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CONTENTS

CLASSIFICATION AND METHODICAL FEATURES OF FITNESS AND WELLNESS FACILITIES

Beliak Yu. I.
Prikarpatskiy National University

Annotation. *Purpose*: health and fitness use a large arsenal of different sports and physical activity. Development of fitness industry promotes its expansion and requires classification and methodological features that lead to the use of appropriate fitness programs. *Material*: more than 60 literature and video of 42 prestigious international fitness - conventions lessons were analyzed. *Results*: the evolution of species fitness and wellness, as well as the character used in those funds. *Conclusions*: as a means of improving classification attribute fitness appropriate to use their orientation, according to which they are divided into aerobic, strength exercises that promote flexibility and psychomotor coordination. The main methodological features fitness facilities are highlighted: the variety and interchangeability, clear regulation, the ability to transform, to exercise a selective effect on the body, the ability to solve a wide range of tasks, innovation.
Keywords: fitness, tools, classification, orientation, methodical features.

Introduction

Fitness is a separate branch of society's functioning, which satisfies human strive for improvement of health and life quality at the cost of specially organized motion functioning [19]. This purpose is realized with participation of health related fitness's subject (person, who is involved in trainings) in process of health related fitness, organized with the help of available scientific and organizational- resource of fitness industry and oriented on satisfaction of his (subject's) strive for healthy life style, improvement of health level and quality of life.

Beginning of application of physical exercises for prophylaxis of morbidity is connected with policy of popularization of healthy life style, which had been started to be implemented in the USA in 60-s of the past century [17]. This policy was a response to quick spreading of cardio-vascular system's diseases and high risk of deaths among population. Effectiveness of aerobic exercises in prophylaxis of certain diseases became the basis for their application in fitness-programs [8, 9]. Further development of fitness-industry resulted in making content of fitness-programs more various. At present fitness-programs satisfy different demands-they facilitate correction of posture and constitution, remove excessive mass of body, recreate psycho-emotional state and so on. Trainings include techniques of different kinds of sports, which can be interesting for different strata of population. Alongside with it differences between tasks of sport and fitness trainings condition peculiarities of methods, used in them. Main requirement to fitness's means is, in opinion of specialists, their health related orientation [3, 6]. But not every motion functioning, which renders health related influence, can be regarded as fitness. In our opinion application of certain methods in health related fitness's programs is conditioned by presence of certain methodic peculiarities in them, which permit to effectively solve fitness-programs' tasks, adjusting them to functional and motion potentials of trainees. Demand in their determination conditioned scientific researches in this direction.

The research has been fulfilled in compliance with topic 3.9. "Improvement of scientific principles of sport for all, fitness and recreation" of combined plan of scientific-research works in sphere of physical culture and sports for 2011-2015 of Ministry of education and science, youth and sports of Ukraine, state registration number 0111U001735.

Purpose, tasks of the work, material and methods

The purpose of the work was classification of health related means and specification of their methodic peculiarities, which condition their application in fitness programs.

The tasks of the work were classification of health related means on the base of analysis of scientific-methodic literature and video-materials of international fitness conventions and specification of their main methodic specificities.

Material of the researches. For fulfillment of the tasks we analyzed about 60 literature sources and video-records of 42 trainings, which were presented at most important international fitness conventions. RiminiWellness-2013 (Italy), MIOFF-2013 (Moscow), Go sport 2013 (Київ).

Results of the research

Analysis of literature and video-materials permits to state that at present in health related fitness programs there used means of different purpose. Popular in 7—s of 20th century idea of application of aerobic exercises in health related programs transformed in appearing of the whole number of programs of aerobic orientation. For example, practicing of general gymnastic and dancing exercises under music in "nonstop" way resulted in creation of "aerobic gymnastic", "aerobic dances" [9]. Then exercises from other kinds of sports began to be fulfilled under music. For example in order to make more interesting trainings for men there appear trainings with using of different martial arts' exercises (boxing aerobic, ki-bo, thai-bo, body-combat and etc.) [11]. For attracting youth dancing programs are widely used [14, 21]. Dancing technologies develop and change very quickly that is conditioned by preference of music styles (Latin and oriental dances, jazz, raga, house and other), which surely are the basis for creation of such programs [6].

The work of Reebok company, which produced step platform and scientifically grounded system of step-aerobic made revolution in development of fitness. [16]. Cyclic rising and dropping on step-platform became safe

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alternative to jump and run loads of other aerobic trainings. Possibility to adjust platform height permitted to additionally differentiate load at trainings of different by physical condition level trainees. Involving of leading companies-sport goods producers in process of fitness-technologies' development facilitated appearing of a number of fitness trainings with the help of additional equipment: slide aerobic [15], spinning (bicycle aerobic) [1], trainings in special shoes ―exoloperses" (kangaroo aerobic) [12] and so on.

In parallel with aerobic programs, programs based on body-building also began to develop. They are oriented on development of muscles and formation of handsome, proportional constitution [2, 5]. Power exercises with different weights, on special stimulators are integral component of modern fitness-centers to day.

Inter-influence of methodic aspects of athletic gymnastic and aerobic resulted in creation of aerobic-power programs. They envisage exercises with weights for different groups of muscles, without rest pauses. As weights dumbbells, rubber expanders, special pump weight, heavy balls (medical balls) and other are used [6].

Fitness technologies of new century have been enriched with programs, combined in foreign literature by term «mined body» [4, 10, 20, 23]. They include: yoga, pilates, thai-chi chuang. Oriental origin of most of them conditions presence of their common with oriental philosophies' features. These features imply that human organism is an integral unity. In this connection training is oriented not on improvement of different sides of physical fitness or groups of muscles, but on development of ability to integrate all available motion and mental potential for maximally effective fulfillment of exercise. Exercises, used in these trainings, facilitate improvement of coordination, ―sense" of own body. Alongside with it they envisage fixing of static positions and fulfillment of static-dynamic movements, which facilitate development of flexibility. In specialists' opinion imbalance of muscular development and absence of flexibility of certain muscular groups can cause wrong posture [7, 13]. Stretching exercises with simultaneous strengthening of muscles correct such disorders.

Also we should be note psychological influence of static stretching, which is characteristic for yoga, pilates and other systems' exercises. Basing on oriental philosophy these programs are oriented on control over body and mind owing to own will [10, 20]

Combination of ancient technologies with modern achievements of health related fitness as well as with technologies, which are widely used in rehabilitation of patients with disorders of supporting motor system, facilitated appearing of exercises with fit balls (fit ball aerobic, resist and ball), special balancing platforms korr, bosu, balancing pillow airex, mini stimulator jymstik and other[23]. These programs are associated with ―functional training". The essence of functional training is mastering of motion stereotypes of some activity by trainees, facilitating of skill to rationally and effectively apply physical abilities for solution of certain motion tasks [22]. Main accent of functional training is on ability to fulfill movements with optimal amplitude, with required strength, keeping dynamic balance in constantly changing conditions under influence of external forces, acting on body with changing of its position. In conditions of rising hypo-kinesia, when restriction of motion abilities influences on fulfillment of professional duties and, sometimes, on ordinary domestic actions, such kind of trainings become especially urgent.

Systemizing methods of analyzed video-lessons we think it purposeful to classify them by orientation and mark out the following groups of methods:

- Aerobic means, oriented on development of cardio-respiratory potentials of organism, general endurance, stimulation of metabolism;
- Strength developing means, oriented on development of strength and strength endurance, correction of bocy constitution;
- Means, oriented on development of flexibility;
- Means, oriented on development of psychic-motor coordination.

In spite of difference between orientations of health related means, regimes of fulfillment, purposefulness of their application in health related fitness's programs is conditioned by intrinsic **methodic peculiarities**, which are the following:

1. *Variability and inter-changeability.* Means of health related fitness are variable by their bio-mechanical structure, orientation and content. They are motions of torso and its parts in different joints, which become more variable owing to dynamic (quick, slow, even, alternate, smooth, jerk, amplitude and so on), space (indifferent directions and planes) and time (simultaneous, alternate and so on) characteristics. Such variety of means permits to choose the most rational of them for solution of certain tasks of health related fitness. Different by content but similar by orientation kinds of exercises cause similar health related effect, which permits to vary content of training program at the cost of replacing one exercise by other.
2. *Possibility to exactly regulate loads.* All means of health related fitness are easy to be dozed owing to determination of quantity of repetitions, temp of fulfillment, movements' amplitude, change of initial position and other characteristics. That is why health related fitness's means can satisfy requirements of any health related program, no matter if this program is oriented on fresher with low level of physical condition or experienced trainee, who can use rather high loads, characteristic for sportsmen.
3. *Ability for transformation in order to differentiate loads.* Possibility to modify the character of exercises' fulfillment, their temp, amplitude, quickness, change of initial position permits to simplify or complicate their technique without substantial change of content, bio-mechanical characteristics or orientation. Possibility to adjust health related fitness's exercises for different trainees, independent on sex, age and level of physical condition, permits to easily differentiate loads in process of training.

4. *Ensuring of selective influence on organism.* In spite of general health related character of exercises, it should be noted that every of them has its own purpose, which is expressed in dominating influence on certain muscular group, development of certain organism's system or physical ability. This characteristic is important with solution of correction tasks, oriented either on correction of posture, improvement of body constitution's proportions or on removal of restrictions and development of organism's functional systems.

5. *Possibility of simultaneous solution of wide range of health related tasks.* As a rule, health related fitness's exercises involves in work great number of muscles; work is fulfilled in different planes and these exercises require certain physical skills that create conditions for comprehensive influence on organism and simultaneous solution of several tasks. For example, squatting with bar weight develop strength, flexibility and balance. Application of such exercises permits to shorten time of results' achievement and, thus, to optimize effectiveness of fitness program.

6. *High level of innovative character and emotionality.* Fitness industry is characterized by highly developed contest environment, in which producers of fitness services compete for consumer. It creates favorable conditions for searching of new means of urgent tasks' solution and of modernization already existing means. Competition with other kinds of leisure and entertainment requires application of such means, which would be effective not only for physiology but would also facilitate sense of satisfaction, joy and psychological comfort. Owing to this fact, in contrast to rehabilitation means or sport training with main distinctive feature is functional purposefulness of exercises, in fitness, alongside with the mentioned emotional and innovative attractiveness is very important for consumer.

Conclusions:

Modern stage of development of health related fitness is characterized by application of great arsenal of means, which is constantly expanded by borrowing of means from other kinds of sports or rehabilitation programs, by creation of new equipment for trainings, by transformation of existing means in new forms with the help of their inter-influence, combination and re-understanding. Systemizing of means by their orientation permits to classify them into group of aerobic exercises, power exercises and exercises for flexibility and development of psycho-motor coordination. In spite of different orientations all they have common methodic characteristics, which condition purposefulness of their application in health related fitness's programs.

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COMPUTER TECHNOLOGY AS A PEDAGOGICAL INNOVATION IN PHYSICAL EDUCATION OF SCHOOLCHILDREN

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Annotation. *Purpose*: determine the status of implementation of computer programs in physical education of students of Dnipropetrovsk region and the need for automated monitoring systems components of the physical condition of schoolchildren. *Material*: This survey was attended by 21 physical education teacher: teacher-trainers - 19.05%, with the highest category of teachers - 33.3%, with the first - 23.8%, in the second - 19.05%, professionals – 4.8%. Found that 90.5% of employees feel the need to create an automated system for complete monitoring of the physical condition of students grades 1-11 for the introduction of a differentiated approach in physical education of students. *Conclusions*. The study results give reason to believe it expedient to establish a comprehensive program of monitoring the physical condition of students based on physical development, functional and physical preparedness depending on features weighty growth indicators.
Keywords: computer, technology, innovation, comprehensive monitoring.

Introduction

Increasing of effectiveness of rising generation's physical education is an urgent task of theory and practice of physical education. Attempts to solve it have been made by many of domestic and foreign scientists, specialists, managers and some pedagogues [6]. One of main reasons of unsatisfactory state of comprehensive schools' pupils as well as their physical fitness is, in opinion of specialists, absence of scientifically grounded system of pupils' physical education [4, 8]. In opinion of Yu.V. Vaskov it is connected with the fact that there is no developed holistic conception of this problem, ways of its modernization (reconstruction) have not been determined. Recent years, in Ukraine there have happened some deaths during physical culture lessons at comprehensive schools. In this connection Ministry of education and science of Ukraine issued two orders: № 956 dt. 22.10.2008 "On measures of improvement of physical education and preservation of school children's health at educational establishments of Ukraine" [http://oipopp.ed-sp.net/content/view/954/36], № 1008 dt. 8.11.2008 "On urgent measures of preservation of pupils' health during physical culture lessons, defense of Motherland and extra-curriculum sport-mass measures" [http://shkola.ostriv.in.ua/publication/code-281A8DFA21B4E]. Analysis of unsatisfactory state of physical education at comprehensive educational establishments was carried out at joint collegiums of Ministry of education and science of Ukraine, Ministry of health protection of Ukraine, Ministry of Ukraine on family, youth and sports. On the base of this analysis they adopted appropriate decision, dt. November 11th, 2008, № 13/1-2; 10; 11/1. [http://oipopp.ed-sp.net/content/view/973/77]. In connection with this modern science about physical education requires transition from traditional means of collecting of information about pupils' physical condition to complex monitoring. It is conditioned by the fact that teacher does not always have actual information about pupils' health that negatively reflects in quality of physical education.

Pedagogic innovations are relatively new concept for sphere of education. Recent 10-12 years, in connection with changes in social-economic conditions, development of scientific researches in field of education, need in new, more effective forms, means, methods and technologies of teaching and education has increased greatly [6].

Pedagogic innovations are ideas, conceptions, means, methods and results of improvement of pedagogic system. In respect to educational system innovations mean product of professional-pedagogic functioning, which have substantial properties of novelty and application of which facilitates achievement of social, educational and economic effect.

In our opinion one of pedagogic innovations is creation of automatic system of complex control over pupils' physical condition in order to reveal differences in pupils physical fitness, individual-personal features of responding to external factors and physical loads.

This idea is proved by a number of advanced domestic scientists: V.O. Kashuba (2009), V.G. Arefyev (2007), V.Yu. Volkov (2001), V.S. Ashanin (2005), V.O. Pustovalova (2009), and by a number of foreign scientists, who considered purposeful to widely implement new technologies of automatic processing of information and creation of data base about children's physical condition on this base for planning of physical loads, development of individual programs for independent trainings [9-15, 17, 19, 22]. Foreign editions widely elucidate problem of application of innovative technologies by pedagogues of comprehensive and higher educational establishments [16, 18, 20, 21].

Special attention is paid to computer programs, which realize control over physical condition of pupils of different age groups (N.M. Goncharova, 2009).

Though, as on to day, physical culture teachers' attitude and readiness to computerization of pupils' physical education has not been studied sufficiently. But success of implementation of computer technologies is directly connected with this attitude. In this connection there appears need in determination of approaches to optimization of structure and content of computer training of physical culture teachers.

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Our work is connected with fulfillment of fundamental research for 2013-2015 –Scientific-theoretical principles of innovative technologies in physical education of different population strata", state registration number 0113U001406.

Purpose, tasks of the work, material and methods

The purpose of the work is to determine the state of implementation of computer programs in physical education system of Dniepropetrovska region's school children and to reveal demands in automatic systems of control of school children's physical condition at present stage.

The tasks of the research:

1. Carry out questioning of physical culture teachers.
2. Determine purposefulness of computer programs' implementation in physical education's process of Dniepropetrovska region's school children.

The method of the research was anonymous questioning of physical culture teachers, which was carried out on base of Dniepropetrovsk regional institute of after diploma pedagogic education and comprehensive schools of Dniepropetrovska region.

The questioning covered 21 teacher of physical culture, in particular teachers – 19.05%, teachers of highest category – 33.3%, of first category – 23.8%, of second category – 19.05% and 4.8% of specialists. Period of practical work less than 5 years – 14.3% of respondents; up to 10 years – 33.3%, more than 10 years – 52.4%. Representatives of Dniepropetrovska region were 48.0% from total quantity of teachers and from Dniepropetrovsk – 52.0%.

The content of questioned shows that all our respondents were experienced specialists and that is why their answers were highly valuable in respect of determination of need in computerization of school physical education.

Results of the research

The questionnaire for physical education teachers contains questions about necessity of knowledge and skills in work with PC and application of computer technologies in practice, about period of practical work and qualification of respondents.

In first block of questions we determined degree of application of computer technologies in process of school children's physical education. Results of our research show, that physical culture teachers use different computer programs, developed on base of computer laboratories of higher educational establishments [2] or created by respondents themselves [3].

Question –What is your attitude to application of computer technologies in field of physical education and sports?" was answered positively by 81.0 % of respondents and only 19.0 % regard this application as not purposeful.

Analysis of answers to second block of questions witnesses that 57.1 % of specialists do not use computer programs (see fig.1), justifying it by the following reasons: 33.3 % — by insufficient material base of schools; 33.3 % – absence of skills in working with PC; 38.1 % of respondents do not know where to acquire such programs; 19.0 % mark absence of programs, which would satisfy their demands; 4.8 % think that implementation of computer technologies in educational process is unnecessary.

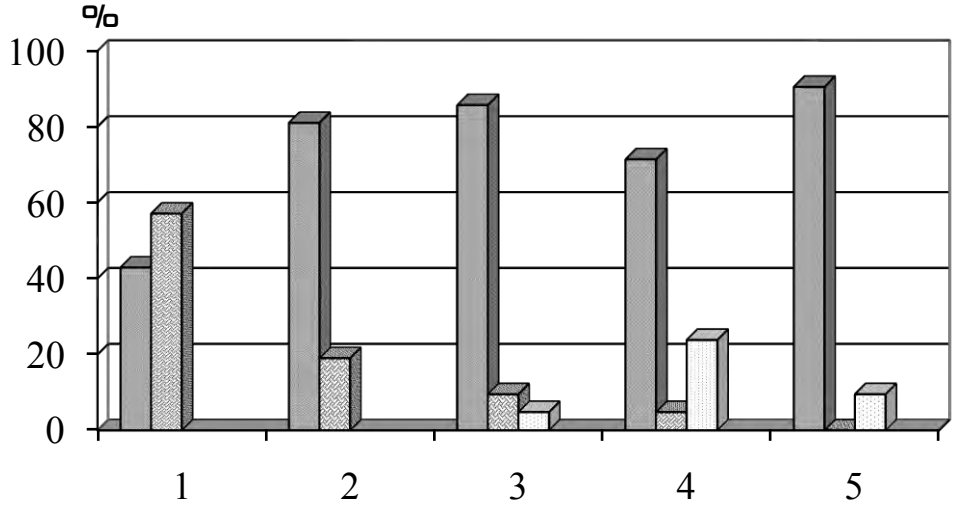

Fig.1. Attitude of physical culture teachers to computerization of school children's physical education:
–yes; – no; – not sure;

1. Apply computer programs in practical work;
2. Think that implementation of computer technologies in educational process can help to optimize physical education of pupils;
3. Think that it is possible to evaluate health, physical condition and fitness of children with the help of computer;
4. Think it possible to influence on progress, on health, physical condition and fitness of children with the help of computer programs;

5. Think it is necessary to create automatic system of complex control over 1-11 forms pupils' physical condition, for implementation of differentiated approach in pupils' physical education.

Computer programs are already used by 42.9 % of physical culture teachers. More over, 81.0 % of these teachers think that computerization of physical education teacher's work is one of ways of physical education's optimization. 85.7 % of teachers think that computer programs can help to evaluate and influence (71.4 %) on pupils' physical condition.

90.5 % of specialists think that it is necessary to create automatic system of complex control over 1-11 forms pupils' physical condition for implementation of differentiated approach in school children's physical education. With it coefficient of concordance was $W = 0.729$, mean value of rage correlations was 072 ($p = 0.0001$) that proves concordance of teachers' opinions and confidence of questioning results in the whole.

These data have become a ground for working out of automatic program of complex evaluation of 7-17 years old children's physical condition with determination of age-sex, functional characteristics and reserves of children's organism, which shall be considered with differentiated approach to pupils' physical education.

Conclusions:

Thus, our questioning permits to recommend application of computer technologies as pedagogic innovations in organizational-methodic maintenance of pupils' physical education. Results of the research also permit to think it purposeful to create program of complex monitoring of 1-11 form' pupils' physical conditions and fitness depending on their mass-height indicators.

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THE INFLUENCE OF SPECIAL ACROBATIC CLASSES ON THE EXPRESSION LEVELS OF SUSTAINABILITY OF THE VESTIBULAR ANALYZER OF YOUNG 6-8 YEAR-OLD ALL-ROUND FIGHTERS ATTENDING BASIC TRAINING GROUPS

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Annotation: *Purpose*: to increase the level of manifestation sustainability of the vestibular analyzer young fighters-all-rounders aged 6-8 years in initial training through a shift from the technical and tactical training in the direction of general physical and acrobatic. The research task was to prove the effectiveness of training, aimed at special acrobatic training at the level of the manifestation of stability of the vestibular analyzer young fighters-all-rounders aged 6-8 years who are engaged in military-sports-around in initial training. *Material*: the research has been done at the premises of the Kirovograd Federation of military and sports all-rounders. It covered 40 young sportsmen divided into two groups of 20 persons each: an experimental and control group. The research was conducted during the two years engaging steady student population. *Results*: it is established that after the execution of the experimental training program most likely changes were observed among the indicators vestibular illusions against rotation (VIAR) (43.3 %), after performing traditional training programs respectively to 10.6 %; less noticeable changes among the indicators heart rate and eyes nystagmus (2,6%, 1,62% and 0,4%). *Conclusions*: shifting focus from technical and tactical training in the direction of the general physical and acrobatic increase the level of manifestation of the stability of the vestibular young fighters all-rounders aged 6-8 years.
Key words: stability, vestibular, analyzer, young, fighters, military, sports, all-rounders.

Introduction

While ensuring traffic one of the main systems of the analyzers is the vestibular system. A.N. Laputin, V.A. Kashuba [8] thought that the vestibular apparatus of central gravitational centre of the man. His perceptions on the quality of managerial decisions when building movements and realization of all the vital programs motive of action and the optimal level of autonomic response [13].

The role of the vestibular function in human physiology revealed in defining the values of vestibular training for the performance of different sports [4, 7, 11]. Vestibular training - system of special exercises aimed at improving the sustainability of the vestibular analyzer to the effects of stimuli associated with active and passive movements in expanse.

The analysis of scientific and methodological literature showed [1, 3] that the problem of determining the stability of the vestibular and dynamics of its development in children of younger school age in specialized groups on military-sports all-rounder was not carried out fundamental scientific research. But some aspects of the stability of the vestibular analyzer concerned in their works a several researchers.

Creative for theoretical justification for the stability of the vestibular system, can be considered according to Vavilov U.N. [5], who notes that the motion - an important component of exercise is a natural stimulus of the vestibular system. Therefore, the exercise of the functions of the vestibular analyzer sustainability with the help of physical exercises, especially those related to balance body and rotational movements, lowers the threshold vestibular sensitivity and increases the organism resistance to rotational stress and sickness [5].

The results show that the use exercises of acrobatic direction allow for adequate development of resistance vestibular apparatus of children of younger school age [3]. Adequate irritation of the vestibular apparatus does not restrict movement capabilities of children, and expands and increases their [6].

Dynamics of increasing resistance of the vestibular analyzer in children 7 to 17 years is stages: the most intensive increase stability is held in pre-pubertal period [10]. Therefore, the formation statokinetic sustainability should be carried out exactly in childhood. Targeted increase statokinetic sustainability beginning sportsmen the growth of their sports skills.

Positive impact workout to increase statokinetic sustainability noticed many authors [2, 9].

In sports activities, especially in the military-sports all-rounder, the main role of motor activity, the effectiveness of which is determined by the accuracy of the spatial orientation depending on the functioning of the vestibular apparatus [9,12]. Therefore, the improvement of vestibulometric functions is important for fighters all-rounders.

The work is performed in accordance with the complex plan of the research work of the Kirovograd state pedagogical University named after Volodymyr Vynnychenko.

Purpose, tasks of the work, material and methods

Purpose: to increase the level of manifestation sustainability of the vestibular analyzer young fighters all-rounders aged 6-8 years in initial training through a shift from the technical and tactical training in the direction of general physical and acrobatic.

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Objective: to prove the effectiveness of training, aimed at special acrobatic training at the level of the manifestation of stability of the vestibular analyzer young fighters all-rounders aged 6-8 years who are engaged the military-sports all-rounder in initial training.

Material and methods. At the beginning of the experiment, both groups were relatively homogeneous level of manifestation sustainability of the vestibular analyzer and quantitatively (n=20).

The levels of manifestation of sustainability of the vestibular analyzer young sportsmen were determined in the formation of the initial training in the month of September with children aged 6 years. Following testing conducted in the month of may after two years of training.

