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PRIMARY CARE: HOW TO INCREASE PHYSICAL ACTIVITY IN YOUR PATIENTS

Abstract

Sedentary lifestyle, being a behavioral risk factor for chronic non-communicable diseases, is relevant for preventive medicine. A key role in the correction of behavioral risk factors for chronic non-communicable diseases is occupied by general medical practice, where the patient is continuously observed for many years. Increased physical activity reduces the risk of atherosclerosis, diseases of the musculoskeletal system, malignant tumors, has a positive effect on the psychological state of patients and reduces the overall morbidity and mortality. Increasing the reserves of the cardiorespiratory system of the body, physical activity improves the quality of life of patients and reduces the cost of medical care.
To effectively combat sedentary lifestyle, it is necessary to adequately motivate patients that can be achieved through routine counseling to enhance physical activity. The method of such consultation should take into account limited time of outpatient admission and all personal characteristics of patients (starting level of physical activity, health group and risk of disease).
The article presents a summary of modern scientific views in the field of increasing physical activity of patients, discusses current issues of counseling. The groups of patients with or without chronic diseases and the high risk of cardiovascular complications were discussed. The variant of rational outpatient counseling with the help of the algorithm of organization of physical activity mode, providing stratification of patients, planning, optimization and control of personal motor activity was presented. The proposed method of optimization of counseling successfully solves the problems of motivation, increase of physical activity and individual approach in outpatient practice.

Keywords: *physical activity, counseling, general medical practice*

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CHD — coronary heart disease, MI — myocardial infarction, CS — cerebral stroke, DM — diabetes mellitus, CVD — cardiovascular diseases, PA — physical activity, PE — physical exercises, RF — risk factors, NCD — non-communicable diseases

Today, the main cause of death is complications of non-communicable diseases (NCD), the cause of occurrence and development of which are behavioral risk factors (RF) [1, 2, 3]. The world health organization, among such RF of premature mortality in global population, put low physical activity (PA) on the fourth place [4]. In the presence of sedentary lifestyle, the risk of death from all causes increases by 20–30 % [1, 5], with cardiovascular diseases (CVD) among the primary causes: the risks of hypertension increase by 35–53 %, coronary heart disease (CHD) — by 30 %, diabetes mellitus (DM) —

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by 27 %, breast and colon cancer — by 21–25 % [5–9]. In Russia, about 40 % of the adult population have low PA [4, 5], which negatively affects workforce productivity and working life expectancy, and consequently, public health and social and economic situation [10], increasing direct and indirect costs of health care [10, 11]. When eliminating sedentary lifestyle, the life expectancy of the population will significantly increase [10, 12, 13]. At the same time, adequate physical exercises (PE) is recognized as an important factor in the prevention and treatment of NCD regardless of their stage [4, 14].

Correction of behavioral RF is carried out in the form of systematic and long-term tasks with the help of preventive counseling. In the presence of NCD, an individual plan to increase PA is drawn up, taking into account the individual clinical pattern, risks and ability to perform exercises [5]. General practitioners (family doctors) are the leading specialists in the field of personalized medicine, who are extremely immersed in the details of the clinical state, social, economic and cultural situation of their patients and their families [15, 16] and can most effectively solve the problems of adequate PA enhancement. In the process of step-by-step preventive counseling, they can use individual fitness trackers of the patient (bracelet or clip with built-in physical activity sensor, fitness watch with pulse monitor or heart rate monitor, pocket fitness trackers and/or smartphones) for individual daily monitoring of physical exercises.

PA and atherosclerosis

When implementing the tasks of increasing PA, positive metabolic changes occur, first of all, serum lipid profile: the levels of total cholesterol, low-density lipoproteins and triglycerides are reduced, the concentration of anti-atherogenic cholesterol, high-density lipoproteins is increased. Thus, regular PA reduces the risk of atherosclerosis [17–20].

