



Available Online through

www.ijptonline.com

INFLUENCE OF OCCUPATIONS BY PRODUCTION GYMNASTICS ON INDICATORS OF PHYSICAL DEVELOPMENT AND CARDIOVASCULAR SYSTEM OF OFFICE EMPLOYEES

Ilnur Abulkayesovich Galimov*, Ayrat Albertovich Askhamov, Victoria Aleksandrovna Martynova, Svetlana Rafaelyevna Sharifullina

Kazan Federal University, Address: Kazan, Kul-Gali str., 15/21-152.

Email: kormash_nur@mail.ru

Received on 05-06-2016

Accepted on 27-06-2016

Abstract:

The article shows the positive impact of production gymnastics on the functional status and physical development of people involved in mental activity. One of the study objectives is the monitoring of the remote influence of industrial gymnastics on the health and physical development of students. The first survey was conducted prior to the production gymnastics exercises, a repeated survey was performed after one year of exercise. The production gymnastics was held in the form of sports breaks twice a day, first time - before lunch two hours after the work start and the second time - half an hour after the lunch break, as the fatigue occurs sooner in the second half of the day. During the examination, the power of a right and a left hand, the chest circumference on inhalation, exhalation and pause were studied, its tour was calculated, the vital capacity of lungs, arterial pressure, heart rate and cardiovascular system reaction to the dosed load (20 squats) were determined.

The comparative analysis of health surveys among the accountants allows to make the following conclusions:

1. The exercises during a work day helps to increase lung capacity and the development of chest mobility.
2. The functionality of the cardiovascular system is increased slightly.
3. The number of complaints on headaches, heart pains, muscles, arms and back are reduced.
4. The motor-coordination abilities are improved.

Keywords: Industrial gymnastics, Cardiovascular system, Physical exercise, Physical education.

Introduction

The activities of modern office employees is mainly related to the work with computer and documents which bear the mental stress - mental and neuro-emotional intensity of work, which is characterized by the degree of inclusion into

work of the higher nervous activity and mental processes [1]. Some researchers argue that the work with high psychological demands is the predictor of the subsequent development of coronary heart disease [2,3,4].

The people of mental labor (including office workers) with a sedentary lifestyle often develop a variety of abnormalities in health status. Bent position which is maintained for hours, compresses a chest, and, therefore, causes the poor operation of internal organs. The lack of movement entails the lowering of blood vessel tone in muscles and during an enhanced brain activity it increases the tone of head blood vessels, which leads to fatigue and reduces attention [5]. Therefore, the working day of office employees should include an active rest, followed by physical exercise [6].

Production gymnastics is the process of physical exercise use during a working day in order to increase the professional efficiency, decrease fatigue and prevent occupational diseases.

Production gymnastics has three variants: the introductory gymnastics; physical activities; physical break. It is reasonable to perform office gymnastics in the form of sports pause which allows you to remove the eye and psychological stress that occurs in about two hours of work. The ability to work productively during a work day changes several times. At the beginning of work the period of involvement occurs, then the period of stabilization takes place, after which the decrease work efficiency decreases. After the lunch break the involvement and fatigue occurs faster than in the morning.

Scientific studies have convincingly demonstrated a positive effect of the production gymnastics on the health of workers, the increase of productivity [7,8]. With the introduction of gymnastics in enterprises the labor productivity increases. Gymnastic exercises used in the system of scientific organization of labor, make versatile effects on a man's body. Using them, you can purposefully influence various functions of an organism. Regular exercises improve the accuracy of movements. They become economical, agile and focused ones. Thus, under the influence of industrial gymnastics systematic studies health is improved, the labor capacity of a man increase, organization and discipline are developed.

In Soviet times industrial gymnastics was a mandatory state event at the enterprises and the institutions. The world's largest companies have long recognized the value of employees' health, and began to introduce modern production gymnastics. Gyms in business centers and corporate fitness passes are no longer considered as a rarity, and the most advanced ones equip their own offices with fitness equipment [9].

To date, production gymnastics is widely developed. Sport gymnastics at enterprises consume only a few minutes of working time, but they bring invaluable benefits to workers.

Unlike other forms of exercise and sports production gymnastics is performed directly in places (opening exercises), or during special breaks within a working day (physical culture pause). The features of production gymnastics determine its specific kinds, means and methods of exercise conduction.

Physical culture pause organized and developed correctly from methodical aspect, must actively counteract the emergence and the development of diseases associated with a sedentary lifestyle; increase attention and work efficiency by switching from mental to physical work and back; contribute to a correct posture by the introduction of corrigent exercises; to promote the education of will and discipline; to develop the need in systematic physical exercises. The production gymnastics for office workers is characterized by a variety of static and dynamic exercises for muscle relaxation. Developing the systems for physical culture pause in offices one should remember that apart from the usual exercises one should include the exercises for eyes. Those employees who have a fast eye fatigue may perform the appropriate exercise independently as necessary [10].