The basis of the functional samples were taken types of testing, characterizing the manifestation of the sustainability of the vestibular analyzer, and in particular: vestibular illusion against rotation (VIA), eyes nystagmus, influence of rotational stress on heart rate(HR) and test of Jarocki.

Pedagogical experiment lasted for two years. Classes with young fighters 6-8 years was conducted 3 times a week for 9 months of every year. The main emphasis in the control group was aimed at technical and General physical training, and in the experimental group on the General physical and acrobatic training [6].

Results of the researches

Pedagogical experiment results are presented in tables 1 and 2. Table 1 presents the results of stability of the dynamics of the vestibular apparatus of young athletes experimental group and in table 2 under control.

Table 1.

Dynamics of indicators of sustainability of the vestibular analyzer young fighters all-rounders aged 6-8 years involved in military-sports all around the experimental program (the experimental group, n=20).

№	Tests	At the beginning of the experiment	At the end of the experiment	ΔX	P
		X ± σ, V	X ± σ, V		
1.	VIA, *c*	33,06±2,5 7,76	18,8±4,7 25,39	14,3	<0,05
2.	Eyes nystagmus, *c*	45,5±2,01 4,43	38,8±2,24 5,79	6,7	<0,05
3.	HR, beats. min-1	106,0±8,43 7,95	87,0±2,3 2,63	19,0	<0,05
4.	Test of Jarocki, *c*	23,68±8,44 36,53	19,5±1,23 6,33	-4,2	<0,05

Table 2.

Dynamics of indicators of sustainability of the vestibular analyzer young fighters all-rounders aged 6-8 years involved in military-sports all around the traditional program (control group, n=20).

№	Tests	At the beginning of the experiment	At the end of the experiment	ΔX	P
		X ± σ, V	X ± σ, V		
1.	VIA, *c*	38,5±2,6 6,75	34,4±2,1 6,12	4,1	<0,05
2.	Eyes nystagmus, *c*	46,5±2,42 5,22	45,3±2,76 6,1	1,2	>0,05
3.	HR, beats. min-1	105,0±8,96 8,53	105,4±8,68 8,23	-0,4	>0,05
4.	Test of Jarocki, *c*	25,24±2,4 9,52	25,65±2,23 8,72	0,41	>0,05

The analysis of dynamics of indicators of sustainability of the vestibular analyzer in the experimental group showed a positive trend of change in the majority of indicators the young fighters -all-rounders aged 6-8 years. The only exception here is the sample Jarocki, where we experienced a deterioration of the results. For all registered us indices were observed significant changes in the level of manifestation sustainability of the vestibular analyzer ($P<0.05$).

After the execution of the experimental training program the most significant changes were observed on the index vestibular illusions against rotation (VIA) (43,3%). Less noticeable changes were observed in terms of heart rate and eyes movement (17,9% and 14.7%, respectively).

The analysis of dynamics of indicators of sustainability of the vestibular analyzer in the control group showed a positive trend of change in young fighters-all-rounders aged 6-8 years for all registered us indicators. However, only in terms of the VIA observed significant changes in the level of manifestation sustainability of the vestibular analyzer ($P<0.05$), all other indicators are significant change.

After performing the traditional training program the most significant changes were observed on indicators vestibular illusions against rotation (VIA). We have observed improve them respectively by 10.6%. Almost no noticeable change was observed in the indicators of the eyes movement, test of Jarocki and HR (2,6%, 1.62% and 0.4%, respectively).

Conclusions.

Comparative analysis of dynamics of changes of level of manifestation of the stability of the vestibular young fighters-all-rounders aged 6-8 years involved in military-sports-around in initial training allows to draw the following conclusions: first, proved the effectiveness of training, aimed at special acrobatic training, to improve the stability of the vestibular; secondly, determined the growth rate indicators of the stability of the vestibular; it is established that shifting focus from technical and tactical training in the direction of the general physical and acrobatic increase the level of manifestation of the stability of the vestibular young fighters all-rounders aged 6-8 years.

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EDUCATION OF CHILDREN IN POLISH FAMILY IN A CONTEXT OF FORMING HEALTH CULTURE

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Annotation. *Purpose* - analysis of the approaches of family education in a Polish family in the direction of forming a culture of children's health. *Material:* The analysis of the publications of post-communist countries and Poland scientists. Used the results of a questionnaire on health culture. *Results:* It was found that healthsaving aspect of family education in Polish family plays a significant role in forming health culture. Highlighted in national traditions of family upbringing of a healthy child. It is noted that social support, as a result of active participation in the religious life, helps to better cope with the challenges of everyday life, reduces anxiety and excessive sadness, increases the feeling of well-being. There is a possibility in the Ukrainian family and the school to ensure the spiritual education of children, the right of parents to ensure the education and upbringing of their children in conformity with their own philosophical convictions. Considered necessary to strengthen the role of the family and school education of students in the context of building a culture of health. The main factors of a healthy lifestyle today's young people are: quality of food, measures to prevent stress, problems of environmental protection, sports, leisure. *Conclusions:* It is recommended to involve parents in various activities of the societies and volunteers of various organizations. Considered necessary to strengthen the role of the family and school education of students in the context of building a culture of health.
Keywords: religion, family, health, culture, school, youth.

Introduction

Formation of future teacher's culture of health during all period of studying is an important component of educational system in schools. This period of studying requires special students' (future teachers) attitude to the whole number of academic subjects, starting from first year of study. Success in solution of educational tasks also depends on quality of teaching of disciplines, availability of appropriate physical culture-sport base and technical maintenance of practical trainings as well as sites for pedagogic practice. It can be supplemented by opportunities for increasing of quality of students' teaching, which can be provided by practice in winter and summer camps.

All these, taken together, create favorable conditions for formation of future teachers' culture of health, independent on their specialization. Of course, the greatest attention should be paid to training of students – future teachers of physical culture, coaches, i.e. those, who, after graduation, will work at schools. Alongside with it, it would be quite logic to analyze experience and system of preparation of future school teachers in Poland at the end of last century. This analysis, would, probably, show direction for development of Ukrainian system of teachers' preparation in HEEs in new conditions of formation of our state.

It should be noted that formation of health culture of schoolchildren, students and society was studied not only by known domestic classics – pedagogues (G. Skovoroda, V. Sukhomlinskiy, K. Ushinskiy et al.) but also by many modern scientists (V. Goraschuk, Ye. Ionova, S. Kirilenko, V. Klimova, G. Krivosheyeva, V. Skumin, L. Suschenko et al.) and they noted that formation of student's health culture starts from first year of higher educational establishment if there exists inner motivation for strengthening of own health, acquiring of special skills and knowledge and with presence of educational-material base at HEE for health related measures.

Researches of Polish pedagogues showed in field of health preservation of a person the works by such outstanding pedagogues, doctors and hygiene specialists as A. Barots, B. Vonarovskaya, M. Demel, G. Matushevskiy, A. Modzhevskiy, K. Olekhnitskiy, K. Pukhalskiy, Z. Yavorskiy and other, who regarded health culture as ability to evaluate individual and social health related demands and ability to apply hygienic and health related requirements in everyday life, elucidated greatly tis problem.

Thus, there is no single opinion about quality of system and structure of students' (future school teachers) teaching. There are regional researches of specificity of students' training, which cannot always be used in other regions. All these, taken together, witness, that it is necessary to fulfill research in this direction.

The research has been fulfilled by governmentally financed topic of Ministry of education "Theoretical-methodic provision of healthy life style formation in conditions of educational establishment in context of European integration (state registration № 0114U001781).

Purpose, tasks of the work, material and methods

The purpose of the work is analysis of experience, structure and system of future school teachers' training at Polish educational establishments.

35 students of physical education faculty (group 1) and 30 students – future teachers of primary school (group 2) of Kharkov national pedagogic university, named after G.S. Skovoroda, took part in questioning. For comparison we used questioning results of students of Polish educational establishments, which were received by other aothors. Besides, we used questioning results, presented in Polish service ANKIETKA.

Results of the researches

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Formation of personality's health culture is closely connected with such concepts as sound education and health related education.

However, one of important mechanism of modern person's socialization is education, which presents hierarchy of targets, tasks, priorities of teaching and education of rising generation. In modern psychological pedagogical literature education is regarded in several aspects: as educational system, as educational process, as educational functioning, as individual or combined result of process and educational medium [14].

There are many proofs that health and education are interconnected. But this connection has not been clear completely for scientists, though they consider three phenomena:

1. Education helps to obtain knowledge and required skills in taking care and perfection of health;
2. Preparation of future pupil for coming to school and studying there through formation and strengthening of health;
3. Social-economic factors, local environment, social nets, certain influence of peers on health and its formation [19].

Health related education is comprehensive educational work in respect to health as a value and health related savings of society in compliance with modern status of medical knowledge in aspect of health culture [16]. It is a process, in which children receive skills of taking care of own health and the health of society, in which they live.

Health related education is not only the process of receiving of certain knowledge; such education contains educational measures, oriented on development of attitude to health as to certain value. As result, health related education is oriented on formation of rising generation so, that it should be able to master health related social-cultural savings [12, 18]. Besides, schoolchildren shall have knowledge of health culture's formation: both of own health and the health of surrounding people. Exactly health culture contains correlation: culture of health – person – culture of health. I.e. person himself creates culture of health, is its carrier and manipulates it as a tool for achieving of healthy life [13].

Every teacher shall, in frames of his duties, teach, educate his disciples, take care of them, because he is responsible for them. It, first of all, concerns class supervisors, who spend much time with schoolchildren and communicates with their parents. That is why class supervisor shall be a leader in field of health related education of schoolchildren [15].

Leader in health related education is a personality, who demonstrates health related strategic approach, based on respect to social identification of interests. In our case – on health, regarded as the highest value [10].

Generally speaking, health related education means the following: creation of skills, which are directly or indirectly connected with protection and perfection of physical and mental health; correlation of will and certain bents of a person to using of hygienic principles and prevention from diseases; awakening of positive interest to health affairs through episodic or systemic deepening of knowledge about own organism and its development [20].

This fact requires actions, oriented on propaganda of healthy life style ideas, on training of highly qualified specialists in the field of physical culture, health related technologies, who would have not only knowledge, principles, methods and conditions of health protection but also could be able to implement all their knowledge and skills dring all their professional activity.

Health protection of children by pedagogic means depends on efforts and health culture of teachers of all specialties. That is why education of health culture shall be of the first priority in individual-professional formation of pedagogic higher educational establishments' students. Health culture of pedagogic HEE's student implies presence of knowledge in field of health and healthy life style, skills in formation, preservation and strengthening of own health (considering regional specificities), ability to effectively build education of pupils' health culture and to use in health related technologies in work. Alongside with it, professional aspect of teacher's health culture is manifested in ability to achieve required pedagogical result without any harm to pupils' health.

In training of future physical culture teaches independent work is very important. For example, Wilczkowski E. [17] in his work regarded students' independent work in extra curricular time. The author determines structure and main components of students' independent work, which is oriented on formation of their cognitive motivation, reeiving of scientific information, required for their professional competences.

Baj-Korpak J. et al. mark that for students the most important motives are perfection of physical form, strengthening of dignity and health improvement, especially for those, who position themselves as "vary active" [9].

All above mentioned has become especially urgent for Ukrainian HEEs as well. It is proved by decision of Supreme Council of Ukraine, which was reflected in Law of Ukraine "On higher education" (№ 1556-VII, dt. 01.07.2014**).**

Alongside with it, it is necessary to regard works of domestic authors, devoted to problems of present article. A. Khalaytsan analyzed required conditions for formation of students' health culture, videlicet: social, pedagogic, economic, individual, medical, ecological and geographical. The author determined that at present time social, pedagogic and economic conditions are unfavorable for formation of student's health culture. Medical and ecological do not made obstacles for formation of health culture. Geographical and individual factors are favorable for formation of students' health culture [7]. V. Zemliakov marked out main factors of health culture's formation for students of higher educational establishments. The author also accentuates attention at absence of continuity, wholeness in the process of health culture's formation in future teacher [3]. R. Sirenko bases on increasing of students' motivation to physical culture functioning with implementation of technologies facilitating students' self education and self perfection, implementation in practice [6].

D. Voronin marks that research of fitness to different kinds of pedagogic functioning showed that dominating elements are: motivational, operational, orientation, will and evaluation components. Readiness of physical culture teacher for professional functioning is a systemic formation and is characterized by psychological, scientific-theoretical, practical, physical and psycho-physiological fitness [1].

M. Danilko says that in modern conditions there is a trend to complex scientific researches of training of physical culture teacher. Especially urgent is study of fitness of physical culture teacher to professional functioning as complex integrative state [2].

B. Shyan regards theoretical-methodic preparation of physical culture teacher on the base of interaction of different disciplines of curriculum that ensures integrative combination of professionally important knowledge, skills and is manifested in readiness to realize such professional functioning, which would meet requirements of school's humanization and ensure conditions for development of every child [8].

With choosing of profession of teacher the level of school education of student is very important. In this aspect Ye, Ionova presents results of comparative analysis of health of pupils of Waldorf and traditional schools, conducted in different countries (Austria, Netherland, Germany, Dutch, Russia, Ukraine, Finland, Switzerland and Sweden). The author established that health related orientation of Waldorf school results in significant positive effect: in comparison with other pupils, Waldorf schoolchildren have better indicators of psychic and physical health, developed cognitive abilities, personality's qualities (individual initiative, creativity, independence in taking decisions, cooperation with people, social mobility). Owing to this fact, among leavers of Waldorf schools nearly there are no unemployment (as well as persons with asocial behavior). Among leavers of Waldorf schools there is big percentage of social, education, medicine sphere workers; among them there are many of known in the West governmental officers, financial specialists, writers, art specialists and so on. [5].

It is evident that it is necessary to base on mentioned positions, when composing academic plans of future teachers' training and creating atmosphere, based on different advanced ides, at HEE. For example, basing on anthropological ideas, described in work by Ye. Ionova [4].

Alongside with it there is an acute demand in supplementing the regarded above works with practical material. This material will permit to characterize vital positions of modern students and insert necessary corrections in approaches to formation of health culture of Ukrainian students. For this purpose we used materials of questioning of Polish students. But the main group contained results of questioning of Ukrainian students.

Questioning results of Polish students (question "How do you understand "healthy life style"?) are presented in table 1.

Table 1.

Questioning results of Polish students (by data of https://www.ankietka.pl)

Answer	**%**	**Quantity of answers**
Physical activity	91.67	110
Absence of harmful habits	62.50	75
Personal hygiene	41.67	50
Leisure	1833	22
Correct eating	85.83	103
Care of environment	5.83	7

As we can see in table 1 most of students incline to physical activity (91.67%) and correct eating (85.83%). Least of all students are troubled with environment (5.83%) and leisure (18.33%). Questionnaire "Healthy life style among youth" gives the following data [https://www.ankietka.pl]:

1) Harmful habits (alcohol) вредные – 82.76% take alcohol rarely, 13,79% take alcohol often and 3.45% - do not take alcohol at all.
2) Smoking - - 24.14% - smoke, 75.86% - do not smoke.
3) Leisure (point in descending order): I position – do nothing, II position – watching TV, III position – shopping.

Quality of eating is rather important for Polish students. Question "Does your meal influence on your health?" 95.74% answered affirmatively. In questionnaire "Influence of leisure on life and health of a person" there was marked the following: 44.16% of respondents think sports training to be compulsory, 48.05% - prefer rest in nature and walks.

Analysis of questioning of Ukrainian students permitted to establish the following (group 1 – future physical culture teachers, group 2 – future teachers of primary school):

1) Most of students (85%) think that direct participation in sport practice and ability to correctly organize physical culture, sport and educational work with schoolchildren in extra curricular time to be an important component of health culture's formation.
2) There are different approaches to formation of health culture in 1^{st} and 2^{nd} groups. For example 2/3 of 1^{st} group students think that the most important component of health culture's formation is practical orientation of lessons.. 75% of 2^{nd} group students think that it is necessary to conduct theoretical classes in combination with propaganda of healthy life style on example of outstanding personalities with including other works with pupils in curriculum.
3) The highest fitness to practical functioning was registered in group 1.
4) Concerning group 2 we registered demand in enriching it with knowledge on different subjects of humanitarian cycle.

Thus, there are insignificant differences in approaches to formation of health culture between modern Polish and Ukrainian students. It witnesses about euro-integration processes of Ukrainian higher school, availability and popularity of communications.

Conclusions:

Necessity of formation of students – future teachers' health culture is determined by society's objective demand in physically firm, mobile, competitive specialists, who would be ready to highly intensive, fruitful functioning. In its turn, if future teachers have certain knowledge and skills on formation of own health culture, on health perfection and if they have attitude to health as to certain value, it will surely raise health level of rising generation.

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ASSESSMENT OF PHYSICAL HEALTH AND PHYSICAL FITNESS OF STUDENTS OF TECHNICAL SPECIALTIES OF I COURSE

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Annotation. *Purpose*: identification and assessment of levels of physical health and physical fitness of first-year students of the main group. *Material*: in the experiment participated 264 students (132 boys and 132 girls). The methods of evaluation: physical health by G.L. Apanasenko and physical preparedness for T. Yu. Krutsevich. *Results*: It was found that more than 75% of the students are low and lower-middle level of physical health. Revealed a level of physical fitness freshmen. 84.8% of boys and 81.1% girls have an average level of physical fitness. This corresponds to a satisfactory evaluation. Found that almost all the students are at risk of development of somatic diseases. *Conclusions*: These results confirm the tendency to deterioration of health and physical fitness of young people. This requires the development of a program of physical education with an emphasis on improving orientation.
Keywords: health, physical, fitness, students, technical, specialty.

Introduction

Health protection, its formation on all stages of human development is a strategic task of any state [6]. Students are social strata of population, which is a reserve of country's labor resources. That is why health condition is regarded as an indicator of their readiness for fulfillment of social and labor functions.

As on to-day there is more than 100 od definitions of "health". The statute of World health protection organization (WHPO) defines health as "state of complete physical, mental and social welfare, but not only absence of diseases or physical defects".

In opinion of M.M. Amosov "health is maximal productivity of organs and systems with preservation of qualitative limits of their functions"[1]. G.L. Apanasenko thinks: "health is harmony, internal systemic order, ensuring such level of energy potential, which permits for a person to feel good and optimally fulfill biological and social functions" [3].

Other scientists regard health as "psycho-physical state of a person, which is characterized by absence of pathological changes and by functional state, which is sufficient for full fledged bio-social adaptation and preservation of physical and psychological workability in conditions of natural environment" [7].

Modern youth's health is influenced by great number of negative factors: hypo-dynamia, nervous-emotional and mental tension of studying functioning, not optimal correlation of work and rest, irrational eating, harmful habits, ecological conditions and other [2, 9].

As per data of WHPO experts approximate correlations of factors, which ensure and form modern person's health are as follows: by 105 they depend on state of health protection, by 20% - on ecology, nearly 20% - on heredity and the most percentage – 50% - on conditions of life and life style.

Basing on above said, human health can be regarded as process of preservation and strengthening of organism's reserve potentials (psychic, physiological, physical), i.e. as dynamic process, which improves or worsens depending on life style [4].

At the same time L.I. Lubysheva stresses that phenomenon of physical culture is one of the most significant, by its valuelogic potential and influence onprotection and strengthening of human health, as far as it, "works" for human health [12]. In number of dissertations (A.I. Drachuk, 2001; P.M. Gunko, 2008; N.I. Turchina, 2009; O.V. Sokolova, 2011 et al.) it was determined close connection between students' health, physical fitness and organization of physical education in higher educational establishments. That is why great part of responsibility for solution of this problem shall be imposed on physical education process in educational establishment.

For improvement of physical education at HEE it is necessary to work out programs, which would maximally solve both health related and professional-applied tasks of physical education.

Analysis of researches [5, 8, 13, 15-19] permits to say that choice of means and regulation of physical loads at health related physical trainings shall be realized in compliance with levels of students' somatic health and physical fitness.

The research has been fulfilled in compliance with plan of scientific-research works of Sumy state university, named after A.S. Makarenko for 2011-2015, by topic "Improvement of health and physical fitness of different population's strata by means of physical culture" (state registration number 0111U005736).

Purpose, tasks of the work, material and methods

The purpose of the work is determination and evaluation of somatic health and physical fitness levels of first year technical specialties' students of Sumy state university, who are members of main health group.

The methods and organization of the research: we used theoretical analysis, anthropometric and physiological methods, pedagogic testing and methods of mathematical statistic.

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Estimation of somatic health was realized with express-evaluation's method, developed by prof. G.L. Apanasenko [3]. It includes using and interpretation of anthropometric indicators (body mass, height, dynamometry), physiological indicators (vital capacity of lungs, HBR, BP) and functional indicators (test of Martine-Kushelevskiy), used for calculation of morphological-functional indices. Evaluation of somatic health was fulfilled by sum of points, which corresponded to calculated indicators; besides, functional classes from "low" to "high" were determined.

Pedagogic testing permitted to obtain and analyze main quantitative and qualitative indicators of students' physical fitness. Comparison of results with evaluation tables' data, developed by T.Yu. Krutsevych for students, with 10 motion tests for physical skills in the base, permitted to determine level of physical fitness [11].

In our research 264 first year students (132 boys and 132 girls) of Sumy state university – members of main health group- participated.

Results of the research

Present time is characterized by unsatisfactory state of health of Ukrainian youth. Statistical data point at trend to worsening of pupils' and students' health and physical condition with their growing and continuing education [10].

According to results of medical examinations in SumSU quantity of first year students – members of special health group and released from physical education classes is constantly growing (see table 1).

Table 1

Health condition of first year students of SumSU (as per data of medical examinations)

Years of medical examination	Main health group		Special health group		Released from physical culture classes	
	n	%	n	%	n	%
2011	2312	85.3	231	8.5	165	6.2
2012	2120	88.3	193	8.0	87	3.7
2013	1917	77.5	327	13.3	174	9.2

In table we can see that recent years quantity of such students has been within limits from 11.7% to 22.5%. It should be noted that membership of students in main health does not guarantee "safe zone" of their health.

It is also known that exactly level of individual somatic health conditions safe zone of motion intensity while fulfilling physical exercises and is a criterion of effectiveness of such trainings.

Level of somatic (physical) health was estimated by the following indicators: body mass index, vital, power index, Robinson's index, time of heart beats rate restoration (HBR) after 20 squatting during 30 seconds (see tables 2, 3).

Table 2

Indicators of somatic health of first years, technical specialties' students

Indicators	Statistic indicators			
	Boys (n=132)		Girls (n=132)	
	$\overline{X}$	m	$\overline{X}$	m
Body mass index, kg/m^2	21.42	0.21	21.38	0.26
Vital index, ml/kg	59.96	0.69	51.88	0.68
Power index, %	60.80	1.07	43.43	0.71
Robinson's index, conv.un.	88.60	0.99	87.65	1.09
Time of HBR restoration during test of Martine-Kushelevskiy, sec.	149.52	3.69	161.07	3.49

Determination of correspondence of body mass and height indicators witnessed that mean of body mass index of students was within standard: boys – 21.42 kg/m^2, girls – 21.38 kg/m^2 (standard 18.6–24.9 kg/m^2). Though individual analysis of results showed that 11.36% of students have deficit of body mass and 3.79% - excessive weight, though for girl students these indicators correspond accordingly to 14.39% and 10.61%. One boy and two girls from total quantity of the tested had obesity of first stage. High indicator of body mass index is connected with increased risk of cardio-vascular diseases and diabetes [14].

Vital index is an important criterion of external breathing functions' reserve and is determined by relation of VCL indicator to body mass. Mean value of vital index is within age standard [11], but 46 students (34.9%) and 44 girl students (33.3%) from total quantity of the tested has this indicator below standard.

Analysis of power index (relation of stronger hand's dynamometry to body mass) showed level of development of muscular system of boys at minimum of low and below middle, while concerning girls this mean value is below middle.

Robinson's index ("double result" in rest) is indicator of reserve and saving character of cardio-vascular system's functioning. Mean value of Robinson's index is 88.4 conv.un. (boys) and 87.65 conv,un.(girls), pointing at middle level of this indicator.

Results of HBR restoration up to initial value after dozed loads (20 squatting for 30 seconds) are given in table 3.

Table 3

HBR restoration for time of fulfillment Martne-Kushelevskiy's test

Time periods of restoration	Boys (n=132)		Girls (n=132)	
	n	%	n	%
Up to 59 sec.	2	1.52	1	0.76
From 1 to 1 min. 30 sec.	8	6.06	4	3.03
From 1 min. 30 sec. to 2 min.	51	38.64	37	28.03
From 2 min. to 3 min.	43	32.58	49	37.12
More than 3 min.	28	21.21	41	31.06

Results of our researches witness that in boys restoration processes go quicker than in girls. More than 60% of the tested students have reduced level of functional potentials of cardio-vascular system. High and above middle level was registered only in 5.68% of cases from total quantity of students.