Adequate PE have a positive effect on carbohydrate metabolism: reduce carbohydrate tolerance, increase tissue sensitivity to insulin, reduce the risk of hyperinsulinemia, insulin resistance and type 2 DM [21, 22]. Impaired carbohydrate metabolism and development of type 2 DM accelerate the development of atherosclerosis and its complications, and PA, improving carbohydrate metabolism, reduces the risk of atherosclerosis and related diseases [14–24]. The influence of aerobic exercises on the reduction of adiponectin with low molecular weight and insulin in blood serum has been proved [25].

PE, by reducing fibrinogen level, activity of VII factor and platelet aggregation, have a beneficial effect on rheological properties of blood and, thus, reduce the risk of thrombotic complications, such as myocardial infarction (MI) and/or cerebral stroke (CS) [18–20, 26, 27]. Current studies have convincingly shown that aerobic PE improve myocardial perfusion by dilation of coronary arteries, improve microcirculation and endothelial function [27, 28]. Regular PE improve the balance of energy consumption and capacity, which prevents the development of obesity. Excess weight and, especially, abdominal obesity contribute to the accelerated development of atherosclerosis. Thus, PA contributes to the normalization of body weight, reduction of abdominal obesity and, consequently, reduces the risk of atherosclerosis [19, 29].

PE regulate vegetative balance inducing ischemic preconditioning [30, 31], which in turn reduces the probability of myocardial damage and the risk of dangerous ventricular tachyarrhythmias, increasing the risk of sudden death [29, 31].

There are convincing data on the modification of the health status of patients with CVD performing PA in cardiac rehabilitation: cardiovascular mortality decreased by 30 %, mortality from all causes — by 20 %, the risk of re-MI — by 17 %, the need for hospitalization — by 60 % [27, 28, 32].

Aerobic PE can be objectively measured and strictly dosed, which increases safety and makes it possible to use them in different categories of patients, especially in the presence of CVD. Cardiorespiratory training, in comparison with simple aerobic PA, reduces the risk of cardiovascular complications — CHD and CS — almost two-fold [32].

PA and cancer

A number of studies have shown that the risk of developing cancer of different localization, in particular, breast and colon, decreases in the presence of an active lifestyle [5–9, 33–36]. PA in combination with a proper diet (stewing versus deep frying)

reduces the risk of breast cancer [37] and prostate cancer [38, 39] and plays a primary role in their prevention [37, 40]. The interrelation of cancer and the presence of systemic inflammation signs is proved. In this case, aerobic exercise improves the profile of inflammatory cytokines in adipose tissue, reducing the concentration of proinflammatory (IL-12p70, TNF-α, IL-6) and anti-inflammatory (IL-10) cytokines in inguinal and epididymal white or brown adipose tissue. However, moderate continuous aerobic exercises have no effect on the expression of lipolytic and thermogenic genes in adipose tissue [24, 25, 39, 41, 42].

PA and diseases of the musculoskeletal system

Regular PE lead to an increase and strengthening of muscle mass, improvement of neuromuscular activity, which reduces the risk of arthritis. The results of the studies did not confirm the common opinion that the risk of arthritis or traumatic joint damage increases during PA [10, 26]. As a result of carefully conducted statistical analysis, it was found that athletes who have been running for a long time, do not have more problems with the joints than people of the same age with a sedentary lifestyle. That is why the American Arthritis Foundation recommends PE in terms of flexibility and muscle strength training as an important component of therapy in patients with arthritis [26, 43].

Regular PE contribute to an increase in bone mineral density, reduce the rate of bone calcium loss, preventing the development of osteoporosis [43–45]. Analysis of the results of several studies showed that in the presence of PA, the risk of bone fracture, including the hip joint and spine, was reduced [45].

PA and psychological state of a person

These studies show that in the presence of physical activity, well-being and mood are determined much more often than in sedentary lifestyle, in addition, patients with greater physical activity are less prone to stress and depression [46]. Physical activity increases subjective assessments of well-being, perception of health and feeling of personal happiness [47].