Study materials and methods

This study on a group of Yelabuga Institute Accountants at KFU made it possible to identify the most rational combinations of production gymnastics forms, the content and the methods of its performance. One of the study objectives is to monitor the long-term effects of industrial gymnastics activities on the health and physical development of students. The first survey was conducted prior to the course of production gymnastics, the repeated survey was performed after one year of exercise. Production gymnastics was held in the form of physical culture pause twice a day: before lunch two hours after the work start and an hour and a half hour after the lunch break, as the fatigue comes sooner during the second half of the day.

The power of the right and the left hand, chest circumference on inhalation, exhalation and during a pause was examined, its tour was calculated, vital capacity, blood pressure, heart rate, cardiovascular system reaction to the dosed load (20 squats) were determined. The complaints on health condition were recorded during a clinical examination, the nervous system condition (according to tendon reflexes, coordination samples, dermatographism), the condition of heart, lungs were studied. The group of women accountants was observed in the age of 20 - 30 years - 11 women, 31 - 40 years - 13 women, 41 and older - 3 women. There was 27 women in the group.

Study results

Some observation results are shown in Table 1. The comparison of chest scope among the accountants after one year of production gymnastics with the initial examination results suggests a valid change of this index by 9.3% on the

average. The scope of the chest increased mainly due to the reduction of its circumference at exhale. During re-examination the vital capacity of lungs increased among the majority of the surveyed ones. The number of increase made 4.9% (141 cm) on the average. In most cases, the increase of lung capacity was accompanied by chest scope increase, suggesting a positive correlation between these indicators. The working posture of accountants is sedentary one, with a slight tilt forward, which impedes breathing, the development of respiratory muscles and chest mobility. The increase of the useful volume of lungs and the development of chest muscles are considered as a result of the beneficial effects of industrial gymnastics on a worker body. Production gymnastics also makes a positive effect on the changes in hand strength. After one year of exercises the power of a right hand increased by 9.7% (2,52 kg), the power of a left hand increased by 6.3% (1.55 kg), which indicates the strengthening of the hand neuromuscular system.

The pulse at rest among the examined ones ranged from 60 to 96 bpm. Its average value made 73.7 bpm. The study of this index after one and a half year showed that the majority of accountants had a decreased pulse. Among 27 people 17 experienced the number of heartbeats per minute decrease, 5 women had no changes and 5 women had an increased pulse. On the average, the pulse slowing made 3.21 bpm., which is statistically significant. There were no significant changes in blood pressure indicators at rest after one year of production gymnastics training. The literature mentions that physical exercises in a working day mode and physical exercises contribute to the normalization of blood pressure [1,6]. There were no individuals with severe hypertension or hypotension among the surveyed accountants. Therefore, we did not get the expressed changes of this indicator. Systolic pressure was in the range from 100 to 140 of mercury column which is considered to be the norm according to some authors. The average figures for this indicator are shown in Table 1.

Table 1: Changes of physical development indicators and cardio - vascular system (average data).

Examination time and indicator deviation value	Chest circumference, cm			LVC* , cm ³	Hand power, kg		Pulse, amount of beats			Arterial pressure at rest, mm of m.c.	
	in-hale	ex-hale	scope		Rt.	Lt.	Rest, min	Reaction on load, 10 sec			
								Before	After		Difference
	Initial ex-	92,4	85,54		6,89	3109	25,7	25,3	73,7		12,

amination	3					7		2	7		6
Secondary examination	92,3 6	84,79	7,57	3250	28,2	26,9 2	70,5	11, 8	18, 4	6,5	113,5/68, 3
Mean deviation value (x)			+0,68 2	+141	+2,5 2	+1,5 5	-3,21			-0,92	-0,45/ 2,23
Deviation error (m)			±0,29	±60,6	±0,9 9	±0,6 7	±1,5			±0,25	±1,6/±1, 3
Deviation validity (t)			2,35	2,3	2,5	2,3	2,14			3,6	0,12/1,7

*LVC – lungs vital capacity

The reaction of the cardiovascular system on the dosed load (20 squats) of change were more pronounced. At the initial examination the heart rate during the first 10 seconds after the load increased by 7.4 beats on the average and by 6.5 beats during the second examination. The difference is significant ($t = 3,6$) in response to the same load. Among 27 people 15 reacted on the load by a smaller increase of heart rate. The significant change of systolic, diastolic and pulse pressure immediately after load a significant difference was observed. 7 accountants had less pronounced changes in systolic blood pressure. One had an atypical response: a stepped rise of pressure in response to exercise (20 squats). The remaining employees had a normal sthenic reaction to it.

