

WORKING OUT OF HEALTH RELATED POWER LIFTING TRAINING PROGRAM FOR FIRST YEAR STUDENTS WITH MUSCULAR SKELETAL APPARATUS AFFECTIONS

Zhen Qiang San

Kharkov State Academy of Physical Culture

Abstract. *Purpose:* substantiation and working out of program for health improvement of first year students with muscular skeletal apparatus affections by power lifting means. *Material:* in experiment, which lasted one year, 24 first year students with muscular skeletal apparatus affections participated (two groups, 12 persons in each). The students' age was 18-20 years old. *Results:* optimal correlation of specific and non-specific loads – 60%:40% was found. The worked out complex of exercises for training of bench press barbell technique includes the following: special warming up exercises, exercises on special simulators and exercises with weights. As general physical training it is recommended to use complex of commonly accepted exercises. *Conclusions:* application of the worked out program ensures formation of steady interest to physical exercises' practicing, strengthening of health, replenishment of motor skills' base, training of motor qualities and functional fitness. Besides, it facilitates more effective students' social adaptation in collective.

Key words: experiment, health, power lifting, program, motor skills, students, testing.

Introduction

At modern stage of Ukraine development the problem of students' health improvement is still rather acute [7, 8, 20]. Diseases, connected with muscular skeletal apparatus (MSA) disorders, are the most often [19, 21, 29]. Such students additionally have problems with social adaptation in universities [11, 21]. Problem of social adaptation is the most acute for 1st year students with MSA affections. Sociological research, conducted by S.V. Korolinskaya (2011) [13] showed a number of social psychological factors, which determine effectiveness of students' adaptation to teaching educational process. The author recommends wide usage of physical culture for adaptation period's shortening and for increasing mental and physical workability.

The research by E.V. Makarova (2012) [16] permitted to mark out directions of students' adaptation to future profession. It was found that integrated and inclusive educational environment is an optimal form for provisioning of disabled youth with conditions for self expression, self-perfection and self-creation; for realization of rights and potentials, formation of personal significance and usefulness feeling.

Among many researches, devoted to problems of first year students' adaptation to HEE educational environment we can mark out the following works: Ye.L. Tomkiv (2008) [27], Ye.A. Belikova and O.L. Omelchenko (2010) [3], V.N. Kornilova and L.A. Prokopenko (2014) [12], T.Yu. Zharov et al. (2015) [10].

In the work by V.A. Druz et al. (2010) [9] directions of solution of re-socialization problems for disabled with MSA disorders are elucidated. The authors note demand in maximal consideration of kind of disease, degree of muscular skeletal apparatus disorders, individual features of physical loads' endurance. Besides, they supply recommendations on application of highly emotional exercises and games that facilitate more effective influence of used physical exercises.

As per specialists' recommendations one of ways of this problem's solution is practicing of different kinds of sports (power lifting, for example) [1, 8, 18]. In the work by Yu.V. Gordiyenko (2015) [6] it is shown, that power lifting trains girl students' ability to think independently; facilitates increase of self control and self analysis. It was found that correctly built training program facilitates strengthening of motivation for acquiring and mastering knowledge by girl students.

Internet information resources about power lifting are significant base for construction of training programs for students. For example, A.I. Stetsenko (2011) [25] thinks, that in Ukrainian speaking Internet environment power lifting is paid much more attention, comparing with other power kinds of sports. It promotes construction of students' power lifting program with better quality.

Speaking about students' power lifting, it is also necessary to pay attention to works by I.N. Manko (2009) [17], M.Yu. Minova (2010) [18], A.V. Gorbunova [5], Ye.V. Kurmayeva (2013) [14].

Alongside with it, power lifting trainings of students with MSA disorders have certain peculiarities. For example, in researches fulfilled by V.S. Lobko (2015) [15] we found distinctions between psycho-physiological characteristics, indicators of psychic state and features of students' personalities, depending on power lifting training experience. It was stated, that under influence of systemic power lifting trainings indicators of functional mobility and strength of nervous processes improve. The author also notes, that rising of students' sportsmanship is accompanied by noticeable improvement of practically all indicators.

By data of M.A. Al-Soub, R.V. Chudna and A.Kh. Khasan Faisal [2, 28, 29] it was found, that researches of the mentioned problem are of fragmentary character. Analysis of researches on problem of health related power lifting programs for first year students with MSA affections points at demand in additional researches.

