La Prensa MedicaArgentina

Research Article

General Recuperation of Elderly People through Regular Physical Training on Simulators

Stepanova ON[1], Shmeleva SV[1]*, Golenkov AV[2], Seselkin AI[1] and Savin SV[1]

Abstract

A very affordable option for general improvement of older members of society is the use of physical exercises during their leisure activities in the gym. In this connection the goal is to assess the overall health of effective exercise on simulators in the elderly. Conducted recreational activities carried out by the author's method allowed achieving more preferable results. After 6 months observations in the experimental group achieved a balance of sympathetic and parasympathetic influences, close to the state of vegetative equilibrium. As a result of using the author's method of training on simulators, the observed elderly people managed to normalize the weight-to-growth ratio, reducing it by 42,7%. This was accompanied in the persons of the experimental group by a decrease in the intensity of adaptation of the circulatory system (by 25,8%) to the level of satisfactory adaptation. As a result of a comprehensive assessment of overall physical development in the experimental group, it was possible to establish its output at a high level against the background of the author's version of recovery. Taking into account the results of the influence of the developed scheme of recovery on the simulators on the dynamics of registered of integral indices, there is advantage of elderly people before a regular but unsystematic visit to the gym.

Keywords

Elderly age; Exercise; Simulators; Rehabilitation; Prevention

Introduction

One of the most important indicators of the welfare of society in economically developed countries is the level of health of its citizens of advanced age [1,2]. It is known that it depends not only on their medical care, but also on the level of their motor activity [3]. The complexity of this issue is due to the fact that the elderly age is often burdened by many chronic diseases [4,5]. Their course often has a progressive character and is difficult to compensate [6,7]. The cardiovascular pathology occupies a prominent place, which very often leads to disability and death of older persons [8,9].

The leading direction of comprehensive health promotion in old age should be considered the use of physical exercises of a different nature [10,11]. It is recognized that the regular dosage of regular muscular activity within the framework of rational exercise can provide, including in the elderly, a preventive and healing effect in relation to many variants of pathology [12,13].

Modern medicine has an acute need to continue improving the complexes of physical exercises and programs aimed at comprehensive recovery in old age [14-16]. Accessible options for the correction of the condition of older people are physical exercises in the framework of leisure activities in the gym. In this connection, the goal is to assess the overall health effect of regular physical exercises on simulators in the elderly.

Materials and Methods

The study was approved by the local ethics committee of the Russian State Social University on September 15, 2016 (protocol No. 9). The study was conducted on the basis of the "Impulse" gym in Protvino, Moscow Region. The study took 62 elderly people who had not been systematically attended gyms. There were formed control group and experimental group which were observed for six months. The criterion for inclusion in the study was the absence in the elderly of clinical manifestations of atherosclerosis, heart failure, metabolic, oncological and allergic diseases. Those included in the study were allowed to have arterial hypertension no higher than 1 degree.

The control group consisted of 31 people (17 men and 14 women). Their average age was 64,2 ± 1,2 years. This group was formed from people who had the opportunity to attend classes in the gym once or twice a week, but could not adhere to the proposed scheme of exercises in the author's methodology.

The experimental group included 31 people, 16 men and 15 women of elderly age. Average age in the experimental group was 65, 0 ± 1,3 years. Engaged in the experimental group who attended the classes in the gym strictly three times a week? For their training, block-type simulators were used, which made it possible to regulate the load by changing the weights and to include in the work alternately different muscle groups.

Exercise complexes used in the experimental group had sacral-occipital direction of influence on the muscular system [17,18]. As a part of the used complexes asymmetric, symmetric and dedicational exercises were applied [19,20]. There was used method of standard - repeated exercise during compiling exercise complexes on simulators [21].

The method of repeated efforts was used to select the level of weights on the simulators. Weight of cargo was selected depending on the number of repetitions (15-20 times). The level of load was maintained until the adaptation to it occurred: an increase in the amplitude of movements in the joints, an increase in the strength indicators for this exercise. Only after this, the load level increased. Exercises were performed in 2 approaches with an emphasis on the conceding (eccentric) regimen with prolonged exhalation.

