respectively, 36.63 ± 1.72 °C and 38%.

Based on the results of medical and pedagogical observations and functional samples, recommendations were made to trainers on changing the training process in the hot period of the year. The trainers carefully analyzed the provided medical and pedagogical observation (MPO) data and reorganized the training and rationalization of loads: they moved the training time to earlier morning hours (for example, 7: 00-9: 00) and later evening (for example, 17: 00-19: 00); the percentage of strength loads was reduced; during the training, short breaks of changing the type of physical activity were included; more attention was paid to the general physical training of young athletes, the variety of exercises and remedies, the comprehensive impact of loads, the presence of a psychoemotional component, in the main part of the training, the proportion of respiratory exercises and relaxation exercises was increased; at least one training per week was carried out in the swimming pool.

In order to increase heat resistance, changes were made to the diet and drinking regime. When compiling the diet, athletes were guided by the main widely used medical and biological principles: adequacy of nutrition, the principle of energy balance, balance in basic nutrients (proteins, fats, carbohydrates, vitamins, mineral substances), accuracy of dosing biologically active ingredients. Along with adequate consumption of liquid and electrolytes in the diet, the number of proteins was reduced. The choice of proteins was justified by the fact that it is their burning that leads to the formation of a large amount of heat compared to the burning of other substances. Fresh vegetables and fruits were also included in the diet as sources of ascorbic acid (250-500 mg), which contributes to increasing thermal tolerance [3]. It is also recommended that athletes use sports drinks containing 6% carbohydrates and 20-30 mg-eq/l sodium chloride to avoid the risk of dehydration and reduce physical performance [1].

Table 1. Recommended minimum fluid intake during and after workout (based on 13 ml/kg during workout and 4 ml/kg after workout)

Body weight, kg	Fluid replenishment during training, ml/h	Fluid replenishment after workout, ml/h
35	455	140
40	520	160
45	585	180
50	650	200
55	715	220
60	780	240

Table 2. Recommended volumes of liquid consumption when organizing the drinking regime of athletes [7].

Time	Volume of liquid
1-2 hours before training	Body weight < 40 kg: 85-170 ml Body weight > 40 kg: 170-340 ml
During the training process	Body weight < 40 kg: 120 ml every 20 minutes Body weight 40-60 kg: 140-200 ml every 20 minutes Body weight > 60 kg: 230 ml every 20 minutes
After the training process	for each 0.5 kg weight loss 500-600 ml of liquid

After a reorganization of the training process, rationalization of physical activity, diet and drinking regime, 2 months later, medical and pedagogical observation (MPO) and functional samples were repeated (Martin's test and Harvard step test).

Two groups of young athletes were identified: the main group (n = 28) was made up of athletes whose training and nutrition regime would be changed, and the control group (n = 26) - athletes whose training, nutrition and drinking mode did not change.

Results. When comparing the results of the Martin sample, carried out before and after making changes in the training regime, it was revealed that in

the main group the frequency of the normotonic reaction increased and the pathological ones decreased accordingly. In the control group, where the training regimen remained unchanged, the indicators showed no dynamics, the frequency of pathological reactions remained the same (Figure 1).

Analysis of training indicators according to the Harvard Step Test showed that the Harvard Step Test Index (HSTI) significantly increased in the main group compared to the control group, the number of athletes who showed "above average" and "good" training significantly increased, and "bad" and "below average" was absent.