PA and overall morbidity and mortality

Regular PE reduces the risk of developing major NCD: CVD — 40 %, CS — 27 %, type 2 DM — 58 %, Alzheimer's disease — 40 %, rectal cancer — 60 % or more, lung cancer — 20–24 %, recurrence of breast cancer — 50 %, the risk of falls in the elderly — 30 % and prevents depression and obesity [5–9, 37, 44, 45, 48]. In combination with sedentary lifestyle with mild cognitive impairment after 12-month aerobic exercise of moderate and high intensity, the indicators of neurocognitive functions improve in terms of memory, attention, fluency, information processing speed and executive functions, which are significantly associated with an increase in the circulation of B- and T-lymphocytes (CD4+ and CD8+) and a decrease in beta-amyloid, indicating a complex relationship between the adaptive immune system, PA and the carrier of the apolipoprotein E gene [49]. Adequate PE contribute to the normalization of lifestyle and social activity, in particular, skilled ability to work [1, 2].

It should be noted that PE have a dose-dependent effect, reducing the risk of coronary problems in a healthy population and in the presence of RF, or in patients with CVD of any age and gender. At PA with duration >30 min/week the relative risk of MI was 0.92 (95 % CI 0.67–1.28), and at PA >210 min/week — 0.71 (95 % CI 0.63–0.79), i. e. the degree of relative risk reduction increased from 8 % to 29 %, respectively [1, 2, 5, 11–13, 17].

Regular increase in PA reduces mortality from all causes: at PA <150 min/week the decrease in relative risk was 21 % (p <0.001), at FA 150–300 min/week — 34 % (p <0.001) and at PA >300 min/week — 46 % (p <0.001) [5, 10–13].

Risks associated with an increase in PE

In some cases, with the latent course of CVD, an increase in PE may increase the risk of sudden cardiac death. The number of such cases related to PE is 1:360,000 hours of running or 1:565,000 hours of PA (American Heart Association). At the same time, in 40 % of cases, these are patients with obvious or latent CVD, increasing PE without prior medical examination. In healthy people, the risk of serious

cardiovascular complications associated with PE ranges from 1:500,000 to 2,600,000 patient-years of exercise. The probability of developing cardiovascular complications during PE activities in terms of cardiac rehabilitation under the supervision of medical workers is 1:50,000 to 120,000 patient-years of exercise; sudden cardiac death — 1:340,00 0 to 750,000 patient-years of exercise [46].

With a careful, gradual increase in the level of PA, the right choice of the PA type, given the paramedical characteristics of the family (social and economic, cultural traditions, living conditions, the nature of interaction in the family, etc.) and careful implementation of programs to increase PA risk of adverse events is significantly reduced. If there is a risk of injury in PA types where such risk exists (e. g. cycling), it is recommended to use personal protective equipment such as helmets [29].

In general, prevention and rehabilitation plans have proven the efficacy and safety of PE: the mortality rate in the regular PA is 40 % lower in comparison with persons with a sedentary lifestyle [29, 32, 46].

Thus, at present, there are sufficient grounds to assert that the use of adequate PA is effective and safe with a careful, consistent increase in exercise intensity and the selection of PA type.

Absolute contraindications for the beginning or continuation of PA are:

- exacerbation of the underlying disease,
- unstable clinical condition,
- acute infectious diseases,
- pregnancy (women exercise according to special programs),
- the presence of symptoms that are suspicious in relation to CVD or other diseases (full examination, including a test with PE, is needed).

Those with the history of acute vascular or coronary events, who have serious complications and individual indications and contraindications, need personalized programs of long-term physical rehabilitation [27, 28, 30, 32, 50].

Psychological aspects of behavioral nature

Risk factors for NCD (unbalanced diet, smoking, alcohol consumption, sedentary lifestyle) are often associated with pleasure and rest, so recommendations to increase PA are often perceived by the patient as "deprivation of these pleasures" and therefore ignored [1].