To assess the condition of the examined in the outcome and six months of training on the simulators, the following methods were used in the work:

Assessment of the functional state of the circulatory system was carried out by the method of [22]. Measure the height and body

***Corresponding author:** Shmeleva Svetlana Vasilievna, Director of the Department of Adaptive Physical Culture and recreation Russian State Social University, Moscow, Russia, Tel: +7-915-147-98-32; E-mail: smelevasv@mail.ru

Received: January 01, 2018 **Accepted:** January 09, 2018 **Published:** January 19, 2018

weight; determine the pulse rate and the level of blood pressure. To quantify the level of the functional state (FS) of the circulatory system in points, the following formula is used: PS = 0,011 (HR) + 0,014 (SBP) + 0,008 (DBP) + 0,014 (Rev.) + 0,009 (MT) - 0,009 (DT - 0,27), Rev. - age in years; SBP and DBP - systolic and diastolic blood pressure in mmHg; Heart rate - heart rate in bpm; MT - body weight in kg; DT - body length in cm. The evaluation of the level of adaptation of the circulatory system in the examined subjects was evaluated according to the scale below (Table 1).

The functional state of the autonomic nervous system (vegetative Kerdo index) [22] was calculated using the formula: (1-DD / HR) x 100, where DD is the diastolic blood pressure; Heart rate - heart rate. The following criteria were used for evaluation. The magnitude of the vegetative index of Kerdin ranges from -15 to +15 indicates a balance of sympathetic and parasympathetic influences.

The value of vegetative index Kerdo above + 15 indicates the predominance of the sympathetic tone of the autonomic nervous system. The value of the vegetative index of Kerdo is less than - 15, indicating the predominance of the parasympathetic tone of the autonomic nervous system. With the value of the vegetative Kerdo index, there is a vegetative equilibrium.

Evaluation of the weight-growth index [23]. The weight-growth index is an integral characteristic of development and reflects the formed level of metabolic processes. The criteria for its evaluation are presented in Table 2.

Assessment of the level of general physical development of the elderly (indicators of the vegetative-vascular system) [24]. A number of simple definitions of indicators were used, which were introduced into the following formula:

Y = -0,615 x X1 + 0,259 x X2 - 0,322 x X3 - 0,124 x X4 + 0,148 x X5 - 0,023 x X6 + 54,21 where Y is the general physical state; X1 - age, years; X2 - body length, cm; X3 - body weight, kg; X4 - Heart rate at rest, bpm; X5 - systolic blood pressure, mmHg; X6 - diastolic blood pressure, mm Hg. The evaluation criteria are presented in Table 3.

The results of the study were mathematically processed with the calculation of the arithmetic mean (M), the error of the arithmetic mean (m) and the level of reliability in the t-test of the Student ($p<0.05$).

Results of the Study

The data on the status of the indicators taken into account among the elderly surveyed are systematized in Table 4.

Conventions: p - reliability of differences in baseline values and values at the end of the observation in both groups; p1 - reliability of differences in indicators at the end of observation between groups. The reliability of differences between groups in terms of outcomes was not obtained.

In the initial state, an increase in the weight-to-height ratio was noted in the examinees who made up the control and experimental group, which was aggravated by the initial manifestations of the unsatisfactory adaptation of the circulatory system in them. This was followed in all examined by the prevalence of sympathetic influences over parasympathetic ones. In addition all those surveyed at the time of taking under supervision had a low level of general physical development (in control 37,1 ± 0,62 points, in the experimental group 37,5 ± 0,59 points).

The beginning of training on simulators in both observation groups led to a change in the level of indicators taken into account. As a result of training on simulators 1-2 times a week, according to the free schedule (control group), the Kerdo index decreased by 70,3%, which indicated an equilibrium between sympathetic and parasympathetic influences in the body. This was accompanied by a decrease in the weight-to-weight ratio by 12,0%, which indicated their transition from the category of overweight to the category of persons with increased body weight [25]. Also, in the control group after six months of visiting the gym, the value of the functional state of the circulatory system decreased by 8,9%. The dynamics found indicated the exit of their circulatory system from the state of unsatisfactory adaptation and the attainment of the level of tension of the adaptation mechanisms by it. After six months of observation, the control group noted an increase in the level of general physical development by 25,6%. This indicated that the persons who formed the control group reached the average level of general physical development.

The health measures carried out by the author's method allowed achieving better results in the experimental group than in the control. So after 6 months, Observations in the experimental group achieved a more stable balance of sympathetic and parasympathetic influences than in people in the control group. After six months of classes in the experimental group, their balance approached the state of vegetative equilibrium (Kerdo index 3,6 ± 0,23 points). As a result of using the author's methodology, the elderly people of the experimental group managed to reduce the weight-growth ratio by 42,7%, thereby ensuring its normalization.