During the second minute of recovery period after the dosed physical load the pulse was higher than the initial one among 20 accountants during the first survey, 3 persons had the pulse equal to the original person and 4 persons had a decreased pulse. During re-examination 13 accountants had an increased pulse, 8 accountants had a similar pulse and 6 accountants had a decreased pulse (table 2).

During the third minute after exercise the incomplete recovery of pulse was observed among 9 people during the initial examination, during the second examination the corresponding situation was observed among 5 people; pulse returned to the initial value among 10 and 15 people respectively. Systolic blood pressure during the third minute of recovery at the re-examination of only one examined woman did not exceed the original values, and at the first examination the increase was observed among 11 examined subjects (see Table 2).

The diastolic pressure indicators by the third minute of recovery period were equal to the original level in 21 cases, and smaller than the original level in 6 cases during the examination.

Table 2: The reaction of accountant cardio - vascular system on dosed load (the data are presented according to the number of cases).

Indicators		Survey	1-st recovery minute			2-nd recovery minute			3-rd recovery minute		
			Higher than orig.	Below orig.	Equal to orig.	Higher than orig.	Be- low orig.	Equ al to orig.	Higher than orig..	Be- low orig.	Equa l to orig.
Pulse in 10 sec.		Original	27	-	-	20	3	4	9	8	10
		Repeated	27	-	-	13	6	8	5	7	15
Arterial pressure	Systolic	Original	26	-	1	15	1	11	11	2	14
		Repeated	26	1	-	1	13	13	1	12	14
	Diastolic	Original	3	18	6	18	2	7	8	1	18
		Repeated	1	13	13	2	8	17	-	6	21

In general, the reaction of the cardiovascular system on dosed load improved among 16 accountants. During repeated examination the number of complaints on heart, muscles, arms, back and other pains decreased slightly. Self-dosed exercises at the initial examination presented some difficulties for many tested subjects. Some women could not sit down 20 times or squatted wrong, the could not coordinate the movement of hands with squats. During re-examination, most persons performed test correctly and much easier.

Conclusions.

There is no doubt that the industrial gymnastics for office workers is very useful and enhances the overall vitality and also causes an improvement of all organism functions, and especially the cardio - vascular, respiratory and nervous system.

The comparative analysis of accountant health surveys allows to draw the following conclusions: 1. The physical exercises during a work day help to increase lung vital capacity, to develop the mobility of a chest. 2. The functionality of the cardiovascular system are increased somewhat. 3. The number of complaints on headaches, heart, muscles, arms and back pains reduces. 4. The motor-coordination abilities improve.

Acknowledgements

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University.

References:

1. Physical education in the professional work of a bachelor and an expert // Knowledge base Allbest. - 2012 [Electronic resource] URL: <http://knowledge.allbest.ru/> (date of appeal: 29.03.2014).
2. Bosma H., Marmot M.G., Hemingway H., et al. Low job control and risk of coronary heart disease in Whitehall II (prospective cohort) study // *BMJ*, - 1997; 314: P. 558-565
3. Belkic K., Schnall P., Landsbergis P., et al. The workplace and cardiovascular health: conclusions and thoughts for a future agenda // *Occup Med* 2000; 15(1): P. 307-321.
4. Kuper H., Marmot M. Job strain, job demands, decision latitude, and risk of coronary heart disease within the Whitehall II study. // *J. Epidemiol Community Health* 2003; 57(2): P. 147-153.
5. Ledesert B., Saurel-Cubizolles M.J. Risk factors for high blood pressure among workers in French poultry slaughterhouses and canneries // *Eur. J Epidemiol*. 1994. Y. 10 № 5. P. 609.
6. Tulppo M.P., Hautala A.J., Makikallio T.H. et al. Effects of aerobic training on heart rate dynamics in sedentary subjects // *J. Applied Physiology* 2003. - V. 95.-P. 364-373.
7. Kuramshin, Y.F. Theory and methods of physical training. - M.: Publishing house "Soviet Sport" 2004.
8. Kholodov, J.K. Kuznetsov, V.S. Theory and methods of physical upbringing. - M.: Publishing center "Academy" in 2001.
9. Warm up at an office // [Electronic resource] URL: <http://www.bodymaster.ru/> (date of appeal: 29.03.2014).
10. Askhamov A.A. The impact of industrial gymnastics on the development indicators and the cardio-vascular system of office staff // *education and self-development*. - 2014.- №3. - pp. 23-24.

Corresponding Author:

Ilnur Abulkayesovich Galimov*,

Email: kormash_nur@mail.ru