Summarizing points for every indicator we received somatic health index, mean value of which (boys) was 3.33±0.33 points that corresponds to level at nearly low and below middle; for girls this value is 2.95±0.31points that corresponds to low level.

Graphic picture of student's distribution by level of somatic health is given in fig. 1. Levels low and below middle belong to 78.8 % of students and 81.8% of girl students. Only 19.7% of boys and 18.2% of girls have middle level of somatic health. From all quantity of the tested only 2 boys had level higher than middle. G.L. Apanasenko determined that safe level of somatic (physical) health starts at border of middle and above middle levels (by 12 points express methodic) and that is why practically all students are in zone of risk of somatic diseases.

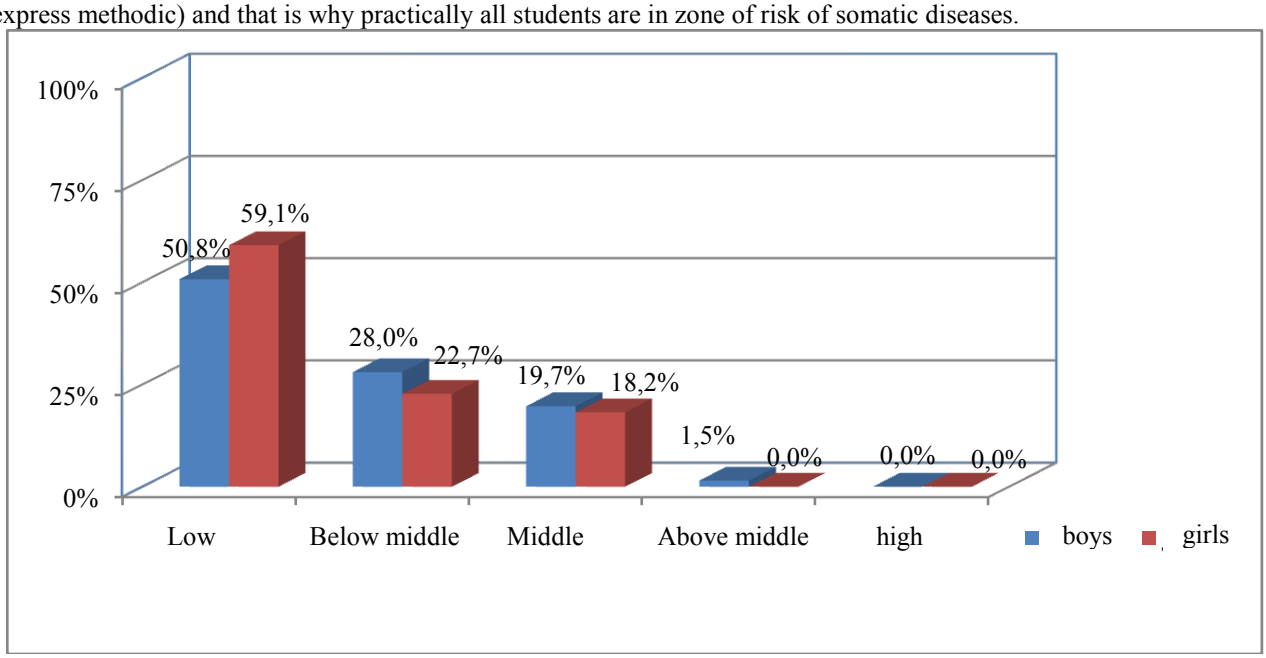

Fig.1. Distribution of first year technical specialties' students by levels of somatic health

Information about students' physical fitness is very important for optimal regulation of physical load in process of physical education. Physical fitness is result of physical functioning of a person, his (her) integral indicator as far as with fulfillment of physical exercises practically all organs and systems of organism interact; thus the level of their functioning increases [11].

Physical fitness was estimated by levels of development of the following qualitative characteristics: general endurance – 3000 meters' run (for boys) and 1000 meters' run (for girls); maximal strength – static hand dynamometry and long jump from the spot (explosive strength); power endurance – hanging on horizontal bar (endurance of arms' muscles) and rising of torso from lying position during 30 seconds (endurance of torso muscles); quickness – cross movements of arms, 100 meters run; dexterity – "shuttle" run 10x5 meters; flexibility – torso forward bending from sitting position; balance – standing on one leg – "Flamingo").

In table 4 we present mean indicators of development of first year technical specialties' students' physical skills.

Table 4

Indicators of physical fitness of 1st year technical specialties' students of SumDU

Physical skills and tests for their evaluation	Statistic indicators ($\overline{X} \pm m$)	
	Boys (n=132)	Girls (n=132)
General endurance 3000 meters run, sec. (boys)	850.79±4,60	-
1000 meters run, sec., (girls)	-	328.90±3.11
Maximal strength Hand dynamometry, kg	40.97±0.65	25.12±0.38
Long jump from the spot, cm	226.17±1.75	166.41±1.20
Quickness 100 meters run, sec.	14.52±0,.10	17.47±0.11
Time of upper limbs' movement, sec.	12.34±0.16	12.91±0.11
Dexterity Shuttle run 10x5 meters, sec.	17.93±0.18	20.19±0.16
Flexibility Torso forward bending from sitting position, cm.	9.27±0.55	15.70±0.54
Power endurance Hanging on horizontal bar, sec.	24.62±1.15	7.73±0.62
Rising of torso from lying position for 30 sec., times	23.00±0.42	20.83±0.33
Balance Test "Flamingo", sec.	6.86±0.28	7.33±0.31

Comparing received results with evaluation tables we come to conclusion that level of certain physical skill is at below middle and middle levels that corresponds to 2-3 points by 5 points system (see fig.2). Boys have relatively higher indicator of long jump from the spot, characterizing explosive strength of legs (mean mark – 3.7), while girls have best of all developed flexibility (torso forward bending from sitting position) – middle mark – 3.39.

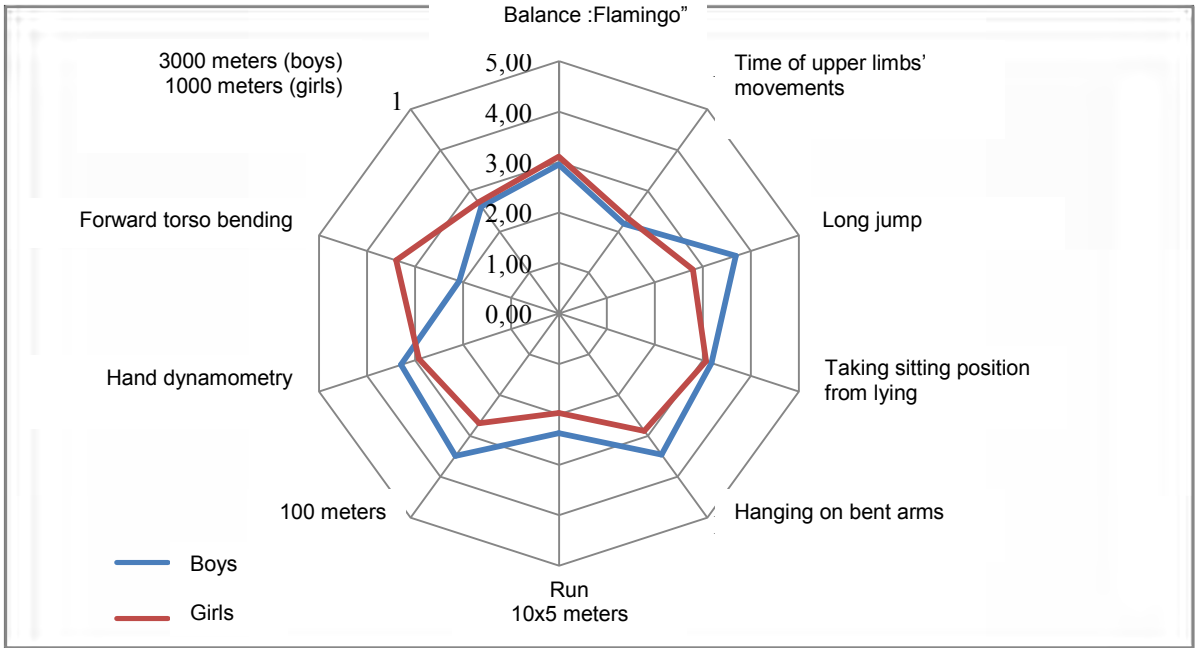

Fig.2. Mean marks in points for every motion test

By results of all motion tests we determined students' physical fitness. Mean value of general quantity of points, taken in all motion tests was 29.3 for boys and by 1.5 points less for girls that corresponds to middle level of physical fitness, i.e. mark "satisfactory". Individual analysis of students' physical fitness is given in fig. 3.

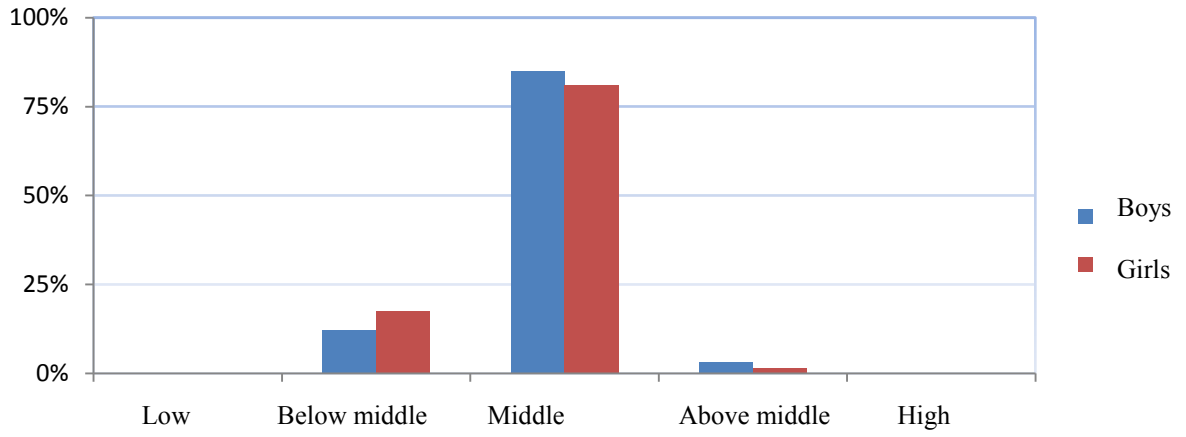

Fig. 3. Distribution of 1st year technical specialties' students of SumDU by levels of physical fitness

84.8% of boys and 81.1% of girls have middle level of physical fitness. Level below middle was registered I 12.1% of students and 17.4% of girl students. Only 6 persons from general quantity of the tested had level of physical fitness above middle.

Conclusions

Results of the research prove trend to worsening of students' health that is reflected in increasing of first year students – members of special health groups or released from physical culture classes from 11.7% to 22.5%. We determined that level of somatic health of 1st year students is mainly at low and below middle levels (78.8 % of boys and 81.8% of girls). From general quantity of the tested contingent middle level was reached by 18.9% of students; level above middle – by 1.5%.

Besides, as a result of research we found that 83% of students have middle level of physical fitness that corresponds to "satisfactory" mark. Level above middle was registered only in 2.3% of the tested.

Unsatisfactory state of the above mentioned indicators requires working out of new programs, which would ensure both health related and professionally applied orientation of physical education process at higher educational establishments.

The prospects of further researches: it is stipulated to test effectiveness of physical education program of training circle "Sport orientation" by indicators of somatic health, psycho-physiological and physical fitness of technical specialties' students.

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JUSTIFICATION FOR EXPERIMENTAL METHODS FOR CIRCUIT TRAINING AEROBICS CLASSES FIRST MATURE AGE WOMEN

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Annotation. *Purpose:* develop and validate a methodology for circuit training aerobics. Methodology focused on improving physical health first mature age women. *Material*: a study was conducted with 81 women (age 21 - 35 years). *Results*: justified the means and methods of circuit training, the duration of the structural components, the rational parameters of physical activity, pulse modes. Depending on the physical health of women developed a set of circuit training for the main part of the session. Complex circuit training consists of 2 series, active rest interval between 3 minutes. Duration of employment in one series of 23 minutes. Exercises are performed at 5 locations: 3 - aerobic (3x5 min), 2 - power (2x4 min). The total duration of training - 49 minutes. The intensity of the training load is regulated by the level of physical health and the maximum test results. *Conclusions*: The positive changes morphofunctional indicators show an increase in the body's bioenergy and women transition to a higher level of physical health.
Keywords: women, health, aerobics, method, training.

Introduction

Preservation of health as important part of human capital is one of factors, basing on which they determine compatibility of state at international level. On all stages of human development there must be realized three groups of opportunities: long and healthy life span, acquirement of knowledge and access to resources for maintaining of healthy life style [31].

Motion functioning is an integral component of healthy life style. It is well known [27] that existing close connection between motion functioning and high level of health witnesses that immobile life style facilitates worsening of health of most of people. Only regular and systemic motion functioning in human life style ensures significant rising health level.

It was noted [29] that among different kinds of motion functioning especially expressive is field of health related physical culture, which includes not only the process of health improvement owing to systemic targeted trainings but also solution of closely connected with them problems: eating, psychic regulation, formation individual life style, cultivation of active social position and so on.

One of main tasks for scientists and practitioners, who work in field of health related physical culture is correct selection of means and methods of motion skills' training, owing to which morphological functional condition and physical fitness of trainees would improve [35].

Successful solution of this task is possible in the process of circuit health related physical culture trainings. L.P. Matveyev noted [14, pg. 378] that "detail development of "circuit training" method resulted in spreading of a number of its variants, designed for training of general endurance, connected with complex manifestation of different motion skills (including power and speed) in frames of combined motion functioning".

Results of numerous researches prove effectiveness of circuit training; point at popularity of its usage in practically all forms of physical culture, on all stages of human ontogeny [30, 32-36].

Against the background of various information about different variants of aerobics, main part of which contains alternating of aerobic and power exercises in definite periods of time, there are practically no scientifically grounded recommendations for effective application of circuit training at aerobic trainings. Till present time problems of selection of means and methods, duration of structural components, rational parameters of physical loads and pulse modes according to physical condition of trainees have not been solved completely [13].

The above rendered material determines urgency of development and scientific foundation of circuit training method at training of first mature women, considering their physical health level (LPH).

The researches have been fulfilled in compliance with combined plan of scientific & research work in sphere of physical culture and sports for 2006-2010 of Ministry of youth and sports of Ukraine in the frames of topic 3.1.5 "Theoretical-methodic and applied principles of physical education in higher educational establishments of Ukraine", state registration number 01006U011725.

Purpose, tasks of the work, material and methods

The purpose of the research is to develop and scientifically ground methodic of circuit training at aerobic trainings, oriented on rising of LPH of first maturity women. The researches were carried out on base of physical education department of State higher educational establishment "National mine university" (Dniepropietrovsk) and covered 81 women of 21-35 years old age.

The tasks of the research: to develop methodic of circuit training for aerobic trainings of first maturity women and to determine its effectiveness, basing on dynamic of physical health indicators.

The methods of the research: analysis and generalization of scientific-methodic literature; pedagogic experiment; methods of express evaluation of LPH [8]; methods of mathematical statistics.

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Results of the researches

Specificity of tasks, organizational forms, means and methods of physical education of different population strata is conditioned both by age peculiarities and by social factors [http://www.vospityvatm.ru – Education of children/ physical education of adults.].

Every age period is characterized by certain changes in organism. Age of first maturity is characterized by the highest indicators of physical workability and fitness, by optimal adaptation to unfavorable environmental factors, by less indicators of morbidity [10]. For women this stage is in the range of from 21 to 35 years.

Mature women play important role in modern society, fulfilling a lot of socially significant functions (industrial, social, political, family, reproductive, educational and other). With it one of decisive condition of effectiveness of these functions' realization is high general workability, basing on sound somatic and mental health of women [6, 20].

In this connection physical education process for mature persons shall solve the most important tasks – strengthening and preservation of health, maintaining of optimal vital activity and high workability.

Among different kinds of motion functioning health related physical culture is especially distinguished with its main target – increasing of organism's functional state and rising of physical workability [29].

With planning and organization of health related training of women the authors [26] specify the following principles:

- Orientation of health related training on development of general endurance (owing to ensuring of aerobic energy supply processes);
- Limitation of speed power exercises in health related training, that is conditioned by less capacity of anaerobic energy supply mechanisms;
- Practicing of power exercises for correction of body mass, considering state of pelvis floor (possible prolapse of pelvic floor with increasing of intra-abdominal pressure).

Basing on results of own resulting experiment [13] and following the above rendered principles the authors oriented experimental methodic of circuit training at trainings of first mature women on increasing of trainees' physical condition and realization of the following tasks:

1. Facilitating of body composition owing to reduction of fat percentage in body.
2. Facilitating of cardio-vascular and respiratory systems' condition.
3. Improvement of physical workability.
4. Increasing of strength, improvement of backbone flexibility and mobility.

Physical endurance is rather important for optimization of human life functioning and health; it permits to fulfill significant motion activity for long period of time and keep high level of its intensity; it permits to restore forces after significant loads [9]. The most important kinds of endurance are general endurance and power endurance [28].

For example, general endurance is closely connected with development and functioning of cardio-vascular and respiratory systems and, therefore, with aerobic potentials of organism [26], because most of motion functions in domestic and working conditions go, mainly in aerobic mode [28].

Basic abilities, which determine the level of power endurance, are power, capacity and saving potential of energy supply systems [17], as well as inter-muscular and intra-muscular coordination, ability to concentrate muscular forces. In this connection methodic of its development is based, mainly, on laws of development of general endurance [9].

It was noted [14] that in practice of physical education the most often are training with complex content and that is why they include a number of different kinds of motion functioning..

The most frequent kind of general endurance's training is circuit training ("circuit" is absolutely conventional name), facilitating complex influence of its main factors.

Training means are physical exercises and complexes of them, which are characterized by the following features:

- Active functioning of most or all large links of supporting motor system;
- Mainly aerobic energy supply of muscular work;
- Comparatively significant total duration of work (from several minutes to several dozens of minutes);
- Moderate, high and alternate intensity (consequently analogous power) of work.

These distinctive features belong to movements of health related aerobics, which involve large muscles of lower limbs in work (quadriceps of thigh, gluteus, most adductors, poluchila muscle, paliperidonesee muscle and biceps), influencing positively on cardio-vascular and respiratory systems of organism [4, 12]. Aerobic is a system of physical exercises, energy supply of which is ensured by consuming of oxygen [Kravitz L. Aerobics vs. Resistance Training Is This the Battle of the Fitness Titans [Electronic resource] / Kravits L. –Access: http://www.drlenkravitz.com/Articles/aerobicresistanc.html].

Optimal structural components of health related aerobic trainings, as well as any other organized form of physical training, are three parts: warming up, main and final [3]. With it, structure, content and duration both od separate parts and the training in the whole can be of different variants depending on tasks, targets and kind of aerobic, while type of training influences greatly [4].

The structure of aerobic complex training, oriented on development of strength and endurance, changes, but with preservation of its main parts.

Warming up part does not depend critically on how many tasks shall be solved within one training. But in main part of complex aerobic training there shall be marked out two main components, following, as a rule, in sequence: aerobic training – the power one.

However, it was noted [11] that specialists were arguing which order of main part was the most effective: "aerobic part → power part" or "power part → aerobic part".

"Distribution of power exercises is determined to large extent by wish to fulfill the most valuable attempts against the background of optimal, "fresh" state of central nervous system. With it creation and perfection of nervous-coordination relations are the most effective that ensures increment of muscular strength. If power exercises were fulfilled when a sportsmen was tired after previous work, nervous system's excitability will be reduced and conditional-reflexive functioning will be less successful, increment of strength will be slowed. Power exercises are the most effective, if they are practiced at the beginning of main part of training" [5, pg.62].

We offer to combine power and aerobic exercises in first half of main part, i.e. apply circuit training, oriented on complex training of general and power endurance in dozed periods of time.

Owing to combination of aerobic and power loads in the first half of main part, in the second half exercises are fulfilled only in parterre (on mat) and quantity of time for final stretching increases.

Also it should be noted that there are variants of circuit training, in which there are strictly oriented physical exercises, combined in one motion functioning and conjugated with significant total scope of loads. It permits to effectively influence on main factors of general endurance of complex character. In the same way flow-type (without pauses or with pauses of active rest) complexes of gymnastic aerobic exercises or aqua-aerobic exercises are fulfilled [14].

Therefore, circuit aerobic training is an organizational-methodic form of training with structural components of - alternating aerobic and power fragments.

Analysis of scientific-methodic literature [30] shows that information about structure, content and duration of aerobic and power components is not complete.

As a result of generalization of above presented material we worked out complex of circuit training (see table 1), which shall be realized in main part of aerobic training.

Table 1

Methodic characteristic of worked out complex of circuit aerobic training of first mature women

<table>
<tr><td colspan="4">Circuit training as durable continuous exercise</td></tr>
<tr><td>Structural components</td><td colspan="2">Aerobic "station"</td><td>Power "station"</td></tr>
<tr><td>Means</td><td colspan="2">Aerobic exercises</td><td>Static-dynamic exercises</td></tr>
<tr><td>Main training influence</td><td colspan="2">Cardio-vascular and respiratory systems</td><td>Muscular system</td></tr>
<tr><td rowspan="4">Intensity of physical load</td><td>40-50% MOC</td><td>Low LPH</td><td rowspan="2">25-40% MTL</td></tr>
<tr><td>45-50% MOC</td><td>LPH below middle</td></tr>
<tr><td>50-60% MOC</td><td>Middle LPH</td><td>40-50% MTL</td></tr>
<tr><td>60-75% MOC</td><td>High and above high LPH</td><td>50-60% MTL</td></tr>
<tr><td rowspan="2">Quantity of "stations" in one circle</td><td colspan="3">5</td></tr>
<tr><td colspan="2">3</td><td>2</td></tr>
<tr><td>Duration of work in one "station"</td><td colspan="2">5 min</td><td>4 min</td></tr>
<tr><td>Quantity of circles</td><td colspan="3">2</td></tr>
<tr><td>Duration of one circle</td><td colspan="3">23 min</td></tr>
<tr><td>Rest between circles</td><td colspan="3">3 min</td></tr>
</table>

Notes: % MTL training load, measured in percents from maximal result; %MOC – maximal oxygen consumption.

Circuit training at aerobic trainings is characterized by fulfillment of work as durable continuous exercise – with relatively constant intensity, moderate and high power, in "flow" manner, repeatedly and without strictly determined rest pauses after changing of kind of functioning. As far as pauses are short load can be regarded as continuous.

In the process of working out of circuit training complex and for grounded choice of physical load's intensity we based on the following:

– Physiological responses of organism and their after effects, which can appear in the course of training – orthostatic effect (collapse) and pressure effect [23];

– Physiological characteristics of aerobic exercises [22] and pulse modes of training of cardio-vascular system [http://www.zdorove.ru –medical site about health.];

– Gradation of physical exercises depending on volume of muscular groups, participating in work [9, 24, 28, 29];

– Dozing of intensity, scope and multiplicity of health related training, considering LPH [2, 26];

– Optimal level of intensity for stimulation of cardio-vascular and respiratory systems, created for persons with low LPH at loads with intensity of 40-50% MOC, with LPH below middle – 45-50% MOC, middle LPH - 50-60% MOC, with high and above high LPH – 60-75% MOC [10].

Aerobic "station" of circuit aerobic training is fulfillment of exactly aerobic exercises, in which not less than 2/3 of muscular mass of body participate. Time of fulfillment of exercises at every aerobic "station" of circuit training is 5 minutes. According to chronology of energetic spectrum in the process of cardio-vascular and respiratory systems' development fulfillment of physical exercises from 3 minutes to several hours corresponds to state of even oxygen consumption [18].

Power "station" of circuit aerobic training is fulfillment of complex of static-dynamic exercises oriented on development and improvement of power endurance.

Methodic of power "stations" is based on some principles of power exercises' application with health related purpose [21]:

– The lower is initial fitness of trainees the less quantity of muscles shall be involved in every exercise;

– Muscles tensions shall be within 30-60% from maximal arbitrary force. Mode of work shall be static-dynamic, i.e. without relaxation of muscles during all attempt. It shall be achieved owing to slow speed of exercises' fulfillment, amplitude and constant tension of muscles;

– Exercises shall be fulfilled in not maximal muscles efforts' manner – by multiple overcoming of not maximal external resistance up to significant tiredness;

– Exercises shall be fulfilled in non-stop manner, i.e. without rest pauses. In case of "flow" method pause between exercises shall be filled with stretching.

– In most cases it is recommended to combine exercises in "super series", which shall be used in two variants: 1) alternating of two-three attempts for two muscular groups; 2) changing initial position or exercise itself, repeated loading of the same muscular groups.

