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Key title: Fiziceskoe vospitanie studentov
Abbreviated key title: Fiz. vosp. stud.
ISSN 2075-5279 (Russian ed. Print), ISSN 2223-2125 (Russian ed. On line).

Key title: Physical education of students
Abbreviated key title: Phys. educ. stud.
ISSN 2308-7250 (English ed. Online)

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A journal is ratified the Higher attestation commission of Ukraine:
physical education and sport,
pedagogical sciences
Decision of Presidium N1-05/3 - 08.07.2009, N1-05/7 -
or 10.11.2010.

Journal is reflected in databases:

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  http://lib.sportedu.ru/Press/FVS

Certificate to registration:
KB 20682-10482PR от 31.03.2014.
Frequency - 6 numbers in a year.
Address of editorial office:
P.O.Box 11135, Kharkov-68, 61068,
Ukraine Tel. 38097-910-81-12
http://www.sportedu.org.ua

Address of editorial office (Poland):
Sport str. 2, of.209, 85-064 Bydgoszcz, Poland
Editor-in-Chief: Sergii Iermakov, tel.: +48886680976
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STUDY OF SPECIAL CAPACITY IN BOXERS WITH DIFFERENT STYLES OF FIGHT

Aksutin V.V., Korobeynikov G.V.
National University of Physical Education and Sport of Ukraine

Annotation. Purpose: the determination of tendency in boxer to a certain style of fight is important at all stages. Material: The special capacity in boxers with different styles of fight were studied. The special capacity and the impact force were studied by special training equipment among 23 boxers of higher qualification. The absolute and the relative strength of serial and single strikes were studied. Results: the results indicated that the absolutely impact force, the total tonnage and the relative strength of his right hand of strikes in boxers-“strongman” are more higher than in boxers with different styles. In boxers-“player” the power-hitting left-handed is more increasing for different styles. This fact indicates the presence among boxers-“player” the left-handed persons. Conclusions: the presented data are indicated about more higher of special endurance in boxers-“fastest”. This group of boxers differs from other of more higher development speed endurance

Key words: boxers, capacity, styles, fight, force.

Introduction

It is know that different people have different “sets” of abilities. Individual combination of abilities is formed during all life and determines personality’s features [1,2]. Successfulness of functioning is ensured by presence of one or another combination of abilities, favorable for desired result [3,4]. In actual conditions one kind of abilities can manifest together with other, similar by their manifestation, but different by their origin. Successfulness of one and the same functioning can be determined by different abilities that is why absence of some skills can be compensated by presence of other skills. That is why individuality of certain skills, ensuring successful fulfillment of certain action is usually called “individual style of functioning” [5,6]. In modern psychology competences, as integrated qualities (skills), aimed for achievement of results, are more often mentioned.

At present stage of boxing style of bout is a characteristic feature of every boxer-professional [7,8]. For example there are boxers with high power vigor in bout. They have strong blows; they strive to suppress adversary with power. Some boxers conduct bout constantly varying their actions, striking in the most sudden moments. There are boxers, who “exhaust” adversary with high temp during many rounds and win, when adversary can not endure enforced temp. The most effective variant is ability to combine different styles and show different manners of bout’s conducting in different duels [9]. However, the most characteristic features of sportsmen’s movements remain unchanged that permits to speak about prevailing style [10,11].

Determination of boxer’s bent to certain style of boxing is an actual task as far as style of functioning is manifested, as a rule, on the stage of maximal realization of sportsman’s potentials, though, for increasing of boxers’ training efficiency, determination of sportsmen’s bents to certain styles of boxing is greatly significant on all stages of training [12,13]. For this purpose, it is necessary to use informative indicators, which are easily detected and do not require long time for registration; which would be relatively unchanged in ontogeny. In connection with the above said we think it urgent to analyze special workability of boxers with different styles of boxing.

Purpose of the work, material and methods

The purpose of the work is analysis of special workability of boxers with different styles of boxing.

Material and methods of the research:

Determination of special workability and power of strikes was conducted on special stimulator. We registered absolute and relative strength of single, serial and double blows, in particular, left-side and right-straight blows; gradients of different blows’ effectiveness; quantity of blows for 8 seconds and for 40 seconds; coefficients of different blows’ quickness; gradients of different blows’ endurance; total “tonnage” of blows for 8 sec. and for 40 sec. In total, 24 indicators of special workability and power of blows were registered. In the research 23 highly qualified boxers took part: candidate masters of sports and masters of sports of Ukraine.

Results of the research

For analyzing of boxers’ distinctions depending on style of boxing, we analyzed mean mass of sportsmen’s bodies.

