SPORTS LOADS AS A WELLNESS COMPLEX FOR THE HUMAN BODY

Akbar Rakhmonov
Student of Tashkent Pediatric Medical University
+998338920951 akbarrakhmonov0112@gmail.com

Iroda Mukhiddinova
Student of Tashkent Pediatric Medical University
irodamuhiddinova2@gmail.com

ABSTRACT

In the last decade, there has been an increase in diabetes mellitus among the population, according to the journal PHM by the middle of the 21st century, every third adult will have diabetes mellitus in his medical record. In addition, it is also necessary to emphasize the scripture that the metabolic syndrome increases sharply, a decrease in metabolism. The reasons for the increase in these critical indicators is a decrease or lack of proper attention to a healthy lifestyle, for example, with the increasing pace of global globalization, more and more work related to mental activity is becoming more and more. Based on the above data, doctors and medical students should have clear ideas about the benefits of an active lifestyle and encourage their patients to follow such rules. Judging by the publication of the medical journal Arteriosclerosis, Thrombosis, and Vascular Biology, as well as the WHO Recommendations of 2020, children aged 6 to 17 years should devote an average of 60 minutes a day to moderate exercise, adults aged 18 to 64 years should devote moderate exercise at least 150 minutes a week, i.e. 30 minutes a day, and older people aged 65 should increase the load, so they are recommended 5 hours of training in the same conditions per week. It is also necessary to distinguish concepts such as recreational physical activity and grueling sports. In the first case, the body benefits, but in the second, the organs begin to work beyond their capabilities and can lead to suppression of functions, this can be seen from the works of Tepperman J. and Tikhvonsky S.B. Below are examples of the impact of sports activity on individual systems and diseases.

Keywords: *sport, metabolism, cardiovascular system, respiratory system, endocrine system, immune system, hormones, hemoglobin, erythrocyte, leukocyte, platelet, metabolic syndrome, diabetes mellitus.*

АННОТАЦИЯ

В последнее десятилетие наблюдается рост заболеваемости сахарным диабетом среди населения, по данным журнала PHM к середине 21 века

каждый третий взрослый человек будет иметь в своей медицинской карте сахарный диабет. Кроме того, также необходимо подчеркнуть писание о резком нарастании метаболического синдрома, снижении обмена веществ. Причинами повышения этих критических показателей является снижение или отсутствие должного внимания к здоровому образу жизни, например, с нарастающими темпами глобальной глобализации становится все больше работы, связанной с умственной деятельностью. Исходя из приведенных выше данных, врачи и студенты-медики должны иметь четкое представление о пользе активного образа жизни и побуждать своих пациентов к соблюдению таких правил. Судя по публикации медицинского журнала Arteriosclerosis, Thrombosis, and Vascular Biology, а также Рекомендациям ВОЗ от 2020 г., дети в возрасте от 6 до 17 лет должны уделять в среднем 60 минут в день умеренным физическим нагрузкам, взрослые в возрасте от 18 до 64 лет следует уделять умеренным физическим нагрузкам не менее 150 минут в неделю, т.е. 30 минут в день, а пожилым людям в возрасте 65 лет следует увеличить нагрузку, поэтому им рекомендуется 5 часов тренировок в тех же условиях в неделю. Также необходимо различать такие понятия, как оздоровительная физическая активность и изнурительный спорт. В первом случае организм получает пользу, а во втором органы начинают работать сверх своих возможностей и могут привести к угнетению функций, это видно из работ Теппермана Я. и Тихвонского С.Б. Ниже приведены примеры влияния занятий спортом на отдельные системы и заболевания.

Ключевые слова: *спорт, обмен веществ, сердечно-сосудистая система, дыхательная система, эндокринная система, иммунная система, гормоны, гемоглобин, эритроциты, лейкоциты, тромбоциты, метаболический синдром, сахарный диабет.*

INTRODUCTION

Speaking of the heart, training mainly affects the myocardium, and there is a physiological hypertrophy of this layer. Which gives a reduced heart rate at rest and during exercise, an increase in systolic volume, which improves hemodynamics, as well as heart valves wear out more slowly [1]. Lang G.F. described a "sports" heart and noted that trained people have bradycardia, an increased number of capillaries, a greater amount of nutrients, as well as an increase in the rate of amplitude of systole and diastole, and such a heart is 40% "more economical" [2]. Regarding hypertension, there are a number of studies [3] confirming a decrease in blood pressure at rest after

2 months of training. Thus, 1,600 experimental participants aged 21 to 80 years, after 10 weeks of training 2-3 times a week, had a decrease in resting systolic blood pressure by 3.2 mmHg and 1.4 mmHg [4].