Training load is expressed in percents from maximal result (%MTL) [16]: 25-40 %MTL for persons with low and below level LPH, 40-50% MTL – with middle LPH and 50-60% MTL for persons with high and above high LPH. Load is in range of moderate and high power and is mainly of aerobic or combined aerobic-anaerobic character.

Time for exercises of power "station" is about 4 minutes. The data witness [18] that for power exercises of moderate intensity (3-4 points by Berg's scale) with duration of more than 3 minutes energetic substrate are: fats, muscular glycogen and glucose of blood. That is the existing oxidizing processes, in the base of which there is organism's ability to absorb and utilize oxygen, point at aerobic mechanism of energy generation for durable work.

The worked out complex of circuit aerobic training consists of 2 "circles" with active rest interval between them of 3 minutes [28]. It was noted [17] that compensator work is very important as rehabilitation mean, videlicet: exercises of not high intensity (substantially lower than threshold of anaerobic metabolism, 30-50% MOC). Duration of one "circle" is 23 minutes (fulfillment of exercises in 5 "stations"): 3 aerobic "stations" (3x5 min.) and 2 power "stations" (2x4 min.). Total duration of complex is 49 minutes.

From above said it is followed that circuit training with justified duration of its structural components and intensity of training loads adequate to level of physical health, adaptation potentials of trainees, can render positive influence on level of physical health of first maturity women.

For determination of effectiveness of the worked out methodic we carried out comparative analysis of indicators of morphological functional indices of physical health express-evaluation [8] of experimental group (EG) and control group (CG) women before and after experiment (see table 2).

In the process of analysis of the received results we registered substantial changes in mean statistic values of morphological functional indices: mass-height index reduced by 4.63% ($\alpha_I \leq 0.05$), power index increased 16.00% ($\alpha_I \leq 0.001$), index "double product" reduced by 14.86% ($\alpha_I \leq 0.001$), index PWC_{170} increased by 15.54% ($\alpha_I \leq 0.001$) and Rufiet's index decreased by 43.59% ($\alpha_I \leq 0.001$).

Table 2

Indicators of physical health of EG and CG women before and after pedagogic experiment

Group	Statistic characteristics of EG (n=36) and CG (n=45)						
	Before experiment ($\bar{x} \pm \sigma$)	After experiment ($\bar{x} \pm \sigma$)	t_1	α_1	Difference%	t_2	α_2
Mass/height index, g/cm							
EG	350.02±37.28	333.80±30.65	2.02	≤0.05	4.63	0.05	≥0.05
CG	345.83±39.31	334.13±35.11	1.49	≥0.05	3.38		
Power index, %							
EG	77.11±11.14	82.49±11.28	4.31	≤0,.01	16.00	2.28	≤0.01
CG	72.35±10.60	76.81±10.98	1.96	≥0.05	6,.6		
Double product, conv.un.							
EG	89.45±17.16	76.16±9.84	4.03	≤0.001	14.86	4.14	≤0.001
CG	94.74±16.54	85.02±9.29	3.64	≤0.001	10.62		
PWC_{170}, W/kg							
EG	2.51±0.36	2.90±0.32	4.88	≤0.001	15.54	1.54	≥0.05
CG	2.58±0.39	2.78±0.39	2.45	≤0.01	7,.5		
Rufiet's index, conv.un.							
EG	13.58±5.16	7.66±2.98	5.96	≤0.001	43.59	2.60	≤0.01
CG	13.41±4.23	9.55±3.56	4.68	≤0.001	28.78		
Level of physical health, points							
EG	11.94±3.67	16.72±3.00	6.05	≤0.001	40.03	3.39	≤0.01
CG	11.29±4.30	14.27±3.51	3.60	≤0.001	26.40		

In control group positive changes were registered in reduction of mass-height index by 3.38% ($\alpha_1 \geq 0.05$), "double product" index – by 10.62% ($\alpha_1 \leq 0.01$) and Rufiet's index – by 28.78% ($\alpha_1 \leq 0.001$) as well as in increment of power index by 6.16% ($\alpha_1 \geq 0.05$) and PWC_{170} index – by 7.75% ($\alpha_1 \leq 0.01$).

The registered positive changes of morphological-functional indicators after pedagogic experiment witness firmly about increasing of organism's bio-energetic resources and, thus, about transition of first mature women to higher level of physical health (see table 3).

Table 3

Distribution of women by level of physical health before and after pedagogic experiment (%)

Group		Level of physical health				
		High	Above high	Middle	Below middle	Low
EG (n=36)	Before	2.78	19.44	58.33	13.89	5.56
	after	33.33	50.00	13.89	2.78	-
CG (n=45)	Before	4.44	20.00	33.33	35.56	6.67
	after	15.56	33.33	37.78	13.33	-

In the process of comparative analysis of express-evaluation's results we determined great number of EG persons - 83,33% (n=30), who were at "safe" level of health (before experiment – 22.22% (n=8)), were "endogeneous risk factors, manifested forms of chronic not-catching diseases practically were not registered as well as risk of death because of them" [1, pg.38].

Quantity jf women with low LPH decreased from 58.33% (n=21) to 13.89% (n=5) and with level below middle – from 13.89% (n=5) to 2.78% (n=1). Persons with low LPH were not registered at the end of pedagogic experiment (up to – 5.56% (n=2)).

On the base of mean mark of physical health level we can conclude that EG members increased LPH as a result of pedagogic experiment.

It means that the purpose of our research has been achieved: the worked out methodic of circuit aerobic training facilitates increasing of first maturity women's physical health.

Conclusions:

1. The fulfilled researches resulted in foundation of means and methods of circuit aerobic training of first maturity women, duration of its structural components, rational parameters of physical loads and pulse modes according to physical health level of trainees.
2. Circuit aerobic training is characterized by fulfillment of work as a continuous durable exercise with relatively constant intensity, moderate and high power, in "flow" manner, repeatedly and without strictly determined rest pauses between different kinds of motion functioning. Intensity of training load for circuit training's components was determined by level of physical health and results of maximal test.
3. Results of pedagogic experiment revealed positive influence of worked out by us methodic of circuit aerobic training of first maturity women, considering their physical health level and differentiation of loads. It permits to recommend it for implementation in practice of health related physical culture. Effectiveness of experimental methodic is proved by increasing of physical health level of trainees.

The prospects of further researches are studying of effectiveness of circuit training's application at aerobic trainings for second maturity women.

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GENDER ASPECTS OF FORMATION OF VALUE POTENTIAL OF STUDENTS' PHYSICAL TRAINING

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Annotation. *Purpose:* study of gender peculiarities of formation of valuable orientations of students in physical education and sport. *Material:* in research students of 3 - 11 classes of secondary schools (419), with which the survey was conducted, were involved. *Results*: the absence of students' understanding of the necessity of motor activity to human health. Also development of adolescents values of physical culture and sports. Showing psychosocial characteristics to form a stable interest in the physical self. It was found that 15% of girls wish to play hockey on grass, athletic gymnastics, football and boxing. *Conclusions:* for the formation of valuable orientations of physical culture among students it is necessary to consider not only the physiological, morphological and psychological aspects, but also gender peculiarities of personality.
Keywords: gender, physical, culture, student, value, sports.

Introduction

Recent time gender problem has been becoming more expressive in different kinds of science. Certain progress has been achieved in field of physical culture. In theory of physical culture, like in no other humanitarian discipline, natural basis of gender distinctions are considered and corporeality is one of the most important manifestations of human potential. It permits to form new information field, connected with development of category "gender" on material of physical culture [3].

Gender is formed in the process of personality's socialization and includes psychological, social and cultural distinctions between men and women [2]. Gender approach, as genderologists mark, overcomes the most fundamental opposition – opposition of biological sexes, which is connected in social, political, economical, cultural and all other spheres of human life [16]. To day, as never before, question of gender approach's realization in pupils' physical education has become especially acute. This realization goes in two directions: one of them – is higher educational establishments, the second – comprehensive schools, lyceums, gymnasiums, establishments of primary and secondary vocational training [16]. Implementation of gender approach in physical education of schoolchildren, - is organization of physical education, considering sex identity, peculiarities of children's development in process of sex-role socialization [13]. Unfortunately, there have not been yet methodic recommendations for schools' teachers on differentiated physical education of girls and boys [16]. In our opinion development of gender approach conception, oriented on formation of schoolchildren's physical culture in process of physical education, is urgently required.

Purpose, tasks of the work, material and methods

The purpose of the research is studying of gender characteristics of schoolchildren's value orientations in sphere of physical culture; factors, influencing on formation of physical culture of a personality in process of physical education of schoolchildren.

Results of the researches

For solution of our tasks we carried out questioning of respondents. In the research schoolchildren of 5^{th} – 11^{th} forms, who practice certain kinds of sports (swimming, basketball, volleyball, gymnastic, wrestling, thae-quan do) participated as well as schoolchildren, who do not practice any sports.

For determination of gender distinctions in motivation of physical culture lessons' attendance, schoolchildren of different age categories were asked question: "For what purpose did you attend physical culture lessons?" Most of schoolchildren, defining motives, did not limit themselves with one answer and chose two or three variants of answers. Questioning results showed that boys of 5^{th}, 6^{th} and 7^{th} forms (10-12 years old) practically had no understanding of what influence is rendered on organism by physical exercises (see table 1). Only 20% of 5 form pupils, 13% of 6^{th}, and 26% of 7^{th} form pupils chose answer "I know that it is useful". The most popular answer, for boys of this age, was "For receiving credit in physical education", and "Not to have debt in physical culture". Boys of 9^{th} and 10^{th} forms chose answers: "For receiving of credit in physical culture", "I know that it is useful", "To raise physical fitness". These answers were given by boys, who study in usual schools and do not practice sports. But in their schools there are special sport classes. And may be example of these classes' pupils was a motivating, positive factor, which influenced on wish to have sport constitution and skills in some kind of sport.

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Table 1

Motives of physical culture lessons' attendance by schoolchildren of different age categories (boys) (%)

	5 form	6 form	7 form	8 form	9 form	10 form	11 form
I know that it is useful	20	13	26.6	40.9	50	33.3	44
For credit	60	39.1	53.3	40.9	34.2	33,3	60
Trainings are interesting	0	17.3	6.6	16.3	21	8.38	20
Training of will	0	13	20	9	7.8	0	12
To receive consultation	0	4.3	0	0	5.2	0	0
To raise physical fitness	26.6	26	13.3	27	28.9	50	20
To avoid debts	13.3	34.7	40	22.7	18.4	25	36
To learn new exercises	0	13	13.3	4.5	10.5	8.3	0
To relax mind after mental activity	20	13	20	9	5,2	8.3	16
To increase motion activity	26.4	21.7	20	27.2	15.7	25	36

Analyzing motives of physical culture lessons' attendance by girls we received the following answers: 47% of 6th form girls, 50% - of 7th form в 57% - of 9th form 46% of 10th form and 46.6% of girls-school-leavers chose answer "To avoid debts in physical culture" and "To receive credit". Choosing motive of lessons' attendance boys and girls gave similar answers, in spite of their studying in different classes. But in choosing of other motives their answers do not coincide (see table 2).

For girls the most popular was the following answer: "To raise motion activity". This motive was chosen by 57.1% - of 5th form girls, 58.3% - of 7thy form girls, by 38.4% - of 9th form and by 40% - of 10th form girls that is by 20% higher than boys' answers. Answer "Trainings are interesting" was also chosen by 205 more than by boys. If to group motives of lessons' attendance , than we obtain that 35% of girls attend physical culture lessons with health related and recreational purposes, that is by 10% more than boys.

Table 2

Motives of physical culture lessons' attendance by schoolchildren of different age categories (girls) (%)

	5 form	6 form	7 form	8 form	9 form	10 form	11 form
I know that it is useful	57.1	5.8	58.3	38.1	38.4	40	33.3
For credit	32	35.2	50	47.6	34.6	33.3	46.6
Trainings are interesting	21.4	23.5	16.6	19	34.6	33.3	26.6
Training of will	14.2	29.4	8.3	0	3.8	13.3	3.3
To receive consultation	7.1	17.6	8.3	4.7	3.8	0	0
To raise physical fitness	25	35.9	33.3	0	15.3	20	23.3
To avoid debts	18.2	47	8.3	57.1	11.5	46.6	13.3
To learn new exercises	21	17.6	0	14.2	11.5	13.3	3.3
To relax mind after mental activity	7.1	29.4	16.6	28.5	7.6	26.6	30
To increase motion activity	46.4	35.2	25	28.5	11.5	46.6	4

The next in questionnaire was question "Is it possible to achieve high physical fitness, only attending physical culture lessons?" (see table 3). Having analyzed respondents' answers we can conclude that majority of pupils, independent on sex and age, (65-70% of pupils), think that for achievement of high level of physical fitness physical culture lessons are insufficient. If consider separately answers of boys, practicing sports, than 100% of girls and boys gave negative answer to this question. And concerning motives of physical culture lessons' attendance the most frequent was answer "Relaxing of mind after mental work".

The received data witness, first of all, about absence of pupils' (majority of them) understanding of importance of motion functioning for health, secondly, about absence of teenagers' values of physical culture and sports. In this connection we can make conclusion that it is necessary to seek new approaches to physical education for formation of physical culture values, one of which gender approach can be, which could consider physiological, morphological-functional and psychological characteristics of different sex pupils.

Table 3

Pupils attitude to physical culture lessons, %

Form	Quantity of pupils in a form	Variant of answer	
		yes	no
5	Boys n=15	6.67%	93.33%
	Girls n=28	42.86%	57.14%
6	Boys n=23	4.35%	91.30%
	Girls n=17	41.18%	58.82%
7	Boys n=15	60.00%	40.00%
	Girls n=12	66.67%	33.33%
8	Boys n=22	22.73%	77.27%
	Girls n=21	52.38%	42.86%
9	Boys n=38	52.63%	44.74%
	Girls n=26	57.69%	38.46%
10	Boys n=12	0.00%	100.00%
	Girls n=15	26.67%	66.67%
11	Boys n=25	16.00%	80.00%
	Girls n=30	16.67%	83.33%

The question "Do you practice any kind of sports?" we received the following answers (see fig.1).

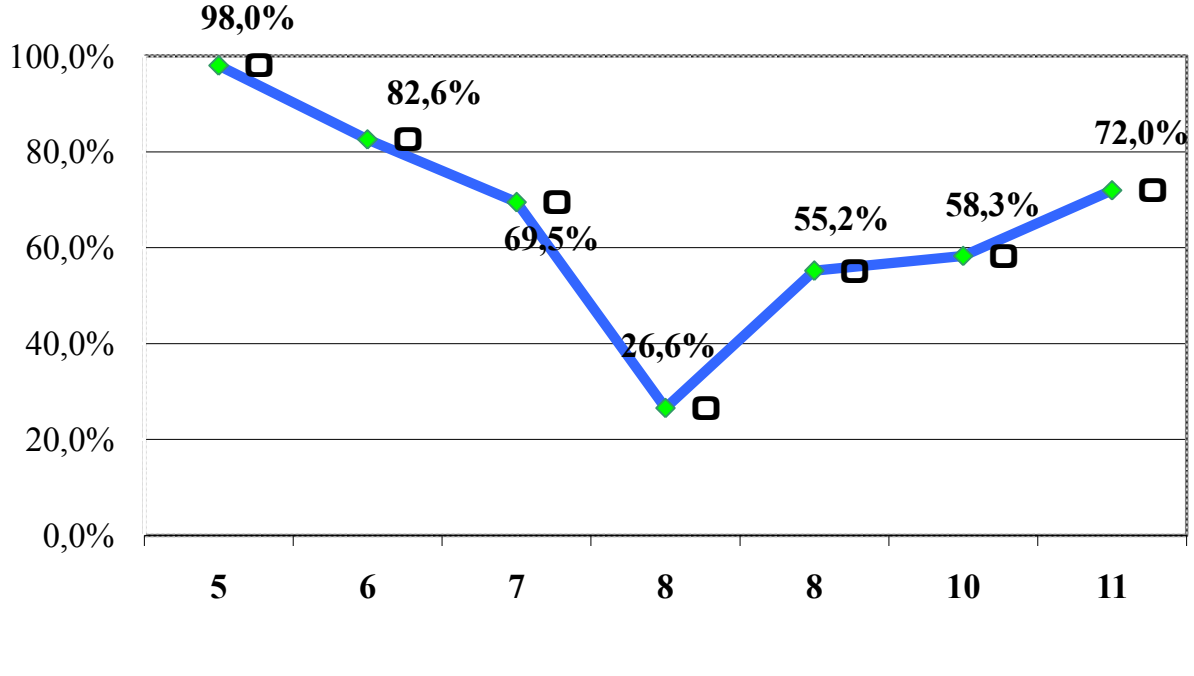

Fig.1 Questioning results (boys)

Practically all boys of 5th form gave positive answer. These are such kinds of sports like football, basketball, swimming, wrestling (see fig.1). In 6th form already 82.6% of boys practice sports. Football is on the first place, swimming – on the second place, further basketball and wrestling go. In 7th form – 69.5% of pupils practice sports and among 8th form pupils – percentage reduces up to 26.6%. Further from 9th to 11th form we see positive dynamic – from 55% of 9th form pupils to 72% - of school-leavers. We explain it by the fact that in early youth age certain relations with surrounding world starts to form. In senior forms demand of senior pupils in self development, self perfection and self realization becomes strong. That is why, starting practicing sports or continuing them in this age, boys become

more motivated and committed, understanding purposefulness of their trainings and choosing appropriate motives of physical self-perfection.

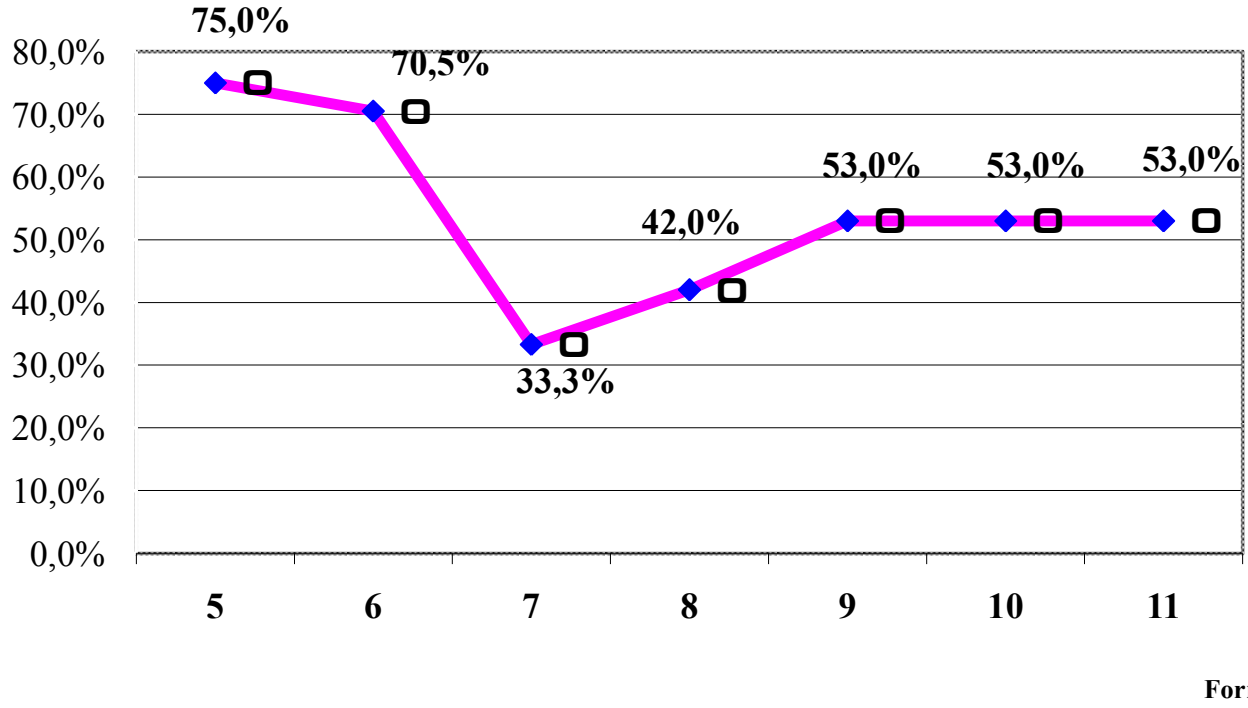

Fig2. Questioning results (girls)

Girls answered in the following way: 75% of 5th form girls practice sports in extra-curriculum time. These are such kinds of sports like swimming, volleyball and sport dances. But 25% of girls, who do not practice sports – 17% want to attend sport circles. Further situation is the same as among boys. In 6th form– 70.5% of girls practice health related sport activity, in 7th form– 33.3%. But from 8th form percentage increases up to 42%. In 11th form – 53% of girls practice sports. But in this case we speak not about sport as it is but about health related fitness.

In spite of certain positive dynamics of sports' practicing and health related activity of girls and boys, percentage of pupils who do not wish to practice sports still remains rather high. In order to understand reasons, preventing from practicing of health related physical culture functioning, we analyzed respondents' answers to the following questions: "Give reasons, which prevent you to practice sports or physical culture?" Boys put on the first place answer "Absence of health related sport groups, interesting for me", on the second – "Parents cannot pay trainings". Girls put on the first place – "Absence of free time". On the second place - "Parents cannot pay trainings". «

Analyzing problem of gender approach in education, we can say that scientists have different points of view about consideration of sex and gender peculiarities of physical education's organization. The conducted questioning revealed also the fact that about 15% of girls want to practice such kinds of sports as hockey on grass, gymnastic, football and boxing. They explain their sympathy to masculine kinds of sports by the fact that they are attractive, help to improve physical condition, prove to themselves and surrounding people that they worth something. The latter motives are definitely masculine ones and we can assume influence of psychological sex on choosing of kind of sports.

Conclusions:

Analysis of rather restricted quantity of publications devoted to gender approach to physical education of schoolchildren, concerns, mainly, consideration of biological sex in the course of trainings, at passing tests; besides, it also is considered with formation of interests, motives and demands in physical functioning. The conducted analytical search and our own researches permitted to mark out not only biological approach, based on anatomical-physiological distinctions of man's and woman's organisms in pedagogic principle of physical education's individualization, but also gender approach, connected with psychological sex. In this case we regard gender approach not from the point of view of gender policy (equal rights for men and women) but from the points of studying of their psycho-social peculiarities for creation of adequate organizational-methodic conditions in process of physical education for formation of firm interest to physical self-perfection, using, for this purpose, effective stimuli and motivators of behavior.

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PSYCHOLOGICAL AND PSYCHO-PHYSICAL TRAINING AS A PART OF PHYSICAL EDUCATION OF STUDENTS IN HIGHER EDUCATIONAL ESTABLISHMENTS

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Annotation. *Purpose:* to analyze the phenomenon of psychological and psycho-physical training as part of physical education of students. *Material:* literary sources about problem investigation. *Results:* are given and analyzed a number of factors that determine the need for higher education in the special psychological and psycho-physical preparation for professional work. The question of psychological and psycho-physical preparation of students for professional work in the structure of physical education has considered. The difference has shown in the proposed concept of "psychological and psycho-physical training" known in physical education concept of "professionally applied physical training" and "psycho-physical preparation". Psychological and psycho-physical readiness is considered in the work as a kind of substructure overall personality structure. A model of psychological and psycho-physical preparedness of the student has proposed in this work. *Conclusions:* psychological and psycho-physical preparation of students for professional work can be done in physical education. It should be considered as part of physical education students in relation to specialized psychological and psychophysical characteristics of future careers.
Key words: physical education, training, readiness, personality, students.

Introduction

Psychological and psycho-physical training is practicing in different spheres of people's functioning. For example it is actively practiced in armed forces, (especially in detachments of special purpose). There psycho-physical exercises are called those exercises, which train simultaneously psychic and organism of military officers. They are complex of actions, which shall be fulfilled in conditions of danger and are connected with significant physical and psychic loads. V.V. Yagudov [13] notes that sense and content of military officers' psychological trainings are determined by conditions of modern combat. Among them he calls: a) danger (for life of a person); b) sudden character of situation; c) deficit of time and information (contradictory information); d) enormously complicated management of troops; e) discomfort. Character of influence of the above mentioned factors determines content of military officers' psychological training. Psychological training of military officers is oriented on formation of psychic stability and psychological alertness. It is formed in process of military lessons and classes in conditions close to combat.

Home affairs board also pay great attention to psychological training. Here it is regulated by orders of ministry of home affairs (Order of Ministry of Home affair Np.1444, dt. 25.11.2003 "On organization of professional training of tankers and junior officers of home affairs departments"; Order of Ministry of Home affairs of Ukraine, dt. 28.07.2004, № 842 "On further development of service of psychological maintenance of home affair boards' service functioning"). In these documents psychological training is defined as complex of measures of psychological-pedagogic character, oriented on formation, support and development of officers' professionally important psychological skills.

