Sanitary and hygienic conditions for effective sports activities of players

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Abstract

Objective of the study was to give a detailed sanitary and hygienic description of the conditions of professional sports activities of team sports athletes and to prove that overload and overtraining of the body cannot but have a negative impact on the health of athletes, especially among athletes with high professional experience.

Methods and structure of the study. The microclimate of indoor sports facilities, temperature conditions, lighting, dust, and microbial contamination of training premises were studied. When analyzing the state of adaptation of the athletes' body, the indicators of cardiointervalography (CIG) were determined using the method of R.M. Baevsky in terms of the magnitude of the mode amplitude (AMo) and voltage index (VI). The state of health and circulatory system of gaming athletes was also analyzed based on the prevalence of chronic non-infectious diseases and ECG.

Results and conclusions. The results obtained indicated a significant decrease in the level of adaptation of the body and a lower level of health among trained athletes-players compared to the control group. These conclusions necessitate a government solution to many medical and legal problems regarding compliance with labor rights and guarantees, decent social security and full medical rehabilitation of athletes, both those who continue their sports career and those who have completed it, when they receive sports injuries and injuries.

Keywords: *professional sports, hard work, physical overexertion, overtraining, social protection, social guarantees.*

Introduction. The constant increase in the level of sports results necessitates the need for special measures to preserve and strengthen the health of athletes, members and reserves of national teams, and Russian participants in major regional, national and international competitions [5]. According to sociological surveys, about 85% of athletes note insufficient state support after their retirement from elite sports for health reasons [2].

According to the majority of athletes, the issue of decent financing can be resolved favorably only for athletes who are members of elite clubs, since athletes of this level have the opportunity to insist on the necessary conditions of compensation under a contract with the club. Middle-level athletes objectively have no less chance of getting injured or an occupational disease, and this problem remains absolutely unresolved for them. According to most researchers, "physical culture and sports activities have a significant and comprehensive impact on the athlete's body. And this influence can be both positive and negative" [3].

Objective of the study was to identify the sanitary and hygienic conditions for effective sports activities of players.

Methods and structure of the study. The work analyzed the hygienic factors of the training process, the functional state and health of athletes, representatives of elite sports in team sports - hockey, football and volleyball. The research base was the training bases of the sports clubs "Salavat Yulaev", "Neftyanik Bashkortostan", and the gyms of the Bashkir Institute of Physical Culture (a branch of the Ural State University of Physical Culture). 34 team sports athletes, men aged 18-25 years, were examined. For control, the

functional and health status of students without high sports titles involved in physical education and sports at the Faculty of Physical Education of the Bashkir Institute of Physical Education was studied.

Results of the study and discussion. In team sports (with a single-cycle system), the preparatory period takes about two months a year, the competitive period - more than nine months, the transition period - one month. The duration of training sessions in the preparatory and pre-competition periods is about 40 hours a week, two training sessions lasting 2-3 hours a day, often without days off. Closer to competitions, the load is reduced to three to four hours a day.

The microclimate indicators of indoor sports facilities during training sessions of team sports athletes were compared with the optimal and acceptable hygienic standards regulated by Sanitary rules and regulations 2.2.4.548-96, the results obtained were assessed in accordance with Guide R 2.2.2006-05. It was found that all of them were within normal limits.

The severity of sports activities of athletes in team sports was assessed by indicators of physical dynamic load and static load using the example of hockey players (Table 1). Athletes of sports games devote part of their training time (two to three hours) to general physical training (running, flexibility exercises, stretching) and special training when they develop strength and speed-strength endurance in the gym. At the same time, athletes develop both the muscles of the lower and upper extremities. Then, after a break, athletes spend two to two and a half hours improving the technique and tactics of playing in their chosen sport.