Purpose, tasks of the work, material and methods

The purpose of the work is to work out program of power lifting health related trainings for first year students with affections of muscular skeletal apparatus.

Material and methods of the research: in experiment, which lasted one year, 24 first year students with muscular skeletal apparatus affections participated (two groups, 12 persons in each). The students' age was 18-20 years old

According to the tasks of the research we conducted experiment, which lasted one year. As a hypothesis we assumed possibility of working out of power lifting training program, which would consider correlation of specific and non specific training means in year cycle of first year students with MSA affections. In this connection we conducted pedagogic experiment with participation of two groups, consisting of first year students with MSA affections, who did not practice physical culture or sports before entering university. Both groups consisted of 12 students and had no confident differences by main indicators: functional, physical and psychological fitness. In the course of experiment groups 1 and 2 fulfilled different correlation of specific and non specific loads: in group 1 – 60%:40%; in group 2 – 70%:30%.

Results of the research

More specific of training means in both groups is given in table 1.

Table 1. Year volumes of main training means of 1st year students – power lifters in group 1 and 2.

Min means of training	Group 1	Group 2
Quantity of trainings	120	120
Quantity of training hours	216.4	217.2
Quantity of competitions	4	4
Theoretical training, hours	4	4
Quantity of barbell lifting,	2411.5	2656.7
Including with intensity:		
up to 50% from maximal, %	40	32
up to 60% from maximal, %	20	22
up to 70% from maximal, %	20	22
up to 80% from maximal, %	10	12
up to 95% from maximal, %	10	12
Means of general physical training, including		
exercises by individual plan, hours	91.2	82.1
Exercises in game form and recreation, hours	3.5	3.5

In summer period of experiment as specific loads we used complex of exercises for training of barbell bench press technique, special warming up exercises, exercises on special simulators and exercises with weights. As general training means, in the course of all experiment, we used complex of commonly accepted exercises. Testing of 1st and 2nd groups' students, conducted at the end of experiment, permitted to register noticeable progress of functional, physical and psychological fitness indicators. For example, in 1st group volume of chest in inhale, exhale and in pause increased accordingly by 5.8; 5.7; 7.5% ($p < 0.05$). Vital capacity of lungs increased statistically significantly by 427.2 ml. Significant improvement of respiratory system's functional state was also registered in Stange's test – 19.9% and in Genchi's test – by 37.9% ($p < 0.05$). Quantity of front and back claps (students' speed qualities) increased by 21.6% ($p < 0.05$). Final results in throw of medicine ball from behind the head – forward and from behind the head – backward increased accordingly by 16.8 and 13%. The highest progress (by 46.7%) was noticed in main competition exercise – bench press of barbell. Significant progress of motor and coordination potentials was accompanied by perfection of psycho-physiological indicators. For example, students of 1st group demonstrated reduction of simple visual response latent period by 22.2% ($p < 0.05$). Accordingly latent periods of choice of one from three irritators improved statistically

significantly by 19.6 and 28.2%. Widening of students – power lifters’ circle of conditional reflex links reflected in indicators of functional mobility (by 10.5%) and power of nervous processes (by 39%). At the end of experiment statistically significant positive changes were registered in 1st group by such, important for disabled, characteristics as psychic state and properties of personality.

Analysis of 2nd group students’ psycho-physiological indicators also showed their improvement at the end of experiment. Though, we did not register statistically significant changes ($p > 0.05$). Experimental data permitted also to find that group 1 had noticeable superiority by indicators of respiratory system’s functional state. For example, volume of chest at inhale, exhale and pause in 1st group was 82.7 cm, 72.4 cm, 77.3 cm in contrast to 79 cm, 70.1 cm, 72.4 cm in group 2. Also in group 1 there is higher level of vital capacity of lungs: 2718.9 ml in contrast to 2583.3 ml in 2nd group ($p < 0.05$). Comparison of students’ physical fitness at the end of experiment showed the following (see table 2). Power lifters of 1st group demonstrated higher results in tests for quickness and speed power. With it differences between two groups were statistically significant. Statistically significant distinctions between groups were also registered in indicators of static endurance of strong and weak hands. In other tests we did not notice statistically significant difference ($p > 0.05$).