Psychological training is also paid great attention in State board guard service of Ukraine and in the Ministry of Emergency situations. In theses boards it is also regulated by special orders (instructions on procedure of organization and practicing of psychological prevention work with staff of State board guard service of Ukraine. Approved by: Order of Administration of State board guard service of Ukraine, dt. 14.04.2008, № 318; Instructions on organization of psychological maintenance of rescue services. Approved by: Order of the Ministry of Emergency situations of Ukraine, dt. 23.02.2004, № 89).

Psychological training, as certain direction of work, is actively realized in sphere of sports. Theoretical solution of the problem has been greatly contributed by A.Ts. Puni, P.A. Rudyk, A.V. Rodionov, Ye.P. Ilyin, V.I. Voronova et al. Psychological training is regarded as one of kinds (sides) of sportsman's training, which has the same significance for sport perfection as other components. They mark out two kinds of sportsmen's psychological training: general psychological training and special psychological preparation for participation in future competitions. General training is regarded as comprehensive development of psychic functions and abilities of a personality, which are required for a sportsman for successful sport functioning, in process of systemic sport trainings. It is also the basis for special psychological training.

Recent time understanding of significance of psychological training has been becoming more profound in sphere of sports. There appear ideas about psychological maintenance as compulsory component of sportsmen's training. Such approach, for example is shared by V.V. Smirnova, who reasonably includes in psychological maintenance the following: general psychological training, special psychological training for certain competitions, operative psychological influencing, psychological preparation for many years' training process. As an indicator of psychological maintenance's effectiveness she offers to evaluate psychological readiness of a sportsman in the whole.

In our opinion, it is high time to set question about psychological and psycho-physical training in other spheres of human functioning. First of all it concerns its including in training of future specialists in higher educational establishments. Demand in special psychological and psycho-physical training for certain profession at higher

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educational establishments is determined by a number of factors. The first is specific influence of work on a person at present time. Fulfillment of work is not connected with sufficient motion functioning, but it is accompanied by tensed emotional state, unfavorable influence of environment and so on. Influence of these factors disturbs natural physiological adaptation and results in a number of negative for health and workability after effects. Second factor is determined by changing of place and person's functional role in modern production process. Object of specialist's labor efforts is purposeful usage of machinery and automatic systems. So responsibility of a subject for results of his work substantially increases. Modern production also sets increased requirements to such psycho-physical characteristics as stability, selectiveness, re-switching or distribution of attention, quickness, accuracy of response. Third factor is connected with demand in high intensity and productivity of specialist's labor. These indicators are limited by specialist's psychological and psycho-physical potentials but they can be improved in the process of specialized training. The forth factor is demand in psychological and psycho-physical reliability of future specialists in the process of their future work.

Such discipline as physical education can make substantial contribution in solution of tasks of psychological and psycho-physical training of future specialists. Physical culture and sport activity of students can be effective in this aspect, being properly and purposefully organized.

The research has been fulfilled in compliance with topical plans of scientific and research works of physical education department of Dniepropetrovsk national railway university, named after V.A. Lazarian and is a component of topic "Theoretical-methodological and pedagogic principles of students' psychological and psycho-physical training in process of physical education", (state registration number 0113U006237).

Purpose, tasks of the work, material and methods

The purpose of the research is determination of sphere of psychological and psycho-physical training as a component of students' physical education.

The tasks of the research:

1. Analyze the sense of concepts "professional-applied physical training", "psycho-physical trainings". Definition of concept "psychological and psycho-physical training".
2. Analyze existing experience of physical education's application for solution of tasks of psychological and psycho-physical training.
3. Working out of model of student's psychological and psycho-physical training for future professional functioning.

The methods of the research are theoretical analysis of modern state of this problem's solution, simulation.

Results of the research

Application of physical education for training for professional functioning is traditionally connected with professional-applied physical training. It is regarded as pedagogically oriented process of ensuring of specialized physical readiness for future professional functioning [9, pg. 3], as system of organizational-pedagogic measures, oriented on formation and improvement of professionally significant skills, knowledge and features of a personality, which are rather important for his (her) successful work in certain specialty. There have been published a lot of works, devoted o these problem. Among the most recent it is necessary to mark out the works by L.P. Pylypey, V.A. Ovchinnikov, G.V, Rudenko, V.A. Sadovskiy, R.T. Rayevskiy et al.

In scientific literature there is also concept "psychological training". It is interpreted as process of formation, fixing and activation of personality's readiness for certain functioning [2].

In scientific literature there can also be met concept "psycho-physical training". Analysis of it permits to see different understanding of it by different authors. There are approaches, when "psycho-physical training" is understood as purely "physical" (in the sense as it always was regarded in theory and practice of physical education and connected with development of person's physical characteristics). With it dexterity is regarded as the highest human psycho-physical level. This position is taken by, for example, I.M. Turevskiy [10]. Approach of S.M. Borschova [3]. A.O. Yegorychev [5] is close to it; they use "psycho-physical training" for combining of subsystems of physical and psychic fitness in one system. I.M. Turevskiy includes in psycho-physical training the following components: somatic health, motion skills, special professional skills, characteristics of nervous system. In some works [11] psycho-physical and professional-applied physical trainings are practically equated.

In our opinion it is purposeful to combine psychological and psycho-physical training in one block, when they are realized in students' physical education We base on the fact that physical culture and sport activities are effective both: in the aspect of psychological components' formation (for example features of a personality) and in the aspect of development of psycho-physical skills (for example psycho-motor characteristics). In this case there is no sense in separating these kinds of training in course of physical education. It is also purposeful to call properly this process. To express the mentioned sides we offer term "psychological and psycho-physical training".

In present research psychological and psycho-physical training s are regarded as a part (side) of physical education of students, which is oriented on psychological and psycho-physical features of their future professional functioning. Such training shall result in psychological and psycho-physical fitness. There appears a question "what is the difference between conceptions "professional-applied physical training" and "psycho-physical training" from the offered by us concept "Psychological and psycho-physical training". In our opinion in the first case accent was made, mainly, on applied (in relation to profession) orientation of, first of all, physical training of a specialist. In the second the task is different; it is formation of professionally-significant psychological and psycho-physical components.

Psychological and psycho-physical training supplement general and special physical and professional-applied physical training in students' physical education.

It should be noted that in recent researches we can see clear interest to usage of physical education's potentials in formation of personality's components. In this context we can name works by A.O.Artiushenko, S.O. Sychova, V.G. Vitun, Ye.G. Matveyeva, O.M. Sergeyeva, V.Yu. Solonskiy, L.K. Solntseva et al. An interesting research of personality's development of healthy students was made by I.Ye. Kramida [6]. Among foreign works the most interesting are works by F.H.Asci [14], A.Byrne [15] тand many other.

Analysis of psychological readiness for professional functioning was made in works by A.O. Avershin, L.O. Makhotniuk, V.A. Molotay, S.A. Mul, T.L. Panchenko,, N.O. Priadko, V.A. Tereschenko, O.V.Tiuptia, N.V. Khmel, O.V. Khurtenko, O.A. Cherepkhina et al. They set important questions of psychological fitness for different professional functioning. At the same time complex of questions about using of physical culture in formation of psychological and psycho-physical readiness for professional function has still remained insufficiently solved. In this direction the highest progress was achieved by scientists, who studied application of physical exercises for psychological training of military or home affairs officers.

In scientific researches of this direction it was sated that physical exercises are one of means of active influence on military officers' mentality (V.L. Marischuk, Yu.P. Blazhko, V.A. Schogolyev, I.M. Yevdokimov, S.M. Ashkinazi, A.N. Potapchuk, A.G. Sarakul, V.S. Khagay et al.). For example, A.G. Sarakul [8] researched psychological fitness of special purpose military officers, trained with physical exercises, combined with techniques of psycho-emotional self-regulation. He found dependence of military officers' stability on level of their physical fitness. The author also determined that multiple repetitions of physical exercises in conditions of actual danger, physical tiredness and psycho-genous influence of combat irritators, being combined with techniques of psycho-emotional self-control, facilitate formation of military officers' psychological adaptation to service-combat functioning.

V.S. Khagay[12] fulfilled work, in which he analyzed using of martial arts as a mean of formation of military officers' psycho-emotional stability. The data, rendered by the scientists, prove effectiveness of complex application of accelerated moving, overcoming of obstacles and martial arts in formation of psycho-emotional stability.

An interesting research of formation and support of psychological state of military-transport university's cadets by means of physical exercises and mental training was conducted by O.V. Prystav [7]. She determined that combination of mental training with previously conducted physical training for muscular relaxation, permits to receive higher indicators of dynamic of cadets' psychic state. The latter, in its turn, results in rising of effectiveness of educational and military-professional functioning.

Physical culture means are effective in formation of socially significant social-psychological characteristics of military officers. It was proved in works by Yu.Yu. Andreyev [1]. The scientist registered that high level of physical and sport fitness positively influences on character of inter-personal relations. He also detected that high physical fitness facilitates increasing of other cadets' respect, strengthening of personal status and self-determination in collective.

In spite of evident progress, it is necessary to note that problem of psychological and psycho-physical training of higher educational establishments' students for professional functioning, as a component of physical education, has not been yet the subject of special researches.

In the present work the most important principle of research of student's psychological and psycho-physical readiness for professional functioning is its analysis as certain sub-structure of a personality. In this connection for building of model of personality's psychological and psycho-physical readiness it is necessary to base on one or another model of personality. In the author's opinion the most appropriate for this purpose, extensive-ring model of personality by M.S. Burgin will be. Basing on it, it is possible to construct model of student's psychological and psycho-physical fitness. The main feature of this model is its hierarchic character. The basis of this model is composed of professionally significant personality's features, motivation of professional functioning and emotional stability of a personality. These components determine to large extent first of all psychological readiness for work. Above them there is a system of knowledge about structure of human psychic, person's abilities to control own emotions and relations with surrounding people. This level is also rather important for psychological readiness for labor. Next level includes specific features of some psychic processes (attention, senses, perception, memory, thinking, imagination). These components characterize mainly psycho-physical side of readiness for labor. The next level of psycho-physical fitness is psycho-motor abilities of a person. Schematically this model is shown in fig.1. Structuralizing of psychological and psycho-physical personality's fitness facilitates working out of effective methods of its formation, permits to more purposefully realize pedagogic influence.

Psycho-motor features of specialists
Characteristics of psychic processes (attention, senses, perception, memory, thinking, imagination)
System of knowledge about structure of human psychic, abilities to control own emotions and relations with surrounding people
Professionally significant features of a personality, motivation of professional functioning, emotional stability

Fig.1. Structure of psychological and psycho-physical specialist's fitness

Basing on the offered model of psychological and psycho-physical fitness of specialist's fitness, psychological and psycho-physical training of students in process of physical education can conventionally be divided into two

components. The first is psychological training. It includes formation of professionally significant features of a personality and emotional stability, formation of professionally significant motivation for professional functioning, students' work on mastering of professionally significant psychological knowledge. The second component is psycho-physical training. It includes development of psychic processes and psycho-motor skills of future specialist in professional direction..

Conclusions:

1. Physical culture and sport functioning is actively used for solution of tasks of psychological and psycho-physical training in different spheres of professional functioning (armed forces, Home Affairs Ministry and etc.).
2. Demand in special psychological and psycho-physical training at higher educational establishments is connected with influence of such factors as: a) specific influence of conditions of work at present time on a person; b) demand in ensuring high intensity and productivity of modern specialist's labor; c) demand in psychological reliability of future specialists.
3. Psychological and psycho-physical training of students can be realized in process of physical education. It is purposeful to regard it as a part of student's physical education, specialized for psychological and psycho-physical characteristics of future professional functioning.
4. Psychological and psycho-physical trainings supplement general and special physical and professional-applied training in students' physical education.
5. Results of psychological and psycho-physical training shall be psychological and psycho-physical readiness of a student for professional functioning. It should be regarded as sub-structure of general structure of a personality. For construction of model of personality's psychological and psych-physical readiness it is necessary to base on one or another model of personality's structure.

The further research shall be connected with foundation of theoretical-methodological principles of students' psychological and psycho-physical training in process of physical education and with experimental testing of such approach.

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TENSODYNAMOMETRIC AND SPATIAL-TEMPORAL CHARACTERISTICS OF DEFENSIVE MOVING REACTION OF A LAW-ENFORCEMENT OFFICER IN RESPONSE TO AN ATTACK OF AN ARMED ENEMY

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Annotation. *Purpose:* to examine the tensodynamometric and spatial-temporal characteristics of a law-enforcement officer's defensive movements in response to the moving attacking actions of an offender. To identify the efficient ways how to counter the attack of the enemy armed with the firearms. *Material:* It was surveyed 62 employees of practical units of law enforcement authorities. It was experimented with 15 cadets of Kyiv National Academy of Internal Affairs and 15 employees of Department of the State Guard of Ukraine. *Results:* As a result it was found out that the participants adapted to true-life armed conflicts with the offender. On the basis of the broadened knowledge about the outer indicators of the menace and spatial-temporal characteristics of the movements of the armed enemy it was created the moving behavior of the law-enforcement officer. *Conclusions:* In case of an armed enemy's attack it is recommended to carry out the defensive action lunging aside with the optimum cooperation of supporting reactions and action in response, shooting on account of "muscle memory" of the angle of the pointed gun and the projection of the straight line in accordance with the gun tube, the target and the spatial characteristics.
Key words: armed attack, firearms, armed enemy, law-enforcement officer.

Introduction

In main cases, law enforcement officer shall combat and arrest armed criminals. Specificity of professional functioning puts increased requirements to law enforcement officers' fitness [-2] [1, 3, 6, 7, 8-14].

One of elements of their professional fitness is ability to timely move aside from attack of armed adversary with simultaneous counter-attacking and restricting of adversary's motion potential [3].

Statistic data about deaths and wounds of officers, alongside with cases of their inadequate use of power means prove that there are problems in training of law enforcement officers [3].

The main problem is that future law enforcement officers, trained in compliance with existing program, remain to be not sufficiently adapted to actual armed fights. Absence of theoretical knowledge about external signs of threat in criminal's behavior, space-time characteristics of armed adversary and insufficient level of own motion skills bring to negative results.

Specialists note that extreme conditions of fighting with armed person are characterized by different level of danger and risk of death or health [4, 5, 7]. Conditions of fights with criminals show that it is necessary to have differentiated approach to degree of threat. Considering space-time parameters, psychological state of adversary, in some cases it is necessary to act in advance, using service gun[3], in other cases it is necessary to use martial arts' techniques or do not provoke aggressive actions and avoid combat [4, 15-22]. It is difficult to take decision owing to deficit of time.

Success in training of law enforcement officers for effective functioning in conditions of combat with armed and aggressive criminal depends on methodic of training. Methodic of training shall meet these requirements, be oriented, by sense and content, on acquiring of theoretical knowledge about external signs of threat in behavior of criminal, training of skills of timely physical response with simultaneous fulfillment of effective defense actions and acute gun shooting.

For working out of model of police officer's action it is necessary to carefully analyze peculiarities of movements of both criminal and law enforcement officer during attack and shooting in respond.

Purpose, tasks of the work, material and methods

The purpose of the work is studying of space-time and strain-dynamometric characteristics of law-enforcement officer's movements in respect to attacking movements of criminal.

The tasks:

1. To carry out questioning of officers of practical law enforcement departments, who had to fight with armed criminals.
2. To determine effective means of counter attack of adversary, who is armed with fire arms.
3. Analyze space-time and strain-dynamometric parameters of movements during shooting gun.

For researching of bio-mechanical and space-time characteristics of such kind of shooting we tested group of military cadets, who were trained by the worked out methodic with the help of patented invention.

Main experimental researches were carried out with cadets (n=30) of National academy of home affairs and with military officers of Administration of state security of Ukraine (Kyiv). Processing of data was fulfilled in

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[3] Internationale Polizei Taktiken und Ausbildungen / von B. Siegfried, F. Hübner. – Auflage. – Stuttgart, 1995. – 238 S.

laboratory of bio-mechanics on the base of Chernigiv national pedagogic university, named after T.G. Shevchenko.

For researching of strain-dynamometric characteristics of responding to adversary's actions we used method of electric strain dynamography. This method helps to determine quantitative characteristics of supporting interactions of officer's body during shooting. With this method we registered efforts, which appear during interaction with support, videlicet value and vector of sportsmen's supporting responses in three inter-perpendicular planes.

Mathematical processing of results permitted to detect a number of indicators, which are characteristic for effective actions of officer.

Results of the researches

In order to find specificities of criminal's behavior, who is armed with fire arm and for researching of effective counter attack we conducted questioning of officers of practical law enforcement departments (n=62), who had experience of using of fire arms in fulfillment of service duties.

Questioning results showed that in fight with armed and aggressive person in 82.3% of situations, police officers did not manage to respond timely, explaining it by confusion and fear of arm.

In 17.7% of dangerous situations, police officers tried to resist attacker. With it, 5.3% of police officers tried to evade line of fire, come closer and use martial arts' techniques or improvised means, analyzing distance to attacker, position of his arm and his psychological state. 12.4% – responded by evading, retreating t6o shelter and using service gun.

In 64.7% of such cases attacker only threatened with arm without using it. In 35.3% criminal shot to police officer, trying to wound him. With it, most of shots were fulfilled without pointing.

Questioning showed that in 79.4% of situations started to use fire arm at distance from 5 to 11 meters; in; 7.2% - at distance from 3 to 5 meters; in 13.4% of situation they did it fat distance above 11 meters.

On the base of analysis of literature sources, questioning results we developed model of adversary's behavior. This model was characterized by combination of space-time and psycho-physical characteristics, which corresponded to parameters of actual criminal. In worked out model of criminal, armed with fire arm, indicator as on moment of using it and shooting was 1.2±0.2 in average that corresponds to adversary's response to appearance of police officer. With such time limits it is practically impossible to timely respond with attacking actions in advance. Only, is police officer first noticed appearance of criminal and determined direct threat to life, he can be ahead of adversary in actions.

Analysis of trajectory of bullets, shot to police officer, was made before researching effective counter-attacking means. On the base of conducted researches and comparative analysis of bullets scattering's (with quick shooting) analysis we determined, within certain period of time, more or less safe zones for police officer.

Considering these zones we established two the most effective means of defense against attack. The first method implies shooting "from belt" without pointing. This method of responding to criminal's armed attack has "preventive" characters, because there is no pointing and optimal angle of arm for acute shot. This method is possible when police officer and criminal noticed each other being with arms in hands. Time of pre-emption is in average 0.4 ±0.1 sec.

The second method of combat with armed adversary is connected with diving aside, creating by this, small target for adversary within safe zone and simultaneous shooting. In such situation deep left (right) side step is fulfilled by diagonal forward at distance of 0.80±0.1meters from initial position. In process of stepping body shall be grouped; it reduces size of "target". Head shall not be bent aside, but be vertically located in respect to criminal that is a compulsory condition of successful shot in answer.

Experienced police officers, who met with such situations, also affirm that the most effective is counter attack in advance or shoot with simultaneous step aside.

Many practices [2, 3] proved that acute shooting from pistol or revolver at short or even long distances is possible without pointing devices. Arm is pointed by space feeling of shooter.

In special literature it is mentioned that shooting without pointing is shooting without visual control with pointing devices. Pointing of arm is carried out at the account of muscular memory, which ensures one and the same position of arm in hand and position of hand in respect to forearm [3].

Psycho-physiological combination of two different by character actions, videlicet: defense with step aside and shot in answer require specially oriented trainings; first of one action and then actions' combination. For effective removal from fire line it is necessary to visually determine the angle of hand with pistol, to analyze and correct own actions.

Multiple repetitions of certain movement, which have one space-time parameters, facilitate formation coordination-muscular sense, which, in interaction with nervous processes, remain unchanged in the form of "muscular memory". Thus, on the base of worked out model of technical action, formation of motion skill takes place. With multiple repetition of movement (taking off pistol from holster), making it ready for shooting, and shooting "from the belt" within one space-time parameters, coordination-muscular senses are formed, which, in interaction with nervous processers, remain unchanged in the form of "muscular memory".

In work [4] authors say that in average time, pent by police officer for taking off pistol from holster, making it ready for shooting and shooting is 2.36 ± 0.19 sec. if officer is sufficiently trained.

Our own experiments showed that mean time for taking off pistol from holster, making it ready for shooting and shooting "from the belt" is reduced up to 1.3±0.17 sec. after multiple repetitions.

During training of shooting without pointing future police officer shall consider own sense during every shot,

analyze accuracy of shooting, insert coordination-power corrections and remember muscular senses with visual projection of straight line at moments of accurate shots; it will facilitate formation of required motion skills [2, 3, 5].

Ability of police officer to determine in due time degree of threat when meeting armed and aggressive person, in combination with skills of shooting without pointing facilitate advantageous position in conditions, preceding armed fight.

Application of method of electric strain dynamography permitted to register the following indicators of responses (see table 1) at moment of shooting without pointing, videlicet: indicator of optimal force of pushing off in respect to vertical axis (F_z max) – 690.6±11.18 N; optimal force in respect to sagittal (F_x max) and frontal (F_y max) axes – 28.2±1.85 N and 13.7±1.16 N accordingly; maximal value of vertical components of support responses, accordingly (F max) (resultant force) –811.7±11.56 N.

Table 1

Mean statistic indicators of support responses at moment of shooting pistol

Strain-dynamography, N	Способи захисних та контратакуючи дій	
	Shooting from the spot, (X±m)	Shooting with stepping aside, (X±m)
F_z max	690.6±11.18	902.3±16.07
F_x max	28.2±1.85	183±6.54
F_y max	13.7±1.16	191.4±5.75
F max	811.7±11.56	980.1±16.29

In case of shooting with step aside we found increase of force indicators (interaction of officer with platform), optimal were: F_z max – 902.3±16.07 N; F_x max and F_y max – 183±6.54 N and 191.4±5.75 N accordingly; F max (resultant) – 980.1±16.29 N.Increasing of these indicators is explained by peculiarities of technique of this action.

Motions, oriented on taking off pistol from holster), making it ready for shooting in average take 0.72±0.1 sec. Step aside before making shoot without pointing takes 1.1±0.14 sec. In general, time for stepping aside from adversary's shot and shooting in answer is in average 1.72±0.68 sec. In respect to adversary's actions police officer manages to step aside from his shot and shoot in answer without waiting for the second adversary's shot.

With shot in answer with stepping aside space-time parameters change in the following way:

- Right-forward step with right leg by 0.43±0.07 meter takes 0.36±0.06 sec. with support response by left leg Fz 902±16, Fy - 183±5.75
- Forward step with left leg by 0.63±0.07 m, left aside by 0.47±0.09 m with squatting takes 0.81±0.09 sec.; support response of right leg is - 980±16N. With exceeding of indicators, i.e. efforts during stepping aside, disorders balance and in general coordination of movements. Besides, reduced indicators of support responses' indicators hinders from defense in due time.

Squatting is characterized by shifting of body mass center, which influences on disordering of coordination. However multiple repetition of such action facilitates formation of skill of its fulfillment, while sharp shifting of body mass center disorders coordination of movements insignificantly.

Conclusions:

On the base of conducted researches we determined specificities of behavior of armed with fire arm criminal at the moment of facing police officer.

We have determined space-time and strain-dynamometric parameters at moment of shooting in answer, which shall be considered when working out model of police officer's technical action.

We have proved that effective means of counter action against adversary's fire attack are in some cases actions in advance, in other cases step aside with simultaneous taking off pistol from holster, and shooting in answer.Main characteristics: stepping aside in optimal regimes of support responses in required time, stable angle of pistol's pointing with the help of "muscles memory" and visual projection of strait line by barrel to target in dynamic of defensive actions.

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PHYSICAL PREPAREDNESS AND FUNCTIONAL STATUS OF YOUNG PLAYERS IN THE COMPETITION PERIOD

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Annotation. *Purpose*: evaluate physical preparedness and functional status of young players in the competitive period. *Material*: the study involved two groups of players. One group - 18 athletes aged 13 years. The second group - 16 players aged 14-16 years. Athletes performed tests: running 15 m stroke and 15 m, 30 m from the spot. Determines the amount of creatinine in the urine of athletes. *Results*: the evaluation of physical preparedness of young players indicates a decrease in the speed of the players, as evidenced by indicators and creatinine excretion in the urine. Revealed hypertrophy of the left ventricle, systolic blood volume. Functional state of the older age group athletes is somewhat better than the younger players. Analysis of the studied parameters indicates incomplete recovery of the body of young players. *Conclusions*: It is recommended to use the results to correct the training process of young players.
Keywords: young, football, preparedness, functional, creatinine.