This was accompanied by a more pronounced decrease in the intensity of the adaptation of the circulatory system (by 25,8%), which ensured that it reached a level of satisfactory adaptation [26], indicating a marked strengthening of the cardiovascular system in them [27]. A comprehensive assessment of the overall physical development made it possible to establish a more pronounced positive dynamics in the experimental group by the end of the observation. The achieved result prevailed over the control values by 12,9% and indicated the achievement by the experimental group of a high level of general physical development.

Table 1: Scale for assessing the functional state of the circulatory system.

№	Adaptation status	Values of FS in points
1	Satisfactory adaptation	to 2,60
2	The tension of adaptation mechanisms	2,60-3,09
3	Unsatisfactory adaptation	3,10-3,60
4	Disruption of adaptation	above 3,60

Table 2: The scale of body weight in old age by weight-growth index.

Weight-growth index (g / cm)	Body weight estimation
<310	Deficit
310-369	Reduced
370-480	Norm
481 - 540	Increased
>540	Excess

Table 3: Scale of assessment of general physical condition.

The level of general physical development	Values in points
High	More than 51
average	38-51
Low	Less than 38

Table 4: Results of the assessment of the health status of persons taken into the study.

indicators	Observation groups			
	Control group M ± m, n=31		Experimental group, M ± m, n=31	
	outcome	at the end of observation	outcome	at the end of observation
Autonomic Kerdo index, points	17,2 ± 0,34	10,1 ± 0,28 p<0,01	17,5 ± 0,27	3,6 ± 0,23 p<0,01 p_1<0,01
Weight-growth index, g/cm	551,8 ± 3,16	492,6 ± 2,88 p<0,05	549,6 ± 2,99	385,1 ± 2,55 p<0,01 p_1<0,01
Functional state of the circulatory system, points	3,15 ± 0,45	2,89 ± 0,36 p<0,05	3,17 ± 0,48	2,52 ± 0,32 p<0,01 p_1<0,05
General physical development, scores	37,1 ± 0,62	46,6 ± 0,50 p<0,05	37,5 ± 0,59	52,6 ± 0,43 p<0,01 p_1<0,05

Thus, systematic and metered exercises with physical exercises on the simulators are able to bring in the elderly a pronounced health-improving effect that surpasses the effectiveness of training in the gym on a free schedule.

Conclusion

The problem of preserving and restoring the health of elderly people is becoming increasingly important in developed countries due to the increase in their share in the population structure. For this contingent, the decrease in motor activity becomes common, which increases the number of dysfunctions and complex pathology in it. In this regard it becomes necessary to further search for rational forms of therapeutic and preventive and health-improving work in the elderly with the help of physical exercises. When assessing the impact of the health improvement scheme developed by the authors on the simulators with the help of integral indices, its advantages were shown before a haphazard visit to the gym. After 6 months observations in the experimental group achieved a more stable balance of sympathetic and parasympathetic influences and normalize the weight-to-height ratio. This was accompanied in the experimental group by the achievement of a satisfactory adaptation of the circulatory system and a high level of general physical development. Based on the conducted research, it can be said that systematic and metered exercises with physical exercises on the simulators are able to bring in the elderly a pronounced health-improving effect that surpasses the effectiveness of training in the gym on a free schedule.