DISCUSSION AND RESULTS

The effect on the cellular composition of peripheral blood is also noted, with a 3-year study of 33 participants of the Jiu-Jitsu section [5]

Indicators	Before training	After training
haemoglobin	150,48±2,13	158,90±2,19
WBC	6,68±0,44	7,31±0,47
RDB	4,96±0,36	5,49±0,40
platelet	188,33±2,38	205,27±2,49

The effect of physical exertion on the respiratory system

During training, hypoxia and accumulation of CO2 are observed, which is accompanied by hyperfunction of the lungs, which naturally leads to its adaptation to new conditions [6]. There is an increase in the size of the organ, the involvement of reserve alveoli in the respiratory processes, a large blood filling of this organ and a detrimental effect on anaerobic bacteria such as Streptococcus Pneumonia. The increase in the organ, the effect of testosterone on the quantitative increase in b2-adrenergic receptors [7] leads to the fact that the BDD decreases from 16-18 to 8-10 [8], shortness of breath is observed less often during physical exertion and with ARI. With a very common disease, according to recent studies, 1-21%, depending on the country [9] bronchial asthma, sufficient motor activity is recommended.

Changes in the endocrine system under the influence of sports exercises

As it was noted, physical exercises induce the synthesis of the sex hormone testosterone [10]. It should also be noted that sports are stressful for the body, which naturally contributes to temporary hyperfunction of the adrenal cortex, but over time this gland adapts to this effect by increasing its size by small values [44], which is accompanied by an increase in the body's endurance not only to sports loads, but also to any other [11,37]. In the works of Tepperman J. and Tigranyan R.A. [12] there is evidence that muscle, work increases the production of hormones such as somatotropin and thyrotropin, which are of no small importance for accelerating and

enhancing metabolism. Intensive training also affects the level of β-endorphin [13], which has a beneficial effect on stressful conditions

Prevention (treatment) type 2 diabetes mellitus by sports loads

According to the WHO global report, the works of academician Dedov I.I. and Lebedevo N.B. [14], as well as the conclusions made by the Kazakh National Medical University named after S.D. Asfendiyarov [15], the incidence of diabetes mellitus among all countries is increasing and by 2035 at such rates will be up to 592 million patients, which will be equal to about one tenth of the total population of the earth. Such forecasts make us look not only for new, more affordable treatments for this disease, but also for methods to prevent such unfavorable forecasts. As previously noted, sports exercises increase such indicators as general metabolism by lipolysis and an increase in the area of muscle tissue, sensitization to insulin, an increase in the density of glucose transporters of type 4. It is necessary to mention the role of training in maintaining glycemic homeostasis, which is noted in the works of a large number of scientists [16]. Also, according to the recommendations of the American Diabetes Association [17], patients diagnosed with type 2 diabetes should attend gyms and exercise, this reduces insulin resistance and glucose tolerance. Based on the research of Sressor and other co-authors in 2010 [18], it can be concluded that intensive training lowers visceral adipose tissue, but also glycemic hemoglobin (HbA1c) and the authors of this article recommended training for people with type 2 diabetes mellitus or for those who are susceptible to this disease. According to the works of Chernozubov A.A. [19] in athletes after training, the testosterone content in the blood serum increased by 8.2% on average and increased strength capabilities to 14.15%, and in untrained athletes there was an increase of 9.9% and 25.77%, respectively. The effect of testosterone in diabetes mellitus has been hotly debated in recent years. Thus, in type 2 diabetes, hypogonadism and a decrease in testosterone synthesis are noted [20] and a reduced effect of testosterone on lowering insulin resistance of cells. So Demidov T.Yu. and Skuridina D.V. we came to the conclusion that synthetic testosterone can be used for treatment, but still such therapy requires further research. I would like to mention a two-year study completed in 2021 under the T4DM program [21]: judging by it, in 504 students with a glucose load, 14 mmol/l of glucose (type 2 diabetes) was detected in the blood serum after 2 hours, these patients received testosterone therapy and after 2 years only 12% of the students of this experiment had glucose in blood serum in the same conditions exceeded 11.1 mmol/l [21]. Based on this position, it can be concluded that in the initial stages of

type 2 diabetes or during the metabolic syndrome, the role of training, both for increasing testosterone and testosterone therapy, cannot be overestimated.

Metabolic syndrome and its prevention by sports

The studies of Endocrinology and metabolism clinics of North America [22], Stressor B [2] and Wilson [23] emphasize the relationship between excess fat in subcutaneous tissue and in the same organ, with the incidence of cardiovascular, type 2 diabetes and hypertension.