Introduction

With organization of juniors' training-competition process it is necessary to consider high intensity of metabolism and age peculiarities of growing child's organism. Relatively low functional level of cardio vascular and respiratory systems of 13-14 years old boys significantly restrict potentials for fulfillment of durable intensive loads by children. Increased excitability and lability of nervous processes in children's age are positive pre-condition for development of quickness but low level of strength restricts speed-power abilities of organism and quickness in actions of cyclic character [1, 10]. With it, modern junior football develops owing to increasing of requirements to all sides of junior football players' fitness [7, 16]. It is known that in process of competition activity organism endures significant by value and time loads, which require maximal mobilization of junior sportsmen's organisms and pet high requirements to their fitness. Indicators of functional condition of junior sportsmen's organism shall be within age norms [5]. That is why scientifically grounded increasing of general and special physical fitness of junior football players, in compliance with their functional potentials, is an important task of training process [2, 7].

In training of junior football players it is very important to develop quickness and it shall be realized in state of organism's optimal workability [3, 4, 7, 9]. Considering the above said it is necessary to pay attention to quickness of separate movements and ability to increase temp of movements in short periods of time without complicating load [14, 16]. In its turn exercises for quickness for children shall be alternated with relaxation exercises, including exercises for quickness [17, 18, 21-23]. For example, in competition period sportsmen endure frequent increasing loads. It forces coaches to reduce scopes of loads during trainings, which are connected with development of endurance and apply loads of speed-power character [19]. That is why requirements to level of general and special physical fitness cause interest of football specialists. As on present time there have been offered many means of evaluation of football players' fitness in competition period, which are widely used both for adult and junior football players. They imply registration of different indicators both of competition and training functioning as well as parameters of functional state of sportsmen's organism [6].

Control over training and competition processes has become very important with it. The purpose of this control is, by V.M. Platonov, optimization of training and competition functioning on the base of objective evaluation of different sides of fitness and functional abilities of the most important human organism's systems [11]. Only in this case it is possible to compare and analyze their values. The results of this analysis permit to work out programs and plans of training or make corrections for their realization [2]. In age of 11-14 years old scope and chemical content of muscular tissues change as well as motion functions and coordination of movements. In this period psycho-physiological functions, connected with quickness and accuracy of movements, intensively form.

Researches has been showed that content of protein *actine* in muscles substantially changes in process of individual trainings. General quantity of creatine is in linear dependence on content of actine in myofibrils. These indicators can be used for observation over progressing of muscular strength and for prognostication of sport achievements in speed-power exercises. It is possible to increase synthesis of contracting proteins in muscles with exercises, which, by bio-mechanical structure, are close to competition loads. Maximal scope of exercises with maximal quickness, strength and power is determined by critical concentration of creatine-phosphate, lower of which it would be impossible to keep maximal quickness of ATP synthesis. It means actually 5-8 repetitions of every exercise. With higher quantity of repetitions local tiredness starts and reduces coordination and power of movements. With it, in working muscles quantity of ATP decreases; glycolysis and lactate increase; intracellular pH level change to acid side, creatinine excretion increases [3, 13].

Alongside with it analysis of publications points at insufficient level of this problem's solution. With its solution it is necessary to consider the fact that rest period after exercises for quickness results in replacement of anaerobic processes by aerobic oxidizing processes and that is one of components of bio-chemical endurance in work.

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That is why with comprehensive training of junior football players they shall have properly developed bio-chemical basis of all physical abilities.

Purpose, tasks of the work, material and methods

The purpose of the work was to evaluate physical fitness and functional condition of junior football players in competition period.

The task of the work is to fulfill analysis of indicators of physical fitness and functional condition of 14-16 years old football players' in competition period.

The methods of the research: analysis and generalization of special scientific literature, testing of physical fitness levels, anthropometrical measurements, spirometry, backbone dynamometry, determination of PWC_{170}, of maximal oxygen consumption (MOC), threshold of anaerobic exchange (TANE), determination of systolic volume of blood (SBV), level of creatinine excretion by Yaffet's methodic, methods of mathematical statistics.

Medical-biological researches were conducted on the base of scientific laboratory of department of bio-chemistry and hygiene of Lvov state university of physical culture.

In the research 2 groups of junior football players of Lvov junior-sport school №4 took part. One group consisted of 18 junior football players of 13 years old age: 2 goalkeepers, 6 backs, 6 halfbacks and 4 forwards. The second group was: football players of 14-16 years old age – 2 goalkeepers, 5 backs, 6 halfbacks and 3 forwards.

Results of the research

Level of physical fitness of junior 13 years old sportsmen was tested by the following indicators: 15 meters run from running, 15 meters, 30 meters from the spot at the beginning and at the end of competition period. Results of these tests are given in table 1.

At the beginning of competition period junior football players ran 15 meters from running in average for 2.08 sec. and at the end of competition period – for 2.06 sec; for test "15 meters run from the spot" they spent 2.46 sec. at the beginning of competition period and 2.49 sec. – at the end. Test 30 meters run from the spot took 4.79 sec. at the beginning of competition period and 4.84 sec. at the end from football players of 13 years old.

Comparing with the beginning, at the end of competition period football palyers of the tested group fulfilled test "15 meters run from running" by 0.02 sec. better; test "15 meters run from the spot" – by 0.03 sec. worse; test "30 meters run from the spot" - by 0.05 sec. worse. Results in quickness of 15 and 30 meters run of junior football players did not improve during competition period and remained on the previous level. We also did not find any confidence of indicators' difference concerning the mentioned tests at the beginning and at the end of competition period.

Results of research of creatinine excretion of 13 years old football players at the beginning and at the end of competition period are given in fig.1. These data point that even at the beginning of competition period before load quantity of creatinine in urina is lower than standard for children of this age and was 0.36 g per 24 hours ($p<0.05$). After football match the quantity of creatinine in urina increases up to 0.54 g/ 24 hours ($p<0.05$).

Table 1.

Dynamic of time of distance 15 and 30 meters covering by 13 years old football players in competition period (sec.)

Nos.	Test	At the beginning of competition period	At the end of competition period	Confidence of indicators' difference
1.	15 meters from running	2.08±0.07	2.06±0.05	p>0.05
2.	15 meters from the spot	2.46±0.05	2.49±0.06	p>0.05
3.	30 meters from the spot	4.79±0.08	4.84±0.07	p>0.05

At the end of competition period (see fig. 1-B) before match level of creatinine was 0.16 g/24 hours that nearly 2 times less than at the beginning of competition period ($p<0.05$).

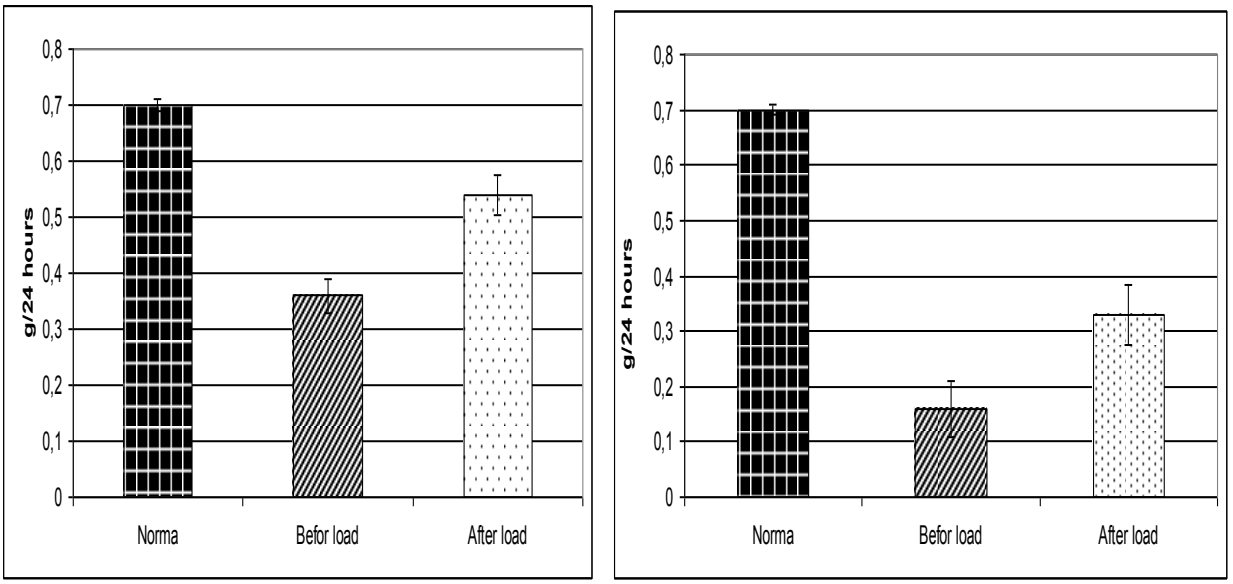

Fig.1. Creatinine excretion of 13 years football players at the beginning (A) and at the end (B) of competition period

After football match quantity of creatinine in urina also increases up to 0.33 g/24 hours ($p<0.05$), but this value still is significantly less than at the beginning of competition period. Analysis of the received data shows that during all competition period quantity of creatinine in urinal is less than it is required by standard. At the beginning of competition period quantity of creatinine before match was lower by 49%, and at the end of competition period it reduced by 77 %. After football match quantity of creatinine in urina was also decreased during competition season: at the beginning of competition period – by 23%, and at the end – by 53%. Thus, the above rendered data of bio-chemical tests point at progressing of tiredness and not complete recreation of junior football players.. Tiredness also is witnessed by absence of positive dynamic in shortening of time of distances 15 and 30 meters' covering at the end of competition period.

In junior football players' training it is necessary to consider their physical condition, functional state, physical fitness [1, 4, 5, 9]. In our researches we determined indicators of physical condition and functional state of 14-16 years old junior football players (see table 2).

Table 2.

Indicators of physical condition and functional state of 14-16 years old junior football players

Nos.	Kinds of fitness	Indicators	Indicators of fitness in different age		
			14 years	15years	16 years
1.	Physical condition	Body mass (kg)	55.9±3.2	55.9±2.8	65.5±2.5
		Height (cm)	165.0±2.3	170.0±3.1	176.0±1.2
		VCL (ml)	3900-4100	4500-4600	4800-5000
		Backbone dynamometry (kg)	100-120	120-140	150-160
2.	Functional state	PWC 170 (kgm/min/kg)	1400-1600	1600-1850	1800-2000
		MOC (ml/kg/min)	50-54	54-56	55-57
		TANE hbr	145-155	155-160	160-170

Physical fitness of this group of junior sportsmen was tested by such tests: control 15, 30 and 60 meters run from the spot and 15 meters from running (for evaluation of quickness), 400 meters run (for evaluation of aerobic-glycolytic endurance), long and triple jumps from the spot and high jumps (evaluation of dynamic force), 3000 meters run or 12 minutes run (evaluation of aerobic endurance) [3]. Integral criterion of football players' fitness was indicators of competition functioning, mean values of which (during season – 16 matches) are given in table 3).

Table 3.

Indicators of special fitness of 14-16 years old football players

Nos.	Kinds of fitness	Indicators, units of measurement	Indicators of fitness in different age		
			14 years	15years	16 years
1.	General physical fitness	15 meters run from the spot, sec.	2.5±0.3	2.4±0.2	2.3±0.2
		15 meters run from running, sec.	2.1±0.2	1.9±0.1	1.8±0.1
		30 meters run sec.	5.0±0.4	4.8±0.2	4.5±0.3
		3x10 run, sec.	8.0±0.4	7.8±0.4	7.6±0.1
		50 meters run, sec.	8.5±0,2	8.2±0.1	8.0±0.1
		7x50 meters run, sec.	71.0±1.2	70.0±0.8	67.0±1.1
		400 meters run, sec.	68.0±1.8	66.0±1.2	65.0±1.4
		12 minutes run	2850.0±43	2900.0±38	3000.0±18
		Long jump from the spot, cm	220.0±8	230.0±5	235.0±6
		Triple jump, cm	610.0±12	640.0±9	650.0±9
		High jump from the spot,	38.0±2.1	40.0±1.8	42.0±1,6
2.	Special physical fitness	Dribbling 30 meters, sec.	5.8±0.12	5.6±0.18	5.3±0.14
		Kicking ball for distance, meters	55.0±4	65.0±5	70.0±1
		Throwing ball for distance, meters	16.0±2	17.0±1	19.0±1
3.	Competition functioning (special physical fitness)	Quantity of tactic-technical actions (TTA):short, middle and long passes, kicking ball, pickups)	50-45	55-50	75-65
		Percentage of mistakes (%)	34-32	34-32	40-35
		Quick movements in match, meters	750-1000	850-1100	900-1200

Alongside with indicators of physical endurance, for determination of football players' readiness for competition functioning indicators of organism's functional state, in particular cardio-vascular system, are rather important [5, 7, 11, 14, 20]. Systemic trainings cause increasing of left ventricle of heart [17]. Haemo-dynamic productivity is also an important indicator of functional state. As per data of some authors systolic volume of blood of junior sportsmen significantly exceeds this indicator of their peers, who are not sportsmen [5]. Adaptation of cardio-vascular system to tensed muscular work is manifested as acceleration of hart functioning (HBR) and noticeable increasing of systolic volume of blood (SBV), especially with progressing of fitness and sport qualification (see table 4). Reduction of SBV in rest state of junior sportsmen, alongside with reduction of HBR, is regarded as indicator of saving influence of trainings [20].

Analysis results of creatinine excretion of 15-16 years old junior football players are given in fig.2. As standard we took excretion of creatinine in control group of 14-16 years old teenagers and it was 1.35 g/l. In training process (preparatory period) this value was 1.2 g/l.

Table 4.

Systolic volume of blood (ml) with significant load on bicycle ergo-meter

Age of the tested	Not sportsmen , X±Sx	Sportsmen, X±Sx
14 years	84.5±8.4	90.7±6.4 (3rd sport degree) 95.4±6.2 (2nd sport degree) 120,2±7,5 (1st sport degree)

At the beginning of competition period creatining excretion in urina was 1.0 g/l before load and after match it increased up to 1.4 g/l. As one can see in fig. 2 at the end of competition period creatinine excretion, in comparison with beginning of competition period, reduced. Before loads, concentration of creatinine was 0.8 g/l and after loads it increased up to 1.2 g/l that is less than at the beginning of competition period.

Quantitative changes of creatinine in football players' urina at the end of competition period point at reduction of energetic resources and are in compliance with reduction of football players' quickness. It is also pointed by the fact that during match energetic resources are replenished at the cost of other energetic systems of organism (may be proteins) and that is why creatinine excretion is low at the end of season.

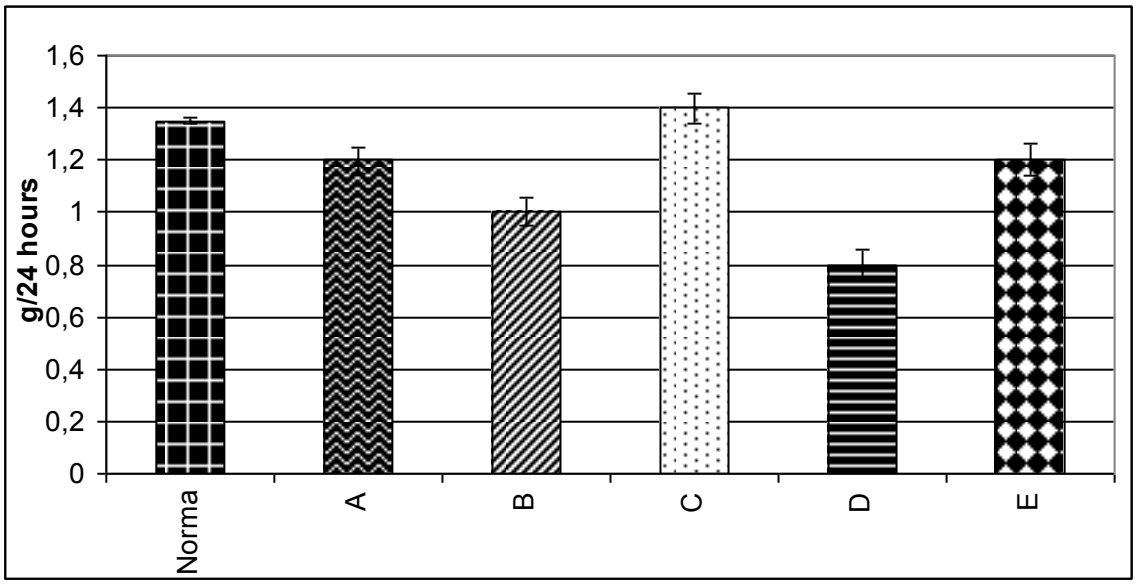

Fig.2. Creatinine excretion of 14-16 years old football players in training and competition periods
A –trainings period, B – beginning of competition period before loads, C – beginning of competition period after loads, D –end of competition period before loads, E –end of competition period after loads.

Conclusions:

1. Results of fulfilled testing on junior football players' physical fitness in competition period permitted to determine their certain reduction of indicators of quickness.
2. The researches showed that response of junior football players' organism to physical loads is manifested as functional changes of cardio-vascular system: increasing of left ventricle, increasing of systolic volume of blood and, besides, we determined dependence of physical fitness on creatinine excretion in urina.
3. Comparison of these indicators in two age groups shows that functional state of older age group is better to some extent than the same of younger group. Analysis of the tested indicators points at incomplete recreation of junior football players' organisms.
4. On the base of analysis of the received results of physical fitness, bio-chemical indicators and functional state of cardio-vascular system, in order to improve sport workability it is possible to make corrections in trainings process.

The prospects of further researches imply correction of training programs and plans on the base of functional state and physical fitness of junior football players. Besides, it is necessary to study energy losses of junior football players in competition period by means of anaerobic-lactate supply.

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HEALTH-TECHNOLOGY IN THE CLASSROOM WITH THE GIRLS PLAYING FOOTBALL OF SECONDARY SCHOOL AGE

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Annotation. *Purpose*: carry out a theoretical analysis of the problem of health-use technology on football lessons in secondary schools. *Material:* processed more than 100 literary sources. *Results*: the article presents the main ways of implementation of maintaining health technology on football lessons. The basic attention approaches to the concept of «maintaining health». An author analyses the classifications of maintaining health technology and basic principles of their application of the lessons of football in secondary schools. The author summarized the current views on the problem of implementation the maintaining health technology in the school system, including such as monitoring the causes of injuries on football lessons and ways to prevent them, the creation of healthy environments. *Conclusion*: It is proved that the use of maintaining health technology on football lessons aims not only development of pupil's skills, healthy lifestyles, but also the creation of educational institution necessary conditions for preserving the health of the younger generation.
Key words: maintaining health, technology, football, injury, differentiation.

Introduction

Searching for new ways of positive influence on improvement of pupils' physical condition and formation of their value attitude to own health has becoming rather important in physical culture. In spite of numerous scientific researches, devoted to problem of pupils' health protection with physical exercises, problem of health protecting technologies' application at football trainings of middle school age girls has been elucidated insufficiently. It conditions urgency of the problem, regarded in this work.

Pedagogic technologies of physical health protection are regarded in scientific works in the field of professional physical culture education – S. Garkusha, M. Nosko, L. Suschenko; organization of physical educational-training process in school-type educational establishments were studied by V. Geraschuk, L. Gnitetskiy, N. Goncharova [8], V. Kashuba [8], A. Sitovskiy [11], B. Shyan [13]. Professional knowledge, functions and functioning of physical culture instructor first of all shall be oriented on protection of pupils' health (I. Brizhata [1–2], O. Vaschenko [4], O. Glebova [5] O. Dubogray, O. Yezhova [6], K. Petrenko [10]), especially concerning prophylaxis character of physical culture classes, mass- sport measures, organization of independent sport trainings.

In context of the regarded problem we consider urgent scientific researches on health protection of rising generation (O. Verbzhytska, Ye. Luparenko, O. Omelchenko, Ye. Fedosimov [12] et al.), on health hardening by means of football (A. Vasylchul [3], G. Kolomiyets [9] et al.) as well as works of foreign scientists [14–15]. Alongside with it solution of problem of health protecting technologies' application at football trainings of middle school age girls has not been elucidated to full extent. That is why there exists demand in more perfect analysis of this problem.

Purpose, tasks of the work, material and methods

The purpose: foundation of problem of health-protecting technologies' application and determination of traumatism's reasons and ways of its prevention at football trainings of middle school age girls.

The tasks: foundation of main approaches to conception of "health protection"; analysis of classifications of health protecting technologies and main principles of their application at football trainings in comprehensive educational establishments.

The methods of the research: theoretical analysis and generalization of scientific-methodic literature data on the regarded problem.

Results of the research

In the process of physical education of pupil's personality in system of school education in our opinion application of health protecting technologies is rather important. Having analyzed the latest scientific works on health protection of pupils we determined that health protection is:

- The process of protection and strengthening of health oriented on transformation of intellectual and emotional spheres of personalities, rising of valuable attitude to own health and health of surrounding people on the base of understanding of own personal responsibility (O. Glebova, 2005) [5];
- Component of health protection, which combines medical, psychological, valuelogic and pedagogic knowledge (Ye. Fedosimov, 2004) [12].

In order to understand the sense of concept "health protecting technologies" we supply main approaches to its definition. In modern science this concept in school education's system is determined as the process of teaching and education, which makes no direct or indirect harm to pupils' health, creates safe and comfort conditions of children's being at school, ensures individual educational trajectory of a child, prevents from stresses, overloads, tiredness and, thus, facilitates protection and strengthening of schoolchildren's health (O. Ionova, Yu. Lukyanova, 2009) [7].

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In the context of the regarded problem we analyzed classifications of the existing health protecting technologies by O. Vaschenko and S. Sviridenko:

- Health protecting – are technologies, which create safe conditions for being, studying and work at school and those, which facilitate rational organization of educational process (considering age, sex,, individual characteristics and hygienic standards), correspondence of educational and physical loads to child's potentials;
- Health related technologies are those, oriented on pupils' physical health, increasing of their health potential (resources): physical training, physio-therapy, aromatic therapy, hardening, gymnastic, massage, phytotherapy, musical therapy;
- Technologies of teaching to be healthy – hygienic education, formation of life habits (emotional control, ability to solve conflicts), prophylaxis of traumatism and using of psycho-active substances, sex education. These technologies are realized owing to introducing of appropriate topics into general educational cycle, organization of otional studying and additional education;
- Cultivation of health culture – education of pupils' personality's features, which would facilitate health protection and strengthening, formation of ideas about health as a value, increasing of motivation for healthy life style, rising of responsibility for own health and health of family [4].

In order to present the sense of regarded health protecting technologies and possibility of their application it is necessary to characterize them by every kind mentioned in classification:

- Health protecting technologies are clear and rational organization of lessons, distribution of physical loads in compliance with age potentials of girls;
- Health related measures – render positive influence on pupils' organism by means of football;
- Technologies of teaching to health mean observation of sanitary-hygienic requirements and safety regulations in football trainings;
- Educational mean cultivation of schoolgirls' understanding of healthy life style and practicing of it with the help of football.

For ensuring of effectiveness of the listed health protecting technologies at football trainings and timely avoid possible traumatic after effects, specialists [1–2; 10] determined the reasons of traumas:

- Disorders in organization of trainings. They are if there are too much children per one instructor or if in one class room several groups are trained; if rules of children's shifting from one kind of training to other are violated; if classes are started or finished not in proper time;
- Violations of methodic of teaching. These violations are manifested in violation of didactic principles. Often the reason of damage or trauma is inattentive attitude to introduction to lesson, warming up; incorrect training of physical exercises' techniques, absence of necessary self-support, incorrect application of it, often usage of maximal or forced loads; порушення в методиці навчання. Ці порушення проявляються в недотриманні принципів дидактики.
- Absence of pupils' discipline. This factor can manifest itself as emotional breakdowns, caused by difficulties of exercises, by violation of teaching methodic, tiredness, absence of individual approach from the side of instructor, violation of behavior rules at trainings, insufficient civility of pupils;
- Unsatisfactory condition of training sites, equipment, inventory: incompliance of them with requirements to physical culture trainings, small dimensions of gym, unevenness of floor. Damage of sport apparatuses, mats, tracks, their wrong exploration;
- Incompliance of cloth and shoes is manifested in the fact that pupils, sometimes, attend trainings in uncomfortable cloth, in shoes, which are not in size, with slippery or too ruff sole and heels;
- Violation of sanitary-hygienic requirements: incompliance of temperature in gym with standards, insufficient natural or artificial illumination, insufficient ventilation, increased humidity of air or its excess dryness, absence of order in gym, non observance of personal hygiene rules;
- Drawbacks of medical control over pupils physical condition: untimely and insufficiently careful medical examination; non observance of doctor's recommendations; wrong rehabilitation after traumas or diseases;
- Underestimation and wrong usage of safety rules, negative attitude to safety rules and to help during fulfillment of complex and insufficiently mastered exercises; absence of necessary experience and weak safety skills; absence of skill in self safety support;
- Violation of safety rules: wrong location of gymnastic apparatuses, wrong location of children in gym or near apparatus; wrong condition of apparatuses or auxiliary equipment; careless attitude to installation of gymnastic apparatuses, laying mats in places of landing [10].