Many factors influence the (non)implementation of PA recommendations: level of education, social status, nature of work, presence or absence of chronic diseases, age, etc. Therefore, recommendations for the optimization of PA should be adapted to a particular patient, taking into account the above factors. When consulting, it is desirable to focus on the individual benefits of PA for a particular patient (what they will get in return for the time spent on PA) [46, 49].

We can expect to improve the quality of life by increasing PA at any age.

It should be borne in mind that sometimes patients with sedentary lifestyle try to compensate for insufficient PA by excessive PE during rest days. This approach is especially dangerous, because it violates the principle of a gradual increase in volume and intensity of PE, and it can be a cause of severe complications of existing diseases in untrained patients. The key to health and longevity is only a rational, scientifically based training regimen. In addition, forms of active rest are less effective in terms of improving physical performance, since their task is to relieve industrial fatigue by using low-intensity and short-duration PA during the working day [46].

Only PA and PE, organized in a certain system of physical training, expand the reserves of the cardiovascular and respiratory system, modify RF of NCD, suppress the markers of atherothrombogenesis and thus prevent the development of NCD and their complications.

Correction of behavioral RF and, in particular, increase in PE is effective only with a gradual approach — step-by-step, better under the supervision of a general practitioner who can perform dynamic monitoring of the patient and conduct regular preventive counseling to correct existing behavioral RF of NCD [15, 16].

Outpatient counseling to improve PA

The low motivation of the patient to increase PA is due to many reasons, in particular, lack of understanding of PE benefits and/or unwillingness to implement them independently. In such

a situation, the primary task is to motivate the patient, not to impose specific recommendations on the optimization of PA. To solve this problem specialized professionals, such as clinical psychologists, may be involved in the exercises.

Factors that increase the patient's motivation to enhance PA:

- confidence in their own capacity for PA;
- getting pleasure from exercise;
- the realization that PA benefits outweigh all the arguments against;
- availability of social support (from family members, friends, etc.);
- active position of the doctor in increasing the patient's PA and his/her support.

The purpose of preventive counseling is to stratify patients by health groups, age, PA, fitness and motivation for PA.

Tasks implemented in the course of preventive counseling:

1. Primary assessment of patient's motivation to PA: in its absence — a brief conversation about the benefits of PA for a particular patient, taking into account his/her status.
2. For active patients in relation to PE — the primary assessment of individual PA level and, if necessary, the correction of a set of exercises in accordance with his/her health group, somatic status, age and degree of fitness.
3. Assessment of health status and identification of temporary contraindications for PA in training mode is carried out using various questionnaires (for example, IPAQ) filled in by the patient. Depending on the degree of motivation and the need to increase PA in the IPAQ questionnaire, there are three types of patients:
   a) with sedentary lifestyle, without intention to engage in PE in the next 6 months (according to IPAQ, item 1);
   b) planning or making attempts to increase PA (according to IPAQ, items 2–4);
   c) physically active persons (according to IPAQ, items 5–8).

The 6-minute walk test (recommended by ACSM, 2006 [28]) is a method of assessing the functional capabilities of patients, including in the presence of cardiac or bronchopulmonary diseases. This test is easy to use, it is necessary to have a 30-meter corridor. The distance that the patient can quickly walk on a flat, solid surface for 6 minutes is measured (Table 1). For healthy men, the average distance is 580 m, for healthy women — 500 m. Before using the test, it is necessary to conduct and analyze the resting ECG performed during the previous 6 months.

Test with squats (Aronov D. M., 1993 [29]). The maximum number of squats is performed at a convenient pace for the patient until fatigue develops. Then the stopwatch records the duration of the test and counts the number of squats, heart rate is measured initially and immediately after the termination of the test (standards are presented in Table 2).