According to the conclusions of DDP [25], after the recommended 150 minutes of active rest, weight loss was observed by an average of 7% or the average weight loss in kilograms was 5.6, which favorably affected not only the general well-being and confidence of the subjects, but also reduced the risk of susceptibility to type 2 diabetes by 58%. Harley et al. [26] revealed the following: strength training accelerates and increases metabolism, overall metabolism in the future, too, as well as cell sensitization to insulin increases and adrenosympathetic innervation increases, which favorably affects lipolysis. According to the conclusions made in STRRIDE [27], physical exercise has a beneficial effect on reducing not only subcutaneous fat, but also visceral fat, which naturally has a good benefit for preventing diabetes mellitus, cardiovascular diseases. They also note that the greater the power load, the greater the effect can be achieved, but even a slight power load in terms of walking equal to 19.2 km per week will have an effect. Similar results are published in the studies of Hunter et al. co-authors in 2002 [28].

According to the American Heart Association [29], approximately 45% of the American population have an undesirable amount and ratio of lipoprotein composition in the blood, which increases the risk of atherosclerosis or coronary heart disease. Many studies indicate a beneficial effect of sports activities on blood lipoprotein ratios [30]. According to the American Medical College [31], physical exercise can increase the content of anti-atherogenic high-density lipoproteins by 8-12%, while reducing the content of atherogenic low-density lipoproteins by 13-23% and triglycerides by 11-18% (31)

The role of sport in the muscular system and in metabolism

A 2009 study with 1,600 participants in the age range from 21 to 80 years showed that three-month workouts favorably affect muscle mass by increasing by an average of 1.4 kg. [4]. Regarding metabolic changes, it was indicated that strength training stimulates protein metabolism in muscle tissue [32]. This is achieved on the one hand on time and immediately after training due to micro traumas; the regeneration itself after training can take up to 72 hours. In addition to micro trauma,

muscle area subsequently increases, and consequently, their energy consumption and an increase for type 4 glutamate, which naturally reduces insulin resistance, according to the sports journal Current Sports Medicine Reports [33].

Changes in the immune system under the influence of physical exercise

First, neutrophils react to sports loads from peripheral blood cells and the so-called "leukocytosis of physical exercises" is observed [34]. According to numerous studies, the number and activity of NK and NKT cells in athletes is higher [35]. With muscle loads, heat production increases dramatically and its control depends on changes in the neuro-endocrine, respiratory and cardiovascular systems. The temperature can reach up to 45°C in some muscles. Such stressful situations induce the secretion of cytokines (IL-1, IL-6, IL-8, TNF-α) and heat shock proteins (HSP), which makes cells more resistant to subsequent stressful situations [36].In addition, all of the above, i.e. the general strengthening and increase of resistance of organs and systems leads to the fact that the body has a higher chance against flagogens.

CONCLUSION

This review presents evidence of the beneficial effects of recreational sports on hypertrophy and muscle strength indicators, but a positive effect on all organs and systems. By accelerating and increasing metabolism, weight loss is achieved, which dramatically minimizes the risk of diseases such as atherosclerosis, type 2 diabetes or pain in the lower back and joints. In addition, an increase in overall endurance benefits the immune system. We must not forget about the self-confidence of patients, which comes after several weeks of training, which affects mood and stress resistance.

REFERENCES

1. Amosov N.M., Bendet Ya.A. Physical activity and the heart. 1989
2. Lang G.F. Diseases of the circulatory system, 2nd ed.-Moscow-Leningrad, 1958
3. Cauza E, Strasser B, Haber P, et al.. The relative benefits of endurance and strength training on metabolic factors and muscle function of people with type 2 diabetes. Arch. Phys. Med. Rehab. 2005; 86: 1527–33.
4. Westcott WL, Winett RA, Annesi JJ, et al.. Prescribing physical activity: applying the ACSM protocols for exercise type, intensity, and duration across 3 training frequencies. Phys. Sportsmed. 2009; 2: 51–8.
5. D. N. Drozdov, A. V. Kravtsov. EFFECT OF EXERCISE ON THE HUMAN PERIPHERAL BLOOD 2015