Taking all these in consideration, we shall admit that important direction of pupils health protection at physical culture trainings is problem of prophylaxis that facilitates creation of health protecting atmosphere in educational establishments and conditions for strengthening of health and harmonious development of schoolchildren; formation of healthy life style and improvement of pupils' physical condition.

In this context we consider conclusions of I. Brizhata to be rather valuable, who sais that in prophylaxis of traumatism during physical trainings significant role is played by didactic components: prophylaxis problems, instructions, observation of safety rules, rendering assistance during exercises' fulfillment [2].

Educational program on physical culture for 5-9 forms' pupils of comprehensive educational establishments

stresses that main sense of module "Football" corresponds to main tasks of program, forming steady schoolchildren's interest to physical culture in particular and to healthy life style in general.

Analyzing contemporary works, devoted to pupils' health protection problems and methodic of football training at schools, we grouped methodic recommendations concerning organization of instructor's work in the aspect of pupils' health protection at football trainings in comprehensive educational establishments:

1. Main program of training shall be started only after 10-15 minutes of warming up and after finishing of training fulfill recreational exercises for relaxation and restoration of breathing during 3-5 minutes.
2. Systemically control heart beats rate before, during and after training.
3. Provide rational load, considering age peculiarities and sex of children's organism [3].
4. Practicing of football trainings in the open air all year around at comprehensive schools [9].

Basing on own experience and in compliance with methodic recommendations and regulations on safety measures during physical culture lessons we determined that in the process of football trainings schoolchildren's health protection will be facilitated by the following factors:

- Strict observation of rules of behavior and sequence of exercises by pupils. Under control of instructor pupils shall take loads gradually in order to avoid traumatism;
- Careful mastering of techniques before starting of match: kicks and passes, correct stance for pass of ball, personal defense. It should be stressed that with it, it is necessary to observe the following sequence: familiarization with technique; mastering of technique in simplified conditions; perfection of technique in conditions, close to match; fixing of technique in game;
- Correctly chosen cloth shall be light and does not hinder movements; football players shall have appropriate shoes. There shall not be any foreign things with pupils in order not to injure other pupils in the process of game;
- It is compulsory to have individual protective elements: knee and shin shields; for goalkeepers – gloves;
- Ball for football trainings shall be of 0.68 – 0.71 meters' length and of weight 396–453 g;
- It is compulsory to have special equipment for football trainings. It should be stressed that observation of this requirement facilitates not only correct mastering of material but also correct organization of training that, in its turn, facilitates schoolchildren's health protection. In compliance with academic program on physical culture for 5-9 forms' pupils of comprehensive schools the following equipment shall be provided for football training with good quality per one class: football balls – 40 pcs., chips – 20 pcs., football vests – 2 x20, football goals – 2 pcs. (instead of them football chips can be used), nets for football goals – 2 pcs., pump for pumping of balls- 1 pc., nipple needles – 5 pcs., measuring tape – 1 pc., timer – I pc., whistle – 1 pc., computer – 1 pc., projector – 1 pc., screen- 1 pc., model of football ball – 1 pc.

An important factor of pupils health protection at football trainings is consideration of schoolchildren's body constitution, physiological processes. Важливим напрямом збереження здоров'я учнів на уроках футболу в школі є необхідність урахування особливостей будови організму школярів, фізіологічні процеси, які у них відбуваються. Considering it, according to academic program of physical culture for comprehensive educational establishments (5-9 forms) it is purposeful to conduct lessons in differentiated way and matches shall be separate for girls and for boys.

Also care attention shall be paid to equipping of sport sites in order to protect pupils' health at football trainings. According to state building standards of Ukraine for sport and health related physical culture facilities these requirements shall be as follows:

1. Open sport sites shall be located in sport zone at distance not less than 25 meters from educational and auxiliary premises.
2. The sites can not be surrounded by any trenches, wooden or brick edges. Trees, columns, fences or other objects shall be, if any, at distance not less than 2 meters from the site.

As far as football trainings can be practiced in closed premises for example in gyms, there also it is necessary to follow safety rules, considering kind of sports:

1. Painting shall be resistant to strikes of ball, shall not crumble or become dirty after contact with ball.
2. Ceiling shall be painted with not crumbling paint, resistant to strikes of ball.
3. Windows and lighters shall have steel protection against strikes of ball; windows shall have transoms, which it would be possible to open, standing on floor.

Thus, application of health protecting technologies at football trainings in school is oriented not only on formation of sills of healthy life style, but also on creation of proper conditions for health protection of rising generation in educational establishment and cultivation of pupils' personal responsibility, considering the kind of sports, trained by them.

Conclusions:

In this article we regarded approaches to definition of concepts "health protection" in physical culture, prived purposefulness of health protecting technologies' application in process of football training of middle school age girls. In particular, we stressed that it is necessary to determine reasons of traumatism and ways of its prevention at football trainings.

The prospects of further researches imply analysis of differentiated approach in physical education of girls of middle school age.

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IMPACT OF SHIFT IN FOCUS OF ATTENTION ON LEARNING TABLE TENNIS BACKHAND WITH SELF-TALK IN HIGH SCHOOL FEMALES STUDENTS

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Annotation. *Aim:* The purpose of the present study was to investigate the effect of variability of attentional focus distance by self-talk on the learning of table tennis backhand. *Methods:* Therefore, 80 high school girls by mean age 16(±0/62) yr. were randomly selected from sport school of Sanandaj and assigned to 5 groups. After pretest, the participants performed 180 forehand strokes during 6 sessions with repeating the words "slightly rotation" in the internal focus group "slightly open" in the near external focus group, "over the net" in the far external focus group, and each of the words "slightly rotation, slightly open, and over the net "respectively in each 2 sessions in the increasing distance of attentional focus group. Control group performed without self-talk during acquisition phase. Retention test was performed 48 hours after acquisition test in the same situation without self-talk, and after half an hour break, transfer test was done by changing the direction of target (parallel forehand) without self-talk. The accuracy and the pattern of forehand strokes were measured by a 5 point-scale (Liao and Masters, 2001) and researcher-made scale, respectively. At the end of acquisition phase, participants filled out the frequency and self-talk beliefs questionnaire. *Results:* According to the results of 2-factor mixed ANOVA, acquisition, retention, and transfer of backhand accuracy in internal focus of attention group were significantly lower than other groups ($p<0.05$). Furthermore, the effect of increasing attentional focus distance on acquisition of backhand pattern was significant. The effect of near external attentional focus on retention of pattern was significant. But transfer of stroke pattern in control group was significantly more than far external focus group ($p<0.05$). *Conclusions:* Thus, it is recommended to use self-talk by increasing attentional focus and near external attentional focus and not to use internal focus of attention to instruct backhand to novice adolescents.

Key words: increasing, distance, external, attentional, focus, self-talk, table tennis, movement, pattern, adolescent.

Introduction

One of essential features characterizing attention towards learning and performing motor skills is focus of attention. It indicates how and to where athletes focus their attention at the time of making movements. As regards direction, focus of attention can be internal (movements and actions of the body) or external (effect of movements on environment and sports equipment) (Schmidt & Timothy, 2011; Magill, 2011). Athletes can take verbal cues for focusing attention to essential details of skills. Sports psychologists call this approach *self-talk* (Chroni et al., 2007). Self-talk results from one word (verbally) and/or from thought, smile or frown (non-verbally) and serves two chief functions. Instructional self-talk improves motor performance through concentration on movements, effective techniques, and effective strategies. And, motivational self-talk improves motor performance due to more power and attempts and it controls for anxiety (Hatzigeorgadis et al, 2011). According to Nideffer's model of attention (1976), athletes can draw their attention from one purpose to another purpose. He appreciates the impact of self-talk on improvement in motor performance and believes that self-talk provides athletes with focus of attention.

A great number of studies have demonstrated superiority of external focus of attention in terms of performance and learning of motor skills. For instance, all male experienced athletes in discus-throwing competitions demonstrated greater superiority as regards external focus of attention as compared with internal focus of attention (Wulf & Su, 2007; Wulf, 2012; Wulf & Dufek, 2009). Also, increase in distance of external focus of attention yield improvement in motor performance and learning (Wulf, 2007; Danghiyan & Shojaee, 2007). A comparison of findings indicates that external focus of attention offers greater benefits when an increase in distance occurs (Wulf, 2012). As findings on types of focus of attention, levels of skills, and distance of external focus of attention show, it seems focus of attention exerts positive impacts on motor performance and skill learning. Instructional self-talk produces more effects upon production of deft movements (Tod et al., 2009). Hardy et al. (2009) point out self-talk exerts more impacts on performance of students and novice persons relative to athletes. In most previous studies, educational instructions and feedback have been given for shift in focus of attention, yet in one study (Parvizi, 2010), self-talk is taken into consideration for shift in focus of attention. As that study indicates, shift in focus of attention by using instructional self-talk does not produce positive effect in cases of free throws in basketball. This condition results from closed nature of this movement (Parvizi, 2010).

We can report much more findings about shift in focus of attention with self-talk, by carrying out further studies on more targeted physical activities and exercises. As a result, we examine backhand in table tennis as an open skill. As mentioned above, enormous studies have made comparison between internal and external foci of attention and have concerned different distances as regards external focus of attention. But, nothing has been considered, as far as increase in distance of focus of attention and shift of focus (from internal focus of attention to distant external focus of attention) are concerned. The present study attempts to evaluate impact of shift in focus of attention on learning and performance of backhand through self-talk.

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Materials and methods

Methodology

This study was a semi-empirical and survey-based research. We conducted pretest and posttest for our population with a mixed two-factor design (factors of random groups and sessions). The factor of groups (or groups of focus of attention with instructional self-talk) contained five levels: internal focus of attention, near external focus of attention, distant external focus of attention, increase in distance of focus of attention, and control. The factor of sessions contained 8 sessions: one pretest session, 6 exercise sessions, and one session for retention and transfer of movement pattern).

Population

The population of this study consisted of girls in Sports High school of Sanandaj (a city of Iran). They were in age range of 16-18 years old and right-handed with physical and mental health. Prior to this study, they had not taken part in competitions of table tennis or other racquet sports. Even, they had not received official education and had not done related exercises. As regards table tennis in Sanandaj, the mean height of players, and distance between their two open hands were 1.61± 6.24 cm, and 1.62± 6.29 cm respectively. Also, girls of our study had the mean age of table tennis in Sanandaj (12.2 years old) (Karimi & Fayaz Moghadam, 2009). Of this population, we selected 80 girls by using convenience sampling. Then, we divided them into 5 groups (16 girls in each group) by using random assignment: 4 treatment groups and 1 control group. The mean and standard deviation of age range were 16.62± 0.62.

Task & Tool

We asked the participants to do exercise of backhand on a standard table with length of 274 cm, width of 152.2 cm, height of 76 cm, and net height of 15.25 cm. We tested accuracy of forehand by doing accuracy test of backhand and leveled its scores on a 5-value scale.

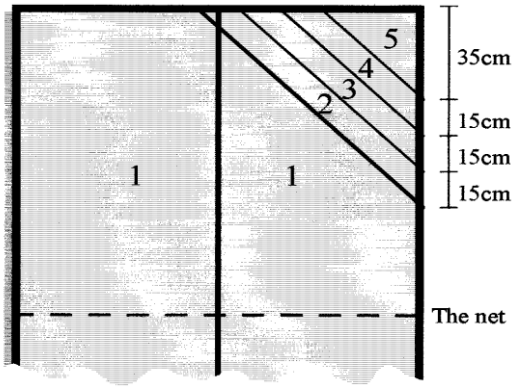

Fig1. Liao's & Master's Accuracy Test of Backhand in Table Tennis (2001)

We utilized researcher-made five-value scale for evaluation of backhand in Table Tennis. We computed temporal stability and content validity of the scale, using intra-class correlation coefficient and content validity ratio and index respectively. A validity of 80 % and a reliability of 86 % have been measured for Ante's handedness inventory (1970) (Rezaee, 2011).

Analysis of Belief in Self-talk and Frequency Questionnaires Weinberg and Gould (2003) and Zinsser et al. (2001), and assessment of its face and content validity as well as reliability have been done by a number of experts (Hatzigeargiadis et al., 2008). Also, we used NEWGY ROBO-PONG 540 for throwing balls.

Procedure

The sports teacher produced movement of backhand and provided its details (including posture stance behind tennis table, way of racquet taking, and good performance of backhand) one by one by organizing a sectional training program (including position of hands, posture of body and continuance of movement) and at the same time by giving verbal cues.

Before pretest, we distributed handedness inventory among participants and divided them randomly into 5 groups (4 treatment groups and one control group). In general, 8 sessions took place: 1 pretest session, 6 exercise sessions and 1 session for retention and transfer of movement pattern. At the beginning of each exercise session, on the basis of the selected type of self-talk for each treatment group, we reminded them about cued words and we asked them to repeat the related words prior to any movement of backhand. The cued words for internal focus of attention, near external focus of attention and distant external focus of attention were respectively as follows: "slight swing", "slightly open", and "over the net". As regards increase in distance of focus of attention, we used "slight swing, slightly open, and above the net" in every two sessions respectively.

Within this period, the control group did exercise without any self-talk and they did not receive any instruction in this regard. In the first session when we offered explanations about self-talk in 5 minutes, we just explained size of tennis table and net. But, we did not give detailed information regarding purpose of study and groups of participants.

The exercise sessions were held twice per week and three sets of tasks (10 tasks in each set) were performed in each session. Balls were thrown from NEWGY ROBO-PONG 540 towards girls' backhand with constant speed (3 m/s) and without any curve. Then, they made movement of backhand. After 5-minute warm-up, the sports teacher asked

them to take 10 tasks as pretest in order to control for the reduced effect of warm-up, after performing 4 backhands. Two cameras filmed their performance of backhand the areas in which balls were landed. We tested the mean accuracy of 10 shots by performing accuracy test (Liao & Master, 2001) and examined patterns of movement by using a researcher-designed scale. We recorded scores of crossed backhands in exercise sessions and analyzed them for evaluation of improvement in girls' performance. At the end of last exercise session, we asked treatment groups to complete a seven-question self-talk questionnaire examining their understanding of self-talk effectiveness (Hatzigeargiadis et al., 2008). After two days, we performed retention test about one 10-task set in similar conditions and after a half-hour break, we performed transfer test in case of target direction shift (parallel backhand). In both tests, we did not utilized any self-talk.

Statistical Analysis

We utilized descriptive statistics for calculation of mean, and standard deviation and for representation of diagrams. Moreover, we used inferential statistics for examining null hypotheses. In order to ensure the occurrence of retention and transfer, we separately compared pretest scores of any group with the last exercise session scores, retention scores, and transfer scores by using repeated analysis of variance. In case of significant relationship, we performed Bonferroni's post hoc test. Data analysis was done by using SPSS Software. The level of significance in all tests was $p < 0/05$.

Results

Mean and standard deviation of age, height, and distance between two open hands in all groups are shown in Table 1.

Table 1

Distribution of Frequency & Characteristics of Participants

Groups	Age (M±SD)	Height (M±SD)	distance between two open hands (M±SD)
Control	16.62±0.50	1.60±7.53	1.60±6.52
Self-talk for internal focus of attention	17±0.73	1.65±6.11	1.64±6.14
Self-talk for near external focus of attention	16.75±0.68	1.63±6.07	1.66±5.72
Self-talk for distant external focus of attention	16.43±0.51	1.60±5.58	1.60±5.67
Self-talk for increase in distance of focus of attention	16.31±0.47	1.61±6.24	1.59±4.13

Table 2

Backhand Accuracy Scores in Six Exercise Sessions (M±SD)

		Group				
Sessions		**Control**	**Internal focus of attention**	**Near external focus of attention**	**Distant external focus of attention**	**Increase in distance of focus of attention**
Pretest		0.75±0.17	0.75±0.19	0.68±0.30	0.69±0.26	0.71±0.18
Exercise Sessions	**Session 1**	1.3±0.34	1.18±0.26	1.18±0.29	1.03±0.37	1.31±0.33
	Session 2	1.10±0.33	1.87±0.33	2.25±0.36	2.29±0.31	1.41±0.37
	Session 3	1.93±0.35	2.34±0.41	2.59±0.24	2.76±0.23	2.81±0.20
	Session 4	1.42±0.34	2.57±0.44	2.74±0.22	2.83±0.21	2.71±0.24
	Session 5	1.95±0.40	2.69±0.32	3.04±0.29	3.23±0.35	3.14±0.29
	Session 1	2.88±0.32	3.50±0.35	3.59±0.34	4.11±0.28	4.12±0.37
Retention & Transfer		3.21±0.50 2.71±0.32	3.79±0.27 3.28±0.42	4.45±0.34 3.75±0.35	4.29±0.20 3.89±0.34	4.26±0.32 3.91±0.36

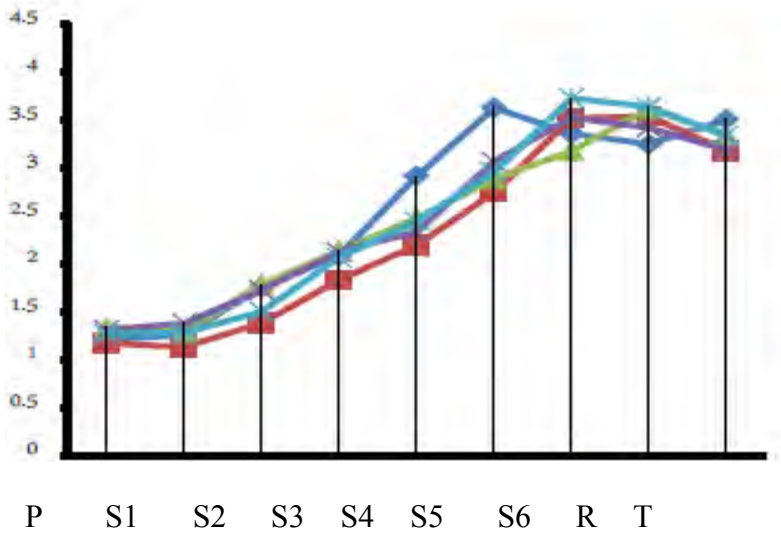

Fig 1. Students' Mean Backhand Accuracy in Pretest Session (P), Exercise Sessions (S1-S6) & Retention-Transfer Session (R &T)
Control Group; Group of Internal Focus of Attention; Group of Near External Focus of Attention; Group of Distant Focus of Attention; Group of Increase in Focus of Attention

As Table 2 and Fig 1 show, the accuracy of backhand performance was improved in treatment groups within 6 exercise sessions. Conversely, the control group had lower accurate backhand performance within six exercise sessions. Treatment groups' means and standard deviations of backhand movement pattern in exercise session, and retention-transfer session are shown in Table 3.

Table 3

Backhand Movement Pattern of Treatment Groups in Six Exercise Sessions (M±SD)

		Group				
Sessions		**Control**	**Internal focus of attention**	**Near external focus of attention**	**Distant external focus of attention**	**Increase in distance of focus of attention**
Pretest		1.21±0.12	1.18±0.99	1.34±0.14	1.32±0.88	1.28±0.16
Exercise Sessions	**Session 1**	1.27±0.11	1.14±0.09	1.30±0.12	1.39±0.09	1.28±0.11
	Session 2	1.76±0.09	1.39±0.13	1.79±0.31	1.73±0.15	1.51±0.15
	Session 3	2.09±0.14	1.84±0.24	2.14±0.17	2.13±0.11	2.07±0.22
	Session 4	2.92±0.81	2.20±0.05	2.84±0.16	2.34±0.27	2.54±0.15
	Session 5	3.63±0.36	2.75±0.26	2.89±0.14	3.07±0.38	2.96±0.37
	Session 1	3.36±0.31	3.52±0.36	3.18±0.44	3.53±0.31	3.73±0.15
Retention & Transfer		3.25±0.15 3.51±0.30	3.54±0.50 3.18±0.41	3.62±0.21 3.34±0.29	3.42±0.35 3.19±0.35	3.64±0.12 3.34±0.27

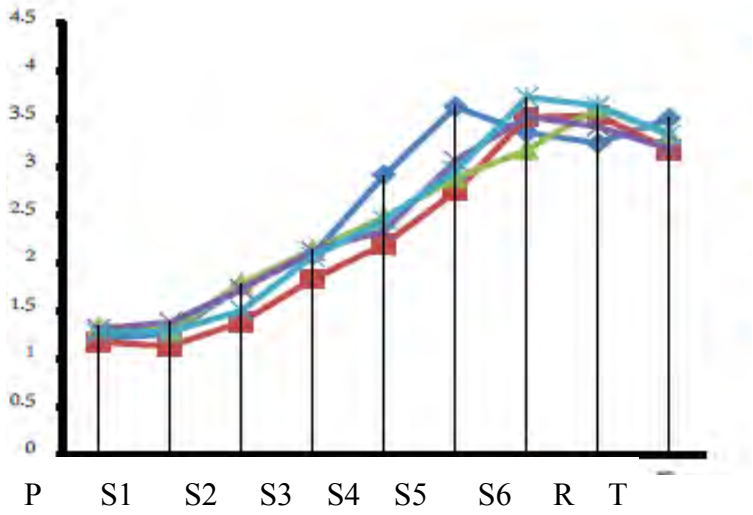

Fig 2. Mean Performance of Treatment Groups in Pretest Session (P), Exercise Sessions (S1-S6) & Retention-Transfer Session (R &T)
Control Group; Group of Internal Focus of Attention; Group of Near External Focus of Attention; Group of Distant Focus of Attention; Group of Increase in Focus of Attention

Results of Kolmogorov-Smirnov test showed a normal distribution of Performance accuracy and Backhand movement pattern over different levels of our independent variable and assumption of normality for using parametric statistics was accepted.

For comparing accuracy of performance and movement patterns among participants in pretest session, we performed one-way ANOVA analysis. The findings reflected no significant difference between variances (P=0.308) and accuracy of performance (P= 0.85) and movement patterns (P=0.001). Results of variance analysis highlighted no significant difference with results of frequent in-group comparisons of performance accuracy and movement patterns. The frequent examination on groups of participants and exercise sessions indicated main impact of groups of participants (P<0.001), main impact of exercise sessions (P<0.001), and group-session interaction (P<0.001). Therefore, as far as differences in scores between retention tests, transfer test and pretest were concerned we did one-way ANOVA analysis instead of one-way covariance analysis. The variance of retention test and pretest was not considered significant. Conversely, as regards transfer test and pretest, we observed significant variance. As a result, we performed Dunnett's post hoc test and Bonferroni's post hoc test respectively for retention and transfer. Findings of Bonferroni's post hoc test making paired comparison of performance accuracy in different exercise sessions demonstrated that accuracy of treatment groups was improved from first session (1.149) to last session (3.717) (P<0.05). Also, they showed that accuracy in control group was significantly lower (1.707; p<0.001) than that of treatment groups and the accuracy of the treatment group in which we did self-talk for internal focus of attention was lower (2.362; p<001) than the accuracy of the treatment groups in which we did self-talk for external focus of attention and increase in distance of focus of attention. But, there was no significant difference between the treatment groups in which we did self-talk for external focus of attention and increase in distance of focus of attention.

Moreover, in our one-way variance analysis, we could not find significant difference in performance accuracy among treatment groups in retention test (P<0.001) and transfer test (P<0.001). Results of Bonferroni's post hoc test indicated that levels of retention and transfer of movement pattern in control group were significantly lower than those in treatment groups (P<0.001). And, levels of retention and transfer of movement pattern in the treatment group in which we did self-talk for internal focus of attention were significantly lower than those in the treatment groups in which we did self-talk for external focus of attention and increase in distance of focus of attention (P<0.05). But, we could not find any significant difference between the treatment groups in which we did self-talk for external focus of attention and increase in distance of focus of attention.

Discussion & Conclusion

The present study aimed at increasing distance of attentional focus through instructional self-talk in cases of backhand learning and performance in high school girls. Instructional self-talk exerts more impact on learning and performing complex, elegant, and open skills (Hatzigeorgadis et al., 2011). Findings of this paper revealed that instructional self-talk causes shift in focus of attention in novice students learning table tennis. In addition, there was significant difference in performance accuracy and movement pattern between treatment groups and control group. These findings were not consistent with study of Parvizi (2010) who examined impact of instructional self-talk on learning and doing free throw as a closed skill in basketball.

As our findings suggested, treatment groups showed a higher degree of learning, performance, retention, and transfer relative to the control group. Also, three treatment groups put in greater performance in all sessions as

compared with the group of internal focus of attention. They were as follows: group of near external focus of attention, group of distant external focus of attention, and group of increase in distance of attentional focus. This result was consistent with some previous findings. For instance, in studies of Wulf, et al. (1998), Totska and Wulf (2003), and Wulf et al. (1999) on ski simulator and golf learning, external focus of attention had superiority as regards retention. Similarly, In respect of transfer test, Totska and Wulf (2003) found that group of external focus of attention put in greater performance than group of internal focus of attention in pedalo movements.