Table 1. *Assessment of the severity of work of team sports athletes*

Ergometric assessment of operations				
Type of operation (physical exercise)	**Weight cargo, kg**	**Travel distance, m**	**Number operations per shift**	**Physical activity, kg*m**
Working on a hand simulator	20	2	20	800
Working on a hand simulator	50	2	20	2000
Working on a leg simulator	20	2	20	800
Working on a leg simulator	50	2	20	2000
Working on a back muscle simulator	20	2	20	800
Working on a back muscle simulator	50	2	20	2000
Average distance traveled during training including the game, km		13,8		
Average weight of sports equipment in ice hockey, kg		15,0		
Assessing the severity of work				
1.Physical dynamic load (units of external mechanical work per shift, kg*m)				
Indicator of the severity of the labor process according to R 2.2.22006-05	The value of the indicator		Class of working conditions according to R 2.2.2006-05	
1.1. With regional load (with the predominant participation of the muscles of the arms and shoulder girdle) when moving the cargo over a distance of up to 1 m (class 2.0 up to 5000)	2800,0		2.0	
1.2. With a general load (involving the muscles of the arms, body, legs) When moving a load over a distance of 1 to 5 m (class 1 to 12500)	2800,0		1.0	
1.2.2. When moving a load over a distance of more than 5 m (ice hockey) (class 3.2>70000)	123000 Cargo weight not less than 15 kg average distance 8.2 km		3.2	
7. Displacements in space due to the technological process, km				
7. Horizontal in hockey (3.2 < 12 km)	13,8		3.2	
5. Working posture				
5.1. Periodically, more than 50% of the shift time, being in an uncomfortable and/or fixed position; being in a forced position (kneeling, squatting, etc.) for more than 25% of the shift time. Being in a standing position for more than 80% of the shift time.			3.2	
General assessment of working conditions by severity in sports games			**3.3**	

Table 2. *Conventional standards for indicators of microbial air pollution in residential premises, m/o/m³*

Air rating	Number of microorganisms			
	Warm period of the year		Cold period of the year	
	Total	Of these, viridans staphylococcus and hemolytic streptococcus	Total	Of these, viridans staphylococcus and hemolytic streptococcus
Clean	< 1500	<16	< 4500	< 36
Contaminated	> 2500	>36	> 7000	> 124

The average number of training games for athletes in sports games, according to timing studies, is 1.6 during one day, which corresponds, according to pedometer data, to a run length of 12.8 km. Taking into account the additional daily morning run of one to two km, the total length of the run is on average 13.8 km, which allows us to classify the work of team sports athletes according to this indicator as class 3.2 according to R 2.2.2006–05.

Indicators of physical dynamic load of athletes in team sports with regional load (with the predominant participation of the muscles of the arms and shoulder girdle) with movement of the load over a distance of up to one m do not exceed the parameters of class 2.0 according to R 2.2.2006-05. Indicators of physical dynamic load with a total load (involving the muscles of the arms, body, legs) when moving a load over a distance of one to five m due to the need to work on simulators designed to develop the muscles of the arms and legs do not exceed the parameters of class 1.0 according to R 2.2.2006 -05.

However, in hockey, the athlete must carry special equipment (equipment), its weight can be more than 20 kg. This determines for hockey players the importance of another indicator of the severity of work - physical dynamic load when moving a load over a distance of more than 5 m, which for an athlete-hockey player averages 123,000 kg×m, and corresponds to class of working conditions 3.2 (Table 1).

We also conducted a study of the sanitary and microbiological characteristics of the halls of indoor sports facilities for the sports being studied. Approximate values of safe, according to A.I. Shafir, the level of contamination by microorganisms (m/o) of premises where people are constantly present are given in Table 2 [4].

The actual content of microbial flora in the air environment of the surveyed indoor sports facilities is given in Table 3.

It was found that in terms of the total number of microorganisms contained in one cubic meter of air in indoor sports facilities and halls for sports games, the microbial contamination of the air corresponds to the upper limit of the above norm. However, the content of β-hemolytic streptococcus in both the warm and cold periods of the year according to this classification should be classified as “dirty”. In addition, staphylococci, yeast-like and mold fungi are present in the air environment of gyms for team sports. Fungal microflora and β-hemolytic streptococcus belong to the group of opportunistic microorganisms, therefore, their content cannot be assessed according to R 2.2.2006-05. At the same time, the microflora found in sports facilities can become a possible cause of various diseases in athletes, including purulent and fungal infections, the likelihood of which increases with a decrease in the body’s adaptation.

Indicators of adaptive capabilities of gaming athletes were assessed by the method of cardiointervalography (CIG) according to R.M. Baevsky [1].

After training, the AMo and VI indicators of athletes in team sports increased to values corresponding to the level of adaptation stress according to R.M. Baevsky. (Table 5).

Table 3. *Microbial contamination of gyms for team sports*

Indoor sports facilities	Number of microorganisms in 1 m³				
	Total	of them:			
		Staphylococci	β-hemolytic streptococcus	Yeast-like mushrooms	Mold mushrooms
Sports games (gyms of the clubs “Salavat Yulaev” and “Neftyanik Bashkortostan”, Bashkir Institute of Physical Culture)	1350,7±146,4 3839,1±868,5	40,7±11,9 60,9±18,0	43,8±11,0 53,5±16,7	0 69,5± 9,7	21,5±8,2 66,8 ±10,4

Note. The numerator is the warm period, the denominator is the cold period of the year.