6. Aghajanyan N.A. Problems of adaptation and the doctrine of health / comp. N.A. Aghajanyan, R.M. Babaevsky, A.P. Berseneva. – M.: Enlightenment 2006. – 238 p.
7. G.L. Osipova, K.A. Zykov, V.V. Osipova, E.A. Sinitsyn, A.V. Rvacheva, E.A. Zaryanova, and A.V. Eremenko. Sports, Hormones, Immunity and COVID-19 DOI: 10.24412/2409-6636-2021-12691
8. Global asthma prevalence in adults: findings from the cross-sectional world health survey / T. To, S. Stanojevic, G. Moores et al. BMC Public Health BMC series – open, inclusive and trusted. 2012. N 12. P. 204
9. A.A. Chernozub. Changing the Content of Testosterone in the Blood of People of Different Level of Fitness in Terms of Power Load. Chernomorsk State University named after P. Mogila, Ukraine Вестник PAMH. 2013; 10: 37–40
10. Viru, A.A. Hormones and athletic performance / A.A. Viru, PK. Kyrgyz. — M, 1983. — 159 p.
11. Meerson, F. 3. Adaptation to stressful situations and physical exertion / F. Z. Meerson, M. G. Pshennikova. - M., 1988. - 256 p
12. Tepperman, J. Physiology of metabolism and endocrine system. Introductory course: translated from English / J. Tepperman, H. Tepperman. - M. : Mir, 1989. - 656 p.
13. Ahtiainen, J.P., Pakarinen, A., Kraemer, WJ. & Hakkinen, K. (2003) Acute hormonal and neuromuscular responses and recovery to forced vs. maximum repetitions multiple resistance exercises. International Journal of Sports Medicine 24(6), 410-418
14. Dedov I.I., Lebedev N.B., Yu.S. Suntsov, etc. About the National Register of Diabetes Mellitus. Message 2. Epidemiology of insulin-dependent diabetes mellitus and the frequency of its complications in the Moscow children's population. // Prob. Endocrinol. - 2006. - Vol.42. - No. 5. – pp. 3-9.
15. A.A. Tanirbergenova, K.A. Tulebayev, Zh.A. Akanov THE SPREAD OF DIABETES IN THE MODERN WORLD. Asfendiyarov Kazakh National medical university Вестник КазНМУ №2-2017
16. Castaneda C, Layne JE, Munez-Orians L, et al.. A randomized controlled trial of resistance exercise training to improve glycemic control in older adults with type 2 diabetes. Diabetes Care. 2002; 25: 2335–41.
17. Standards of medical care in diabetes. Diabetes Care. 2006; 29: S4–42
18. Strasser B, Siebert U, Schobersberger W. Resistance training in the treatment of metabolic syndrome. Sports Med. 2010; 40: 397–415.

19. A.A. Chernozub. Changing the Content of Testosterone in the Blood of People of Different Level of Fitness in Terms of Power Load. Chernomorsk State University named after P. Mogila, Ukraine Вестник PAMH. 2013; 10: 37–40
20. Dedov I. I., Melnichenko G. A., Shestakova M. V., etc. Recommendations for the diagnosis and treatment of testosterone deficiency (hypogonadism) in men with diabetes mellitus // Obesity and metabolism. 2017. Vol. 14, no. 4. p. 87
21. Testosterone treatment to prevent or revert type 2 diabetes in men enrolled in a lifestyle programme (T4DM): a randomised, double-blind, placebo-controlled, 2-year, phase 3b trial. 2021 Jan;9(1):32-45
22. Maggio CA, Pi-Sunyer FX. Obesity and type 2 diabetes. Endocrinol. Metab. Clin. North Am. 2003; 32: 805–22.
23. Strasser B, Siebert U, Schobersberger W. Resistance training in the treatment of metabolic syndrome. Sports Med. 2010; 40: 397–415.
24. Wilson PW, D'Agostino RB, Sullivan L, et al.. Overweight and obesity as determinants of cardiovascular risk: the Framingham experience. Arch. Intern. Med. 2002; 162: 1867–72.
25. Aller B.T., Tjaden A.H., Venditti E.M., etc. weight loss and diabetes incidence in the diabetes prevention program, weight loss and diabetes incidence in the diabetes prevention Program (DPP). BMC Ext 6, 74 (2020). https://doi.org/10.1186/s40795-020-00400-4.
26. Hurley BF, Hanson ED, Sheaff AK. Strength training as a countermeasure to aging muscle and chronic disease. Sports Med. 2011; 41: 289–306.
27. Slentz CA, Aiken LB, Houmard JA et al. Inactivity, exercise, and visceral fat. STRRIDE: a randomized, controlled study of exercise intensity and amount. J App Physiol2005; 99:1613-1618.
28. HUNTER, G. R., D. R. BRYAN, C. J. WETZSTEIN, P. A. ZUCKERMAN, and M. M. BAMMAN. Resistance training and intra-abdominal adipose tissue in older men and women. Med. Sci. Sports Exerc., Vol. 34, No. 6, pp. 1023–1028, 2002
29. Lloyd-Jones D, Adams R, Carnethon M, et al.. Heart disease and stroke statistics: 2009 update. A report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Circulation. 2009; 119: 480–6.
30. American College of Sports Medicine. Position Stand: exercise and physical activity for older adults. Med. Sci. Sports Exerc. 2009; 41: 1510–30.
31. *Rakhmanov A.N., Yuldashev N.M., M.A. Kadirov, G.G. Suleymanova* THE VALUE OF VITAMIN D FOR THE HUMAN BODY https://tashpmi.uz/wp-content/uploads/2021/04/30-178-185-tashpmisppu-14-2020-evp-final.pdf