The test with PE on cycle ergometer or treadmill is carried out in the form of a maximal (for group I of health) or submaximal (for groups II and III of health) exercise testing. Maximal exercise testing is used for examination of practically healthy, mostly young people who have an extremely low probability of having CHD, since it will be necessary to

Table 1. *Results of the 6-minute walk test, assessing physical exercises and prognosis in the prevention of cardiovascular complications (according to the recommendation of ACSM, 2006) **

Physical exercises levels	Number of meters	Prognosis for the prevention of cardiovascular complications
I	<300	Worst
II	300–374	Bad
III	375–450	Favorable
IV	>450	Very favorable

***Note:** the result should be compared with the proper value (in m), which is calculated by the formulas:
Men: (7.57 × height, cm) — (5.02 × age, years) — (1.76 — weight, kg) — 309 m
Women: (2.11 × height, cm) — (2.29 × weight, kg) — (5.78 × age, years) + 667 m

Table 2. *Standards of the test with squats depending on gender and age (Aronov D. M., 1993)*

Age, years	Number of squats per minute	
	Men	Women
29–39	34–42	32–38
40–49	31–41	29–35
50–59	27–35	26–34

Table 3. *Classification of weekly physical activity levels*

Levels of physical activity (power costs, MET min)	Physical activity of moderate intensity (min/week)	Utility for health	Comment
Absence	No physical activity above normal	No	Physical inactivity is a significant risk factor for cardiovascular disease
Low (<500)	<150 minutes in addition to normal	There are some benefits	Low level of physical activity is better than no physical activity
Average (500–1,000)	150–300 minutes to normal	Real benefit	This level of physical activity has additional health benefits
High (>1,000)	>300 minutes to normal	Added value	The limit level of physical activity, above which increase in additional health benefits does not occur is not defined

bring the heart rate of the patient to the maximum age-specific values or to complete exhaustion (the inability to further perform this exercise).

Exercise level criteria proposed by International Recommendations are presented in Table 3. These recommendations distinguish four categories of total weekly aerobic PA: lack of PA, low, medium and high levels of PA, determining the health benefit (risk).

Individualization of programs to increase patient's PA is achieved taking into account patient's group of health, his/her group of dispensary supervision (Order dated December 21, 2012 No. 1344n "On the approval of the procedure of carrying out dispensary supervision") and group of cardio-vascular risk.

- Group I of health — almost healthy, not in need of dispensary supervision.
- Group II of health — having RF of NCD, with high or very high total cardiovascular risk, are on dispensary supervision.
- Group III of health — have a disease and require dispensary supervision or specialized medical care, require additional examination.

Cardiovascular risk is determined by the SCORE system and corresponds to a 10-year risk of fatal CVD: low risk <1 %, medium risk 1 % — 4 %, high risk 5 % — 9 % and very high risk 10 % or more. Patients with CVD (after MI and CS, CHD, carotid atherosclerosis, chronic heart failure, etc.) belong to the group of very high cardiovascular risk. Such patients should be preceded by a medical examination before developing a plan to increase the intensity of PE.

It is mandatory to conduct medical examination for:

- persons over 40 years (smokers over 35 years),
- persons at high and very high cardiovascular risk,
- patients with established CVD (regardless of age and degree of their training),
- persons with a sedentary lifestyle, and therefore untrained [1].

Taking into account the specifics of the work of a general practitioner, in order to optimize the activities carried out by the general practitioner to increase PA in motivated patients, in accordance with the generally accepted methodology of preventive counseling, we propose a method of "Traffic Light": procedure of individual management of the patient for the organization of his/her physical activity regimen.

Traffic Light method: procedure of individual management of the patient for the organization of his/her physical activity regimen (Table 4)

1. Stages of consultation:

- To discuss the positive impact of PA on the improvement of individual health of the patient, improving his/her physical and psychological condition, the correction of RF, reducing the risk of NCD due to insufficient PA and to motivate him/her to include exercises in everyday life;
- To assess the state of health and to exclude contraindications for PA classes;

- To develop an individual program to improve PA, give recommendations on the choice of the appropriate type and level of PE, according to his/her age, fitness, health;
- To monitor the patient's compliance with PA recommendations, support his/her desire to achieve good results, to assess the changes of PA (result) and to make the necessary changes in the tactics of PA correction.