In compliance with Action Effect Hypothesis, Hommel and Elsner (2000) examining relationship between effect and action in cases of learning showed that environmental impact being created immediately after a particular action had capacity of choosing and activating that action. As Conscious Processing Hypothesis suggests, instruction of internal focus of attention in targeting tasks focuses attention not only towards internal information but also towards external basic information. Consequently, instruction on attentional focus imposes greater burden upon attentional resources or working memory, resulting in their poor performance (Wulf & Dufek, 2009).

Also, findings of this study supported findings of Tahmasbi (2004) who examined the impact of internal and external foci of attention on learning and performing soccer skills in novice students and findings of Wulf and Su (2007) who evaluated the impact of external focus of attention on golf shot accuracy in novice players. A large number of studies have investigated attention towards effect of movements vs. attention towards actual movements. Their findings revealed that external focus of attention had advantage in different sports such as Tennis (Wulf et al., 2000), baseball (Castaneda & Gray, 2007), dart (Marjanete, 2007), jumping (Porter et al., 2007), discus throwing in male participants (Zarghami et al., 2012), and agile movements (Porter, 2010). Due to movement patterns, group of near external focus of attention achieved superiority in retention.

Also, increase in distance of attentional focus gradually gave appropriate cues as the result of gradual shift in focus of attention and caused the related treatment group to move away internal conscious control and to move towards automatic external condition. Shift in focus of attention at different times of exercise could achieve greater conformity with requirements and assigned tasks of this group Thus, scholars are required to conduct further studies about conditions in which focus of attention is provided since we could not find significant difference in frequency and belief on self-talk i.e. difference among our groups did not arise from these two factors.

As Constrained Action Hypothesis suggests, internal focus of attention is viewed as a type of conscious control. Conscious effort and internal focus of attention cause small blocks in motor system and therefore automatic control system is weakened and the quality of performance is impaired. Conversely, external focus of attention establishes more automatic control, going through flexible, rapid, and unconscious process. The correlational studies and different examinations on teaching external focus of attention have indicated decreased distribution of attentional capacity (Wulf et al., 2001), compromised motor system with higher frequency (McNevin et al., 2003), and more rapid reaction.

Our study showed no significant difference in backhand movement accuracy in group of near external focus of attention, group of distant external focus of attention, and group of increase in distance of attentional focus in cases of acquisition, retention, and transfer. Therefore, it challenged findings of Totska and Wulf (2003), Park (2000), Danghiyan and Shojaee (2007), Banker (2012), Bell and Hardy (2009), MacCay and Wulf (2012), and McNevin et al. (2003) who highlighted this significant difference in groups with greater distance of external focus of attention. This contradiction in findings might result from the fact that students in group of near external focus of attention required to devote greater attention to near focus of attention for performance of backhand so far as it diverted their attention away from accurate performance in distant external focus of attention. But, students in group of distant external focus of attention should devote greater attention to distant focus of attention, and therefore it diverted their attention away from accurate performance in near external focus of attention. The small distance between near external focus of attention and distant focus of attention and small distance between ball and target points might be considered the other causes of contradiction in findings.

Furthermore, insignificant difference in treatment groups' scores as to frequency and belief in self-talk was an indication of the fact that differences among groups did not arise from these two factors. From the other hand, presence of cameras for recording scores of accuracy in performance and movement patterns diverted attention of students away from cues. As a consequence, there was no significant difference in their performance accuracy and movement patterns and they failed to communicate with cues related to distant external focus of attention.

To sum up, effectiveness of focus of attention with self-talk depended on types and levels of skills. As our findings suggested, increase in distance of attentional focus with instructional self-talk exerted impact on acquisition and retention of movement patterns in high school girls. Students in group of near external focus of attention, group of distant external focus of attention, and group of increase in distance of attentional focus put in greater performance in acquisition, retention, and transfer, as compared with group of internal focus of attention. These three groups did not reflect significant difference in acquisition, retention, and transfer. Their Greater performance, consistent with James' Ideo-Motion Theory, Prinz's Common Coding, Hommel's and Elsner's Action Effect Hypothesis, Constrained Action Hypothesis, and Conscious Processing Hypothesis, reflected the positive impact of external focus of attention on learning and performing movements.

Future studies can perform more detailed examination on focus of attention with self-talk and can control for it more strictly. Self-talk effectiveness is associated with types and complexity of tasks. Therefore, it seems sports

teachers provide novice students with near external focus of attention, distant external focus of attention, and increase in distance of attentional focus for teaching backhand movement in table tennis.

Other suggestions for further studies are as follows: (1) comparison between instructional self-talk and motivational self-talk in cases of focus of attention; (2) impact of instructional self-talk on different skills of sports in cases of near and distant external focus of attention; and (3) effect of instructional self-talk on performance of males and females in cases of focus of attention.

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PHYSICAL REHABILITATION OF LOW BACK PAIN BASED ON A CONCEPTUAL SYSTEM APPROACHES

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Annotation. In Europe, back pain is a common disease, this is according to European statistics. In accordance with the new case, the pain each year occurs in 5% of the population. *The aim* of this work is to develop a conceptual approaches to the physical rehabilitation process at the surgical treatment of patients with back pain. *Materials and methods*. There was researched an experience of the domestic and foreign researches in physical rehabilitation area. Methods of the research were the analysis of the references and theoretical research methods (as an analysis, interpretation and synthesis of scientific and educational literature on the study problem. Abstraction (or idealization and schematization) is the allocation of the essential foundations. Also we used experimenting with schemes (as a development of their content, sophistication and usability testing) at development of concepts, practical models and physical rehabilitation programs. *Results.* The physical rehabilitation concept at the surgical treatment of patients with back pain was developed, given by the modern science in the diagnostics field, performing difficult complex spinal surgery with the using of new tools and the knowledge from the physical rehabilitation improvement. *Conclusions.* The using of a systematic methodology for physical rehabilitation in the surgical treatment of patients with vertebral pathology, helps to optimize research, diagnostic, therapeutic, rehabilitative and preventive measures, providing them with the required comprehensiveness, consistency, orderliness.
Key words: conceptual approaches, physical rehabilitation, back pain, neurosurgery

Introduction

The level of public health in the former Soviet countries at the present time is not high enough. Just in the Ukraine, there is performing some activity for saving the public health, but through the influence of a various reasons, actual results are far from desirable: the overall incidence is increasing, and therefore increasing the financial cost in the society. Through the rising of a primary disease, there can be rising the chronicle diseases, that not only due to the increasing in life expectancy. The content the chronic diseases among the young and middle age also increases. However, it should be noted, that this situation is not unique and generally follows the world trends [8].

Researches, performed by the European Office of the WHO and other organizations, suggest that the chronic non-infectious diseases are the most exposed part of the workable population of Ukraine. From these diseases, there is unable for any work and die in 5-10 times more people in this age group than in the countries of the European Union. Today, the average life expectancy in Ukraine is on a level of 67.5 years (for men is 61.7, for women is 73.4), in Japan it's nearly 82 years old (78 y.o. are in a men, 85 y. o. are in a women), in Sweden it's 79 years old (78 y.o. for men, 83 y.o. for women), and the average healthy life is nearly 55 years old (in Japan is 72 years, in Australia is 71 years, in Canada, Germany, the Netherlands are 70 years, in the UK is 69 years, in the USA is 67 years), respectively, it's on a 11.7 and 12.4 years lower than in the economically developed and socially advantaged countries [9].

The number of chronic diseases is increasing, it has a connection not only with the increasing in life expectancy: in recent years the rise of chronic diseases observed among the young and middle age. The main reasons for the steady growth of the lot of chronic diseases are unfavorable lifestyle and incomplete recovery [9].

One of the best manifestations of this combination are degenerative and dystrophic diseases of the motor system and particularly in the spine, it's occupying one of the first places on the prevalence in the world population [4, 10, 11]. The contingent of patients are the most rising-up and people of working age from 24 to 45 years [3], that's all resulting for a significant economic losses [13]. Urgency of this problem has prompted the WHO to declare a back pain (BP) for the priority research into the structure of the bone and joint decade (in 2000-2010 years).

The data about the prevalence of the BP are contradictory: based on the Ministry of Health of Ukraine, in our country from 14,3 to 21,8% of the population suffers from this disease. Foreign sources [16, 17] give a different picture: according to the epidemiological studies, performed in the United States and West Europe, the prevalence of BP reaches from 40 to 80%.

In Europe, BP is a common disease, this is according to European statistics. In accordance with the new case, the pain each year occurs in 5% of the population. According to official data released by National Health Interview Survey, the rate of this disease in the USA is nearly 2.3% of the total population. Today, BP constantly suffers from 15 to 20% of the population, from 60 to 80% of people at least once in their lives have experienced of the pain. In this regard, in the developed countries BP comparable in scale to the pandemic disease and it's becomes a serious health and social and economic problem. It was founded, that about 25% of the adult population in the different countries of the world at least once in their life were away from work due to BP, the content of missed work days per year is nearly 15% of the

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total disability. Although in many cases, BP is not accompanied by a loss of ability for a work, however, it deteriorates the quality of life in people.

Such significant variation of a prevalence, apparently due to the fact that there are different diagnostic criteria for the disease, as a from elementary to severe clinical forms of the disease [10, 11, 17].

In the case of BP, as a lower and sacral pain in most cases performing a successful conservative treatment [3, 5] however, in some cases, the efficiency of this treatment is insignificant. In addition, the patient has a fear of losing professional form and trying to be treated without interrupting the main activity. Often, it's brings to a chronic disease with severe degenerative and dystrophic changes of all elements in the spine.

In recent years there has been a consistent trend towards younger BP syndromes, dramatically increase the percentage of severe complications such as vertebral and intervertebral hernia with radicular compression-vascular and spinal syndromes [7, 11, 17]. In this regard, significantly increase the number of surgical interventions on the spine [1]. The number of operations performed in the neurosurgical departments of Ukraine for help to the patients with BP from 2001 to 2010 years had been doubled [http://www.neuro.kiev.ua/UserFiles/File/Statistics/Zvit_za_2010_for_web.pdf]. There was developed a various types of surgical interventions. There use the rear, front, anterolateral approaches. Also there was applied classical open, minimal access and endoscopic techniques. For the spinal stabilization using different types of transplants and metal-fixation [14, 15]. All of this is talking about the diversity of existing approaches in a spinal neurosurgery and the choice of methods of physical rehabilitation for full recovery of the patient's health [15].

But the problem of the development of the strategy of physical rehabilitation for different types of surgical intervention in our opinion is the one of the most urgent and no outstanding problems. The lot of clinical forms and features of the surgical treatment of vertebral disease entails a variety the ways of recovery: it must be comprehensive, differentiated, considering the peculiarities of the clinical forms of destruction, individual responses of patients to particular methods (http://www.neuro.kiev.ua/UserFiles/File/Statistics/Zvit_za_2010_for_web.pdf) [8, 15] and the impact of the whole.

Purpose, tasks of the work, material and methods

The aim of this work is to develop conceptual approaches to the physical rehabilitation process at the surgical treatment of patients with BP.

Methods of the research were the analysis of the references and theoretical research methods (as an analysis, interpretation and synthesis of scientific and educational literature on the study problem. Abstraction (or idealization and schematization) is the allocation of the essential foundations. Also we used experimenting with schemes (as a development of their content, sophistication and usability testing) at development of concepts, practical models and physical rehabilitation programs.

Results of the researches

Conception (lat. *conceptio* is an understanding, or system) was given as an ideologically coherent and meaningful, or reasonably coherent and complete presentation of original scientific theory or version [18]. The physical rehabilitation concept at the surgical treatment of patients with BP was developed, given by the modern science in the diagnostics field, performing difficult complex spinal surgery with the using of new tools and the knowledge from the physical rehabilitation improvement.

The basis of the physical rehabilitation organization in neurosurgery treatment of BP should put on the Anokhin's theory of functional systems [2]. It allows to take a different view on the already well-known approaches, but not always comprehensible of the biological phenomena, and in addition, allows to change the principles of the practical using of the knowledge that based system approach. The system approach is a form of application of the knowledge theory and dialectics to the study of processes in biological organisms (a process is the dynamic changes in the system over time). Its essence is the implementation of the requirements of general systems theory, according to this theory, every object in the course of its study should be seen as a large and complex system, and at the same time as part of a general system. In the low-educational sense of a systematic approach, it requires the using of the system (or complex) of methods to the studying of phenomena and processes in living biological system, which outlines the elements of internal and external communications [8].

According to P.K. Anokhin [2], it is a complex of interacting components, aiming at obtaining of the useful results.

Based on the representations of the body as a complex multi-component system of internal and external interactions, V. D. Troshin [13] considers the obvious, that understand the laws of his behavior and management is not enough rely solely on the final stable performance. There must be taking care, and the dynamics of their production, analyze the impact of varying processes of some parts on the other and the system as a whole. Thus, the system methodology requires mastering in the rehabilitation, therapist assess the likely effectiveness of a particular type of treatment, the relative forecasting results of the study or the dynamics of the disease, etc. The accuracy of the probabilistic prognosis depends on the depth and comprehensiveness of the known phenomena, so a systematic approach in such situations is an essential educational tool.

The term as a "systems approach" in the physical rehabilitation must necessarily be complemented by the term as a **"structural"** (the structure is a stability of the relationship between elements of the system [6]), as there is a dialectical interdependence of structural features and functional-system processes in living biological systems are well known. We have modified some conceptual approaches to be followed in the implementation of a systematic approach to physical rehabilitation in the surgical treatment of patients with vertebral pathology:

The systematic and target conceptual approach is enable the scientific definition of the objectives of physical rehabilitation at the surgical treatment of patients with BP at each stage of recovery, their mutual coordination among themselves.

The systematic and resource conceptual approach is to allow the identifying the resources, required for the implementation of the objectives of each phase and the period of physical rehabilitation in the surgical treatment of patients with BP and allows to use a lot of tools of physical rehabilitation for restoring a function of individual cells and the organism as a whole.

The systematic elemental conceptual approach is obligatory consideration of all the factors for determining the nature and direction of physical rehabilitation measures in the surgical treatment of patients with vertebral pathology. These factors include:

- A neurological defects;
- The rate and nature of disability;
- A handicap level;
- The amount and nature of the surgery;
- A surgical access;
- The stage and the period of physical rehabilitation;
- The duration of the post-operative recovery.

The systematic integrational conceptual approach is to allow to perform an analysis the elements of the physical rehabilitation system at the surgical treatment of patients with BP and their relationships within a particular organizational structure, as a medical institution, clinic, sanatorium, rehabilitation or fitness center. Proposed activities should not perform against the basic medical process. Each stage of the rehabilitation period must be organically linked with accepted medical establishment treatments and medical rehabilitation.

The systematic evolutionary conceptual approach is determine the nature of the process and recording the physical rehabilitation of patients based on the theme of phasing and the continuity of their activities, identifying criteria of efficiency or ability to analyze the body condition at each stage, as well as the possible prospects of recovery or compensation functions.

The systematic communicational conceptual approach could be for the identifying external relations of the object with the other, its relations with the environment, it allows to consider the body as a whole and at the same time, as a subsystem of the higher levels. Higher levels in relation to patients with BP are social environment, the influence of environmental conditions on the patient’s body, specific professional activities, especially the patient's lifestyle, etc.

The systematic structural conceptual approach consists of exposure by physical rehabilitation means in the surgical treatment of patients with vertebral pathology to a single biomechanical chain, as a "spine - pelvis - limbs", it was given that the deformation of one link of the human body inevitably leads to a compensatory response by the other biomechanical parts.

The systematic functional approach provides a conceptual identification of the factors limiting recovery of function in patients with vertebral pathology and their remedies. This approach allows to solve some re-adaptational and re-social problem, a feature of which is to develop a new (or optimal), static and movement patterns, the restoration of the affected spine and motor system as a whole, helps prevent further damage the spine and return the patient to his former employment.

Conclusions.

The using of a systematic methodology for physical rehabilitation in the surgical treatment of patients with vertebral pathology, helps to optimize research, diagnostic, therapeutic, rehabilitative and preventive measures, providing them with the required comprehensiveness, consistency, orderliness.

Prospects for future research are to develop the principles of physical rehabilitation in the surgical treatment of patients with vertebral pathology.

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INVESTIGATING THE EFFECTS OF PHYSICAL ACTIVITY LEVELS, DAIRY PRODUCTS AND CALCIUM INTAKES ON RISK FACTORS OF OSTEOPOROSIS PREVENTION IN FEMALE STUDENTS OF ISLAMIC AZAD UNIVERSITY OF DAMAVAND, IRAN

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Annotation. *Aim:* Osteoporosis is a serious metabolic bone disorder that often results in hip fracture and usually asymptomatic in its initial stages. Since the majority of bone formation occurs during childhood and adolescence, it is important to begin primary prevention at an early age, although the optimal way for instilling this preventive behavior in youth has not yet been defined. The purpose of this study was to investigating the effects of physical activity levels, dairy products and calcium intakes on risk factors of osteoporosis prevention in female students of Islamic Azad university of Damavand in Iran. *Methods:* This cross sectional study was conducted on 280 healthy female university students aged between 18 to 24 years old who were selected randomly from the university students of Islamic Azad university of Damavand, Iran. Subjects completed an informed consent form, health history questionnaire; food questionnaire was used to assess the entire dietary component intakes and physical activity questionnaire (Baecke). *Result:* The result shows that Increase in physical activity and diary product consumption, the calcium intake with a decrease in BMI, and increase in BMD. Also results shows that there were significant negative correlations between the physical activity levels, diary product consumption, the calcium intake and risk factors of osteoporosis. *Conclusions:* Increased physical activity and diary product consumption, the calcium intake is associated with an increase in BMD and a concomitant decrease in BMI. These findings suggest that population-level interventions to increase physical activity and diary product consumption, the calcium intake would favorably impact bone and other health outcomes. Thus, dietary pattern coupled with higher education levels and greater physical activity favored bone health and osteoporosis prevention in middle school females.
Key words: dietary, intake, physical, activity, Iran, women.

Introduction

Osteoporosis is a clinically-silent disease in its early stages. It can lead to hip and spine fractures later in life. According to the National Osteoporosis Association of America in 1999, 28.5 million people in the U.S., of whom 89% are women, had osteoporosis in the USA. Also, 10 million people in the U.S. were categorized as having low bone mass, exposing them to the risk of osteoporosis and osteopenia (Mark & Link, 1999; Drozdzowska et al., 2004). The effect of environmental factors on bone is likely to vary across the lifespan, and length of exposure to exercise, diet, alcohol, caffeine, and smoking may have increasing impact in older women. Physical activity and exercise have been demonstrated to have positive effects on growing bones before and during puberty, and many studies have shown the beneficial effects of high-impact weight-bearing activity on the load-bearing sites of the skeleton [McKay et al., 2000; Shibata et al., 2003].Although bone mass achieved by early adulthood primanly reflects bone mass achieved during growth, the additional gain in bone mass that may potentially occur is likely to be dependent on lifestyle factors practiced during young adulthood these factors may include physical activity and nutrient intake, in particular calcium intake [Bonjour et al., 1991; Sowers et al., 1985]. Physical activity has been suggested as an intervention strategy to promote optimal bone density during youth and to reduce the rate of bone loss during middle and later life [Heaney et al., 2000, Kohrt et al., 1996]. Bone tissue responds to dynamic as opposed to static loading, as static loads (even those that produce fairly large stresses or strains) do not initiate osteogenesis [Lanyon et al., 1984]. For physical activity to have an osteogenic effect, the mechanical loads applied to the skeleton need to be in excess of those encountered in daily activity [Frost et al., 1988]. Nutrition could be an important modifiable factor in the development and maintenance of bone mass and the prevention and treatment of osteoporosis. Calcium and vitamin D nutrition play an important role in determining bone health. It has been shown that physical activities and sports during the growing years affect bone mass status in the perimenopausal period, and calcium intake is an additive contributing factor [Uusi-Rasi et al., 1998]. Reeker et al (3) reported that calcium intake and physical activity (PA) were significantly associated with increases in both compact and trabecular bone tissue [Reeker et al., 1992]. Also studies [Cooper et al., 1995; Uusi-Rasi et al., 1998] showed that physical activities and sports during growing years affect bone mass status in the perimenopausal period, and calcium intake is an additive contributing factor.

The studies evaluated the impact of both exercise and nutritional intake on bone mass in premenopausal young women and results unclear [Takada. 2004], but the study involved only a small number of subjects and their results were inconsistent.

However, the associations' physical activity levels, dairy products and calcium intakes on risk factors of osteoporosis prevention in Iranian have not been thoroughly investigated. The purpose of this study was investigating the effects of physical activity levels, dairy products and calcium intakes on risk factors of osteoporosis prevention in female students of Islamic Azad university of Damavand in Iran.

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Materials and methods

The target population consisted entirely of female students of Islamic Azad university of Damavand in Iran. Among them 280 healthy female students with similar age and weight selected were randomly. The condition of the study was thoroughly explained to all subjects, and written informed consent was subsequently obtained. The protocol was approved by the Ethics Committee of Islamic Azad university of Damavand, Tehran, Iran. Subjects completed an informed consent form, health history questionnaire; food questionnaire was used to assess the entire dietary component intakes and physical activity questionnaire (Baecke). SPSW statistical software (version 18) was used to analyze. Both descriptive (mean and standard deviation) and inferential statistical were used to Spearman correlation coefficient were used.

Results

Subject age data are present in table 1. The result shows that Increase in physical activity and diary product consumption, the calcium intake with a decrease in BMI, and increase in BMD. Also results shows that there were significant negative correlations between the physical activity levels, diary product consumption and calcium intake with risk factors of osteoporosis (Table 2).

Table 1

Demographic characteristics of study subjects (n = 254)

Variables	**Mean SD**
Age (year)	21.15±4.62
Height (cm)	162.16±5.04
Weight (Kg)	65.45±7.17
Body Mass Index	24.81±3.39

Table 2.

Relationship between Physical Activity, Dairy production and calcium intakes

	Physical Activity Levels		**Dairy Products**		**Calcium Intakes**	
	Pearson correlation	P Value	Pearson correlation	P Value	Pearson correlation	P Value
Risk Factors of Osteoporosis	-49.6	0.023	-52.7	0.004	-64.8	0.002

Discussion

This study focused on the investigating the effects of physical activity levels, dairy products and calcium intakes on risk factors of osteoporosis prevention in female students of Islamic Azad university of Damavand in Iran. The results show that significant negative correlations between the physical activity levels, with risk factors of osteoporosis. The literature demonstrates the Physical activity is necessary for bone acquisition and maintenance through adulthood. The best evidence that exercise can slow bone loss or add bone mass to the postmenopausal skeleton comes from prospective intervention studies. Even job-related physical activity is an important factor in maintaining adequate bone mass. The suppression of bone turnover is the key mechanism for the positive response of lumbar BMD to moderate walking exercise in postmenopausal women [Yamazaki et al., 2004]. The researchers found that Physical activity in childhood may provide a significant positive contribution to an osteoporosis prevention strategy (i.e., maximizing peak adult bone density) that has been endorsed by some researchers [Burry et al., 1984; Stillman et al., 1987]. Our results suggest that the skeletal status of the os calcis in young women is influenced by the modulation of mechanical stress (i.e., physical activity) in the growing years.

Also results shows, that there were significant negative correlations between the diary product consumption and calcium intake with risk factors of osteoporosis. The major part of this dietary calcium came from plant sources, which are known to have low bioavailability. Inhibitors of calcium absorption such as phytates and oxalates are abundant in the vegetarian diet and retard the absorption of dietary calcium. Moreover, absorption of calcium could be hampered by vitamin D deficiency as this is the major factor influencing absorption of calcium from the gut. Babarousti et al. (2005), reported that BMI, Ca intake, and time spent on physical activity affect heel BMD independently but not in an age-dependent manner [Babaroutsi et al., 2005]. Results with regard to the relationship between calcium intake and peak bone mass were disparate. Greater calcium intake is thought to contribute to the acquisition of a high peak bone mass. A meta-analysis showed that calcium intake correlated with BMD of all areas except in the ulna of postmenopausal women [Welten et al., 1995].It is paradoxical that, as health researchers and educators become increasingly aware of the importance of good habits in nutrition and physical activity in the prevention of a variety of chronic diseases, children and adolescents are adopting lifestyles that act counter to these. Diets in many developing as well as industrialized countries are moving towards foods that are poor in calcium and minerals, and children gravitate to television and computer games in place of outdoor games and sports. In order to reverse this trend, it is necessary to actively promote healthy behaviors and lifestyles to adolescents. School health education programs are critical opportunities for facilitating healthy lifestyles for youth.

Conclusions

Our results suggest that physical activity levels, dairy products and calcium intakes during the growing years has a positive effect on osteoporosis prevention and bone density attained by female students.

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