References

1. Skoryatina IA, Medvedev IN, Zavalishina SY (2017) Antiplatelet control of vessels over the main blood cells in hypertensives with dyslipidemia in complex therapy. Cardio Ther Prev 16: 8-14.
2. Zavalishina SYu, Medvedev IN (2017) Comparison of opportunities from two therapeutical complexes for correction of vascular hemostasis in hypertensives with metabolic syndrome. Cardio Ther Prev 16: 15-21.
3. Skoryatina IA, Zavalishina SYu, Makurina ON, Mal GS, Gamolina OV (2017) Some aspects of Treatment of Patients having Dislipidemia on the Background of Hypertension. Prensa Med Argent 103: 3.
4. Medvedev IN, Zavalishina SYu (2016) Platelet Activity in Patients With Third Degree Arterial Hypertension and Metabolic Syndrome. Kardiologiia 56: 48.
5. Medvedev IN (2015) Neuropsychologicalchanges in cognitive function during the transition of the elderly in old. Adv Gerontolo 28: 479-483.
6. Medvedev IN, Skoryatina IA (2015) The aggregation capacity of neutrophils in patients with arterial hypertension and dyslipidemia treated with fluvastatin. Klinicheskaia meditsina 93: 66-70.
7. Medvedev IN, Skoryatina IA (2010) Platelet hemostasis dynamics in simvastatin-treated patients with arterial hypertension and dyslipidemia. Russ J Cardiol 1: 54-58.
8. Skoryatina IA, Zavalishina SYu (2017) A Study of the Early Disturbances in Vascular Hemostasis in Experimentally Induced Metabolic Syndrome. Annu Res Rev Bio 15: 1-9.
9. Skoryatina IA, Zavalishina SYu (2017) Impact of Experimental Development of Arterial Hypertension and Dyslipidemia on Intravascular Activity of Rats' Platelets. Annu Res Rev Bio14: 1-9.
10. Makhov AS, Stepanova ON (2013) The program of development control of adaptive sport «Finnix» and resultsof its implementation. Ther Prac Physi Cult 8: 21.
11. Korneva MA, Makhov AS, Stepanova ON (2014) The peculiarities of motivation of handicapped athletes with spinal cord injuries to participation in russian press work-out sessions. Ther Prac Physi Cult 6: 18.
12. Zavalishina SYu, Vatnikov YuA, Makurina ON, Kulikov EV, Sotnikova ED, Parshina VI, Rystsova EO, Kochneva MV, Sturov NV (2017) Diagnostical Appreciation of Physiological Reaction of Intravascular Thrombocytes Activity of Two-Years-Old Mice to Regular Physical Loads. Biomed Pharmacol J 10: 129-136.
13. Medvedev IN, Savchenko AP, Kiperman YaV (2015) Dynamics of the Intravascular Activity of Platelets in Young Men with High Normal Blood Pressure Regularly Practicing Physical Activity. Biol Med 7:1 BM-069-15.
14. Mikhaylova IV, Shmeleva SV, Makhov AS (2015) Adaptive chess educational technology for disabled children. Teoriya i praktika fiz. kultury 7: 38-41.
15. Bonkalo TI, Shmeleva SV, Zavarzina OO, Dubrovinskaya YeI, Orlova YuL (2016) Peculiarities of interactions within sibling subsystem of a family raising a child with disabilities. Res J Pharm Biol Chem Sci 7: 1929-1937.
16. Strelkov VI, Zavarzina OO, Shmeleva SV, Kartashev VP, Savchenko DV (2016) Psychological barriers in college teacher's career «Helping professions». Res J Pharm Biol Chem Sci 7: 1938-1945.
17. Makhov AS, Stepanova ON, Shmeleva SV, Petrova EA, Dubrovinskaya EI (2015) Planning and Organization of Sports Competitions for Disabled People: Russian Experience. Biosci Biotech Res Asia 12 : 34-44.
18. Mikhaylova IV, Shmeleva SV, Makhov AS (2015) Information communication teaching aids in long-term training of chess players. Ther Prac Physi Cult 5: 31.
19. Stepanova ON, Vengerova NN, Pogodin SN (2015) Conceptual approach and pedagogical design algorithm of health and fitness classes. Ther Prac Physi Cult 2: 20.
20. Savin SV, Stepanova ON, Sokolova VS, Nikolaev IV (2017) Wellness training of persons of mature age: orientation, content, methods. Moscow: Moscow State Pedagogical University 200.
21. Savin SV, Stepanova ON (2015) Pedagogical designing of employment by fitness with persons of mature age. Moscow: Training Center "Perspective", 251.

22. Bikbulatova AA, Andreeva EG (2017) Dynamics of Platelet Activity in 5-6-Year Old Children with Scoliosis Against the Background of Daily Medicinal-Prophylactic Clothes' Wearing for Half A Year. Biomed Pharmacol J 10.

23. Bikbulatova AA (2017) Dynamics of Locomotor Apparatus' Indices of Preschoolers with Scoliosis of I-II Degree Against the Background of Medicinal Physical Training. Biomed Pharmacol J 10.

24. Vorobyeva NV (2017) Physiological Reaction of Erythrocytes' Microrheological Properties on Hypodynamia in Persons of the Second Mature Age. Annu Res Rev Biol 20: 1-9.

25. Krucevich TYu (2003) The method of physical education of different population groups. Moscow: Olympic literature, 379.

26. Medvedev IN, Maksimov VI, Parakhnevich AV, Zavalishina SYu, Kutafina NV (2016) Rapid assessment of aggregation abilities and surface properties of platelets and red blood cells. International Int J Pharma Bio Sci 7: 793-797.

27. Medvedev IN (2017) Microrheology of erythrocytes in arterial hypertension and dyslipidemia with a complex hypolipidemic treatment. Russ J Cardiol 4: 13-17.

Author Affiliations

Top

[1]*Russian State Social University, Moscow, Russia*

[2]*Federal State Budget Educational Institution of Higher Education "Chuvash State University named after I.N. Ulyanov", Russia*