2. PA planning:

Planning takes the form of a discussion and is based on the following principles:

- The frequency of PA classes — at least 3–5 times a week, even daily;
- The duration of PA — 15–30 minutes, increasing to 45–60 minutes;
- The intensity of PE — 50–75 % of the maximal heart rate according to age (220-age) or individual threshold tolerance for patients with CVD and bronchopulmonary pathology;
- Type of exercise — dynamic.

3. Recommendations for PA optimization:

- Aerobic training should last at least 10 minutes (class IIA of recommendations, level A of evidence) [5].
- Aerobic PE should be spread evenly during the week — 4–5 days a week (class IIA of recommendations, level A of evidence) [5].
- People with sedentary lifestyles should undergo an adequate assessment of the possible risk and only then begin with mild PE programs (class I of recommendations, level A of evidence) [5].

General recommendations to increase daily PA are necessary for individuals with groups I and II of health. For persons of the third group, restrictions of routine and daily PA may be applied according to the underlying disease.

Patients belonging to any of the health groups, having a pathology of the musculoskeletal system, limiting PA, require an individual approach to the choice of the daily motor activity regimen.

With restrictions in health, for increase in PA, it is necessary to gradually increase the time of physical activity up to 150 minutes a week. This is possible due to the distribution of the total time for several classes per week, gradually increasing the duration of each class: for example, 30 minutes of PA of average intensity 5 times a week.

It is necessary to implement the basic principle of increasing PA: gradual increase in the duration of classes, their intensity and volume over several weeks.

It is desirable that the chosen exercises are available for performance and brought pleasure. Classes should be held 1.5–2 hours after meals and no later than 3 hours before bedtime.

If, for any reason, the training is interrupted, its resumption begins with a lower level, reaching the initial level gradually.

4. Control of PA classes:

PE intensity should not exceed 50–75 % of the maximum heart rate or individual tolerance to the performed exercise.

The optimal zones of the training regimen according to heart rate depending on the age are presented in Table 5. Patients are instructed on the importance of monitoring heart rate (pulse) during PA. For example, for a person aged 50 years (group II of health, without clinical signs of coronary heart disease) optimal training regimen can be provided with an exercise with the pulse from 100 to 125 beats per minute In the presence of CVD (group III of health), the level of permissible exercise is determined by the doctor individually, according to tests with PE.

Conclusion

Given the high efficacy and safety of PE in health promotion and prevention of NCD, it is desirable to carry out preventive counseling and make recommendations to optimize the level of PA depending on the age, degree of fitness, the health group of dispensary observation, the presence or absence of organic diseases for patients who are visiting a doctor for any reason.

Patients with high or very high risk of cardiovascular complications, having diseases of the cardiovascular, bronchopulmonary and other systems, recommendations for the optimization of PA should be preceded by thorough medical examination and, if necessary, consultation of specialists: cardiologist, pulmonologist, rehabilitation therapist and others, depending on the individual clinical pattern.

Table 4. *«Traffic Light» method: procedure of individual management of the patient for the organization of his/her physical activity regimen*