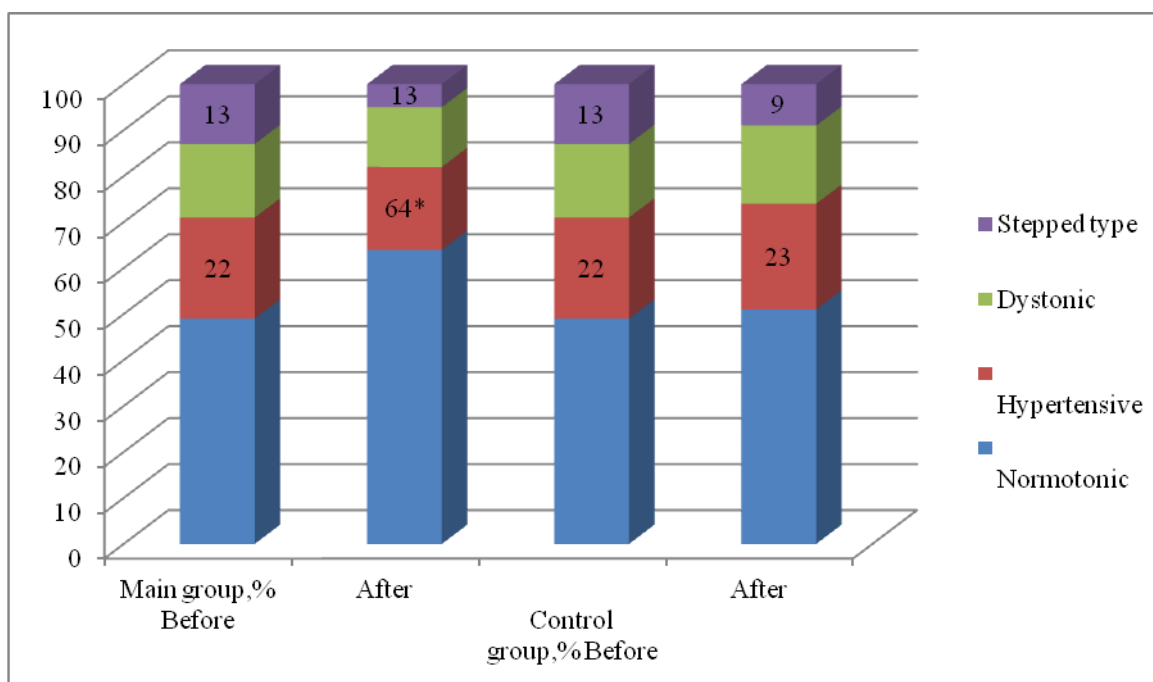


Figure 1. Distribution of types of response to physical load according to the Martine sample in young athletes engaged in groups with different training and food regimens.

* - reliability of P < 0.05 differences.

Table 3. Comparative assessment of the degree of fatigue of young athletes engaged in groups with different training regimens

Indicators	Points			
	Main group		Control group	
	Before	After	Before	After
Skin color (in points 1-3)	2,47±0,52	1,36±0,34*	2,68±0,43	2,76±0,37
Sweating (in points 1-3)	2,76±0,58	1,29±0,78*	2,83±0,64	2,92±0,48
Coordination and balance (in points 1-3)	1,74±0,83	1,45±0,59	1,98±0,67	1,77±0,56
Reaction to coach teams (in points 1-3)	2,15±0,38	1,06±0,47	2,12±0,46	2,43±0,62

* reliability of differences P <0.05

When conducting medical and pedagogical observation and determining the degree of fatigue of young athletes in the main group after the reorganization of training, rationalization of loads and an adequate drinking regime, signs of fatigue, the most significant "color of the skin" and "sweating," significantly improved. In the control group, athletes training in a hot climate in an unchanged training regime, on the contrary, showed a tendency to increase the degree of fatigue. The results are reflected in table 3.

Conclusion: Thus, peculiarities of nutrition and drinking regime of young athletes training in conditions of hot climate are reduction of protein load (protein content in diet should not exceed 1.2-1.6 g/kg of body weight), adequate replenishment of water-electrolyte balance, distribution of diet during the day, strictly agreed with mode and nature of trainings.

The rationalization of the training process, diet and drinking conditions contributes to increasing thermal tolerance, optimizing recovery processes and maintaining high physical performance in hot climates.

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РОЛЬ ПИТАНИЯ И ПИТЬЕВОГО РЕЖИМА В ПОДГОТОВКЕ ЮНЫХ СПОРТСМЕНОВ, ТРЕНИРУЮЩИХСЯ В УСЛОВИЯХ ЖАРКОГО КЛИМАТА

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Резюме. Цель. Оценка эффективности реорганизации тренировочного процесса и рационализации физических нагрузок, питания и питьевого режима у юных спортсменов, тренирующихся в условиях жаркого климата. Материал и методы исследования. Обследовано 56 спортсменов футболистов детско-

юношеских школ г. Ташкента в возрасте от 14 до 17 лет со спортивным стажем 8-10 лет. Всем спортсменам проводились: оценка функционального состояния сердечно-сосудистой системы с помощью пробы Мартине, определение тренированности методом Гарвардского степ-теста, оценка характера тренировочного процесса, распределение нагрузок, степень утомления спортсменов в ходе проведения врачебно-педагогического наблюдения. Результаты. По итогам проведенных врачебно-педагогических наблюдений и функциональных проб были сделаны рекомендации тренерам по изменению тренировочного процесса в жаркий период года, а также внесены изменения в рацион питания и питьевой режим. Выводы. Рационализация тренировочного процесса, режима питания и питья способствует повышению тепловой толерантности, оптимизации процессов восстановления и сохранению высоких показателей физической работоспособности в условиях жаркого климата.

Ключевые слова: юные спортсмены, футболисты, функциональное состояние.