Table 4. *Standards for indicators of the level of adaptation of the body of men in age groups up to 25 years (according to R.M. Baevsky)*

Level of adaptation	Indicators of CIG	
	AMo (M±m)	VI (M±m)
Satisfactory	36 ± 3	67 ± 10
Voltage	43 ± 4	173 ± 73
Unsatisfactory	73 ± 9	303 ± 91
Disruption	-	-

Table 5. *Indicators of adaptation of the body of team sports athletes before and after training*

Monitoring group	Indicators of CIG			
	before training		after training	
	AMo (M±m)	VI (M±m)	AMo (M±m)	VI (M±m)
Game sports	33,3 ± 10,7	69,4 ± 16,6	50,0 ± 13,5	174,5 ± 66,7
Control	31,9 ± 8,7	65,3 ± 16,2	40,8 ± 8,9	98,9 ± 18,8

When assessing the state of health, we considered the prevalence of chronic non-infectious diseases according to in-depth medical examinations of athletes conducted at the medical and physical education clinic in the city of Ufa, Republic of Belarus. Young athletes did not show a significant difference in morbidity rates compared to controls. In the group of trained athletes, the incidence rate was significantly higher than in the control group ($p<0.05$). The main share of chronic diseases in trained sports players was detected from the central nervous system in the form of neurocirculatory dystonias, neuroses and neurasthenia and amounted to 37.1% per 100 examined. According to ECG data, reliable indicators of increased chronic overstrain of the circulatory system in trained athletes-players were determined, such as various conduction disorders and repolarization of the left ventricular myocardium (55.0% of cases); in 5.0% of cases, arrhythmia was detected (1.6% in the control), which may confirm the negative effect of increased physical activity on the body (Table 6).

Conclusions. The increased severity of work of team sports athletes, which belongs to class 3.3, necessitates increased health control measures, full medical and biological rehabilitation and additional social protection measures.

The increased severity of work of team sports athletes can reduce the level of adaptation of the athletes' body, compared to the control group, and have an adverse effect on the circulatory system and, in general, on the health of team sports athletes after five years of professional sports activity.

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Table 6. *Some indicators of the health status of game sports athletes (case per 100 osm.) with experience up to 5 years and more than 5 years*

Monitoring group	Number of inspections	Total disease cases	Chronic overstrain of the CS	Arrhythmic syndrome	CNS
Experience – up to 5 years					
Game sports	34	52,9	21,4	-	23,5
Control	100	50,0	16,0	1,6	12,0
Experience – more than 5 years					
Game sports	35	117,1*	55,0*	5,0*	37,1
Control	52	76,9	16,0	1,6	19,2

Designations: CS – *circulatory system, CNS – central nervous system.*

Note * – *The differences are statistically significant in relation to the control group, $p<0.05$.*

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SCIENTIFIC NOTE

Training police officers in the situational use of physical force based on a differentiated approach

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Key words: *police, physical training, self-defense techniques, situations, differentiated approach to training, difficulty levels.*

Introduction. Police officers must be able to use physical force in various situations of self-defense and detention of criminals [1, 2]. However, as part of the professional training of police officers, a system of typical situations for the use of physical force by police officers has not yet been developed. The lack of a systematic perception of the content of situational training in the use of physical force does not allow modeling the educational process based on the didactic principle "from simple to complex."

Purpose of the research – identifying levels of difficulty in differentiating situations of the use of physical force by police officers.

Research methodology and organization. The study was conducted in 2023 on the basis of the Tyumen Institute for Advanced Training of Ministry of Internal Affairs employees. The study used scientific methods: analysis and generalization of situations of the use of physical force, modeling of situations of the use of physical force by police officers; pedagogical experiment, testing. At the end of the training period for employees from the EG and CG, the skills of using physical force in typical work situations were tested.

Results and its discussion. As a result of the analysis of situations where police officers used physical force in their official activities, two groups of situations were identified. The first group included situations that are universal for all police officers. The second group combined situations specific to the professional activities of individual job categories. Considering the process of development of learning in the direction from abstract to concrete, groups of situations are differentiated according to two levels of complexity: universal and specialized. Differentiation of situations by level of complexity was used and proved its effectiveness in structuring the content of physical training for students in the experimental group studying under professional training programs for the position of "Policeman". At the final lesson, students in the experimental group demonstrated a higher level of preparedness to act in situations (28.4% more than in the control group).

Conclusion. The results of the study revealed that training in the situational use of physical force will be effective, provided that situations of the use of physical force are differentiated according to two levels of complexity: universal and specialized.

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