Risk of physical activity complications (including fatal)	**Health group, age**	**Initial physical activity (by express method of determination of physical condition)**	**Developer of physical activity regimen**	**Elimination of high risk of cardiovascular complications**	**Presence of a risk factor for chronic non-communicable diseases**	**Tactics (program) of physical activity [3]**	**Physical activity for the initiation of exercises for untrained patients or patients with sedentary lifestyle**	**Criteria for extent of exercises — submaximal age limit (220 — age of person)**	**Training mode**	**Physical activity monitoring**
"Green" risk zone	Group I 18–39 years 40–64 years Group I 40–64 years	Adequate physical activity (>75 points), you can use trackers and other gadgets	General practitioner (see General recommendations for improving daily physical activity) [2]	Test with squats 6-minute test	Absent or present at low risk of cardio-vascular complications	Gradual transition to the training mode, no restrictions on daily physical activity	Start physical activity with a dosed walk of 5–10 km/day and/or any kind of exercise, taking into account the cultural traditions of the family	Use circular exercises to bring heart rate up to 80 % of the norm in trained patients, up to 75 % of the norm in untrained patients	High (15–20 minutes) or moderate (30–40 minutes) intensity 3–5 times a week walking (untrained patients), swimming	Keeping a "Patient Diary". In the presence of poor tolerability of physical exercises (high heart rate and blood pressure at rest, disturbed sleep and appetite, health and mood, fatigue, weakness associated with physical activity, pain) — transition to the "Yellow zone" to review the tactics and for observation of the general practitioner[4]
"Yellow" risk zone	Group II 18–64 years	Average physical activity (46–74 points) ODA+ questionnaire	After consultation with GP (family doctor)	6-minute test and cycle ergometry (4-degree evaluation)	The presence of risk factors of chronic non-communicable diseases. With a low risk of cardiovascular complications, the patient moves to the "Green" zone, with a high risk — to the "Red" zone					
"Red" risk zone	Group I–III patients with chronic non-communicable diseases and/or patients over 65 years of age, very high cardiovascular risk according to SCORE	Low physical activity (<45 points) ODA+ questionnaire	GP, physical therapy instructor and/or rehabilitation specialist in medical institutions and at home	Cycle ergometry (4-degree evaluation	The presence of a risk factor for chronic non-communicable diseases, healthy patients >65 years of age, presence of chronic non-communicable diseases	Examination, initiation of physical activity in a differentiated individual mode of physical activity	Start with walking, switch to other types of individually selected exercises[4]	Taking into account the 6-minute test, bring the heart rate to 50–60 % of the norm, exercises in a medical or health institution according to the protocol of aerobic loads	Moderate individual intensity 2–5 times a week, duration and regularity are selected individually	

[1] Patients who have suffered a myocardial infarction, heart and heart vessels surgery, having stable angina or chronic heart failure, are recommended aerobic exercises of **moderate intensity** lasting **30 minutes 3 times or more per week** *(class I of recommendations, level A of evidence) [5].*

[2] Persons aged **18–64** are given physical activity / aerobic physical exercises of moderate intensity for **at least 150 minutes per week** (2 hours 30 minutes), *or* aerobic physical activity of high intensity for at least 75 minutes (1 hour 15 minutes) per week, *or* a similar combination of physical activity of moderate and high intensity (*class I of recommendations, level A of evidence). Main rule: 2 minutes of physical activity of moderate intensity are equal to 1 minute of physical activity of high intensity, for example, 30 minutes of physical activity of moderate intensity per week are similar to 15 minutes of physical activity of high intensity.*

[3] The initial level of physical exercises in untrained citizens should not increase the heart rate by more than 30 beats/min relative to rest, then the intensity of physical exercises increases until the optimal training heart rate is achieved.

[4] Adults (up to 65 years) should increase the moderate intensity load to 300 minutes (5 hours) per week *or* high intensity physical activity sessions to 150 minutes per week.

Note: Criteria for the effectiveness of physical exercises: heart rate and blood pressure at rest do not exceed safe standards, sleep, appetite, health and mood are improved, exercise tolerance increases, good performance of stress tests

Table 5. *Optimal zones of training regimen depending on age (heart rate equivalent to 60–75 % of MPC or maximum heart rate by age)*

Age, years	Heart rate, beats per minute	Age, years	Heart rate, beats per minute
20–29	115–145	60–69	95–115
30–39	110–140	70–80	88–108
40–49	105–130	80 and older	77–98
50–59	100–125		

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