Table 2. Sport results and motor qualities indicators of students – power lifters with MSA disorders in group 1 and 2 at the end of experiment

The tested indicators	Group 1 (n=12)		p	Group 2 (n=12)		
	\bar{X}	m		\bar{X}	m	
Front and back claps during 10 sec., quantity	23.15	0.21	<0.05	20.14	0.26	
Forward throw of medicine ball from behind the head, m	4.52	0.03	<0.05	4.21	0.05	
Backward throw of medicine ball from behind the head, m	4.38	0.03	<0.05	4, \.11	0.03	
Bench press of barbell in lying position, kg	64.53	2.17	>0.05	66.91	2.11	
Strong arm’s mobility in shoulder joint, degrees	70.18	2.18	>0.05	70.92	2.46	
Weak arm’s mobility in shoulder joint, degrees	69.53	2.68	>0.05	69.87	2.84	
Static endurance of strong hand, sec.	11.4	0.02	<0.05	8.1	0.03	
Static endurance of weak hand, sec.	10.1	0.01	<0.05	6.9	0.02	
Total indicator of strength of 5 muscular groups of strong arm, kg	absolute	169.8	3.96	>0.05	172.9	4.29
	relative	2.70	0.03	>0.05	2.79	0.04
Total indicator of strength of 5 muscular groups of weak arm, kg	absolute	157.5	3.75	>0.05	161.3	3.84
	relative	2.51	0.04	>0.05	2.61	0.03

At the end of experiment in both groups all psycho-physiological indicators improved. With it, more positive changes were in power lifters of group 1. Calculation of confidence of differences between indicators of group 1 and group 2 showed statistically significant superiority of group 1. Exclusion was indicator of latent period response when choosing one irritator from three ($p > 0.05$). Testing of psychic state and personalities' features in group 1 and group 2 at the end of experiment showed that in group 1 there was higher level of nervous psychic stability in motivation for success and avoiding failure; besides there were statistically significant differences between groups.

Discussion

Final data of experiment confirmed actual materials of pedagogues, psychologists, medical workers, specialists in therapeutic physical culture, coaches of sports for disabled about effective impact of regular physical exercises' practicing on physical health of disabled [1, 4, 7, 11, 21, 26, 31, 33]. In our experiment we realized, to some extent, principle, offered by L. Vygotskiy:

- 1) Observation of pedagogic actions' orientation on weakening of physical and psychic defects of children with health problems;
- 2) Active development of cognitive functioning, psychic processes, physical abilities and moral qualities of children [22-24, 30].

Results of our researches supplement the data of other authors (Trinka E., Rhoads M.L., 1999 [41]; Rossouw F., Krüger P.E., Rossouw J., 2000 [39]; Keogh J.W.L., Hume P.A., Pearson S.N., Mellow P., 2007 [36]; Jensen A.M., 2010 [35]; Hale B.D., Roth A.D., DeLong R.E., Briggs M.S., 2010 [34]; Kozub F.M., Brusseau T.A., 2012 [37]; Lewis C., 2015 [38]) about positive influence of power lifting specific loads on students' health.

Results of our researches also confirmed the data of V.S. Lobko (2015) [15] that systemic power lifting trainings facilitate improvement of functional mobility and nervous processes' power indicators.

The received by us results permit to speak about more effective influence of power lifting means on indicators of students with MSA disorders. Such influence is ensured by:

- 1) Correlation of specific and non specific loads – 60%:40%;
- 2) Application of worked out complex of exercises for training barbell bench press technique, which included special warming up exercises, exercises on special simulators and exercises with weights.

Conclusions:

1. It was found that recent years methodic of disabled health improvement through trainings in separate kinds of sports has been being prevailed. In our research we tried to substantiate program of health related power lifting trainings for first year students with disorders of muscular skeletal apparatus.
2. In the course of experiment we solved the task – determination of optimal parameters of physical loads in year cycle of power lifting training of students with MSA affections. The conducted during one year experiment permitted to substantiate optimal program of power lifting trainings for first year students with MSA disorders, which envisages application of specific and non specific loads in proportion 60% and 40%. Application of the worked out program ensures formation of steady interest to physical exercises' practicing, development of motor skills and functional fitness as well as facilitates more effective students' social adaptation in collective.

The prospects of further researches in this direction can be connected with studying of competition loads influence on students-power lifters' organism.

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Conflict of interests

The author declares that there is no conflict of interests.

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<p style="text-align: center;">Information about the author:</p> <p>Zhen Qiang San; http://orcid.org/0000-0001-5766-0833; alesik1974@mail.ru; Kharkov State Academy of Physical Culture; Klochkovskaya str. 99, Kharkov, 61022, Ukraine.</p>
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