In table 1 we give mean body masses of boxers with different styles of boxing.

<table>
<thead>
<tr>
<th>Style of boxing</th>
<th>Body mass, kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>“variable style” boxers</td>
<td>66.31 ± 5.34</td>
</tr>
<tr>
<td>“power style” boxers</td>
<td>86.14 ± 8.52*</td>
</tr>
<tr>
<td>“quick” boxers</td>
<td>72.80 ± 7.65*</td>
</tr>
</tbody>
</table>

Table 1

Body masses of boxers with different styles of boxing.

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doi:10.15561/20755279.2014.0501
The data of table 1 witness that “power style” boxers have the biggest mass of body, while “variable style” boxer have the least mass. It is connected with “power style” boxers having big muscular mass. Besides, actually “power style” boxers belong to heavy weight categories, while “variable style” boxer – to light categories. Accordingly, “quick” boxers belong to middle weight categories.

In table 2 we give mean values of blow absolute power of different styles’ boxers.

<table>
<thead>
<tr>
<th>Style of boxing</th>
<th>Power, manifested in technical blows, kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left side</td>
</tr>
<tr>
<td>“variable style”</td>
<td>114.81±9.73</td>
</tr>
<tr>
<td>“power style”</td>
<td>138.71±8.47*</td>
</tr>
<tr>
<td>“quick”</td>
<td>92.00±6.53***</td>
</tr>
</tbody>
</table>

* - p<0.05, comparing with variable style” boxer; ** - p<0.05, comparing with “power style” boxers.

Our analysis showed that “power style” boxers have indicators of blows’ “absolute strength” higher than “variable style” and “quick” boxers. At the same time, “quick” boxers are characterized by decreased indicators of blows’ “absolute strength” (see table 2). However, it is valid only for left side and right straight blows. Concerning left side and right straight single blows we did not find any confident differences between “variable style” boxers and “quick” boxers (see table 2). It is evidently connected with specificity of single blows’ technique.

According to commonly accepted definition strength of blow in boxing is a value, with which boxer impacts the body of his adversary. This value requires application of different forces and comprehensive boxer’s fitness. But actual manifestation of blow’s strength depends on boxer’s body mass.

In table 3 we provide values of blows’ relative strength (in relation to body mass) of different styles’ boxers. The data of table 3 witness about absence of confident differences between different styles’ boxers.

<table>
<thead>
<tr>
<th>Style of boxing</th>
<th>Power, manifested in technical blows, conv.un.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left side, single</td>
</tr>
<tr>
<td>“variable style”</td>
<td>2.72±0.37</td>
</tr>
<tr>
<td>”power style”</td>
<td>2.51±0.73</td>
</tr>
<tr>
<td>“quick”</td>
<td>2.48±0.36</td>
</tr>
</tbody>
</table>

Thus, we can say that relative strength of blow in boxing does not depend on sportsman’s body mass.

In boxing, like in other contact martial arts, blow’s power is connected with explosive power. Explosive power is ability of sportsman’s body to increase muscular forces within the shortest possible time, during which enormous energy releasers. As a result of such action boxer is able to fulfill a series of sudden, very strong and quick blows. Exactly explosive power is the most suitable aspect of strength in boxing; however, maximal manifestation of explosive power hinders accurate movements and reduces variability of movements. Power, explosive power in particular, is the most characteristic feature of “power style” boxers.

In table 4 we give calculated coefficients of blows of different styles’ boxers.

Analysis of results, given in table 4, witnesses that blows' coefficients of “power style” boxers and “variable style” boxers are rather close by their values. At the same time coefficients of “quick” boxers rather differ. It is seen in gradient of effectiveness of left and right side blows as well as in gradient of blows’ effectiveness (see table 4).
Thus, “power style” boxers and “variable style” boxers have close by values coefficients, while “quick” boxers are characterized by lower values that is in compliance with absolute results of blows’ strength (see table 2).

However, “quick” boxers have higher coefficient of endurance than “power style” and “variable style” boxers. So, we can conclude that boxers with prevailing power characteristics (“power style” boxers) have lower values of endurance. In their turn “variable style” boxers are characterized by better endurance.

Physiological mechanisms of manifestation of muscular strength and quickness are determining foe formation of boxing style. Speed of muscular contraction (i.e. value of its contraction per unit of time) depends on value of external load, which it has to overcome. The less is the load the higher is speed of contraction. It is explained by the fact that with increasing of muscle’s contraction speed, time of interaction of actin and myosin fibers, sliding in respect to each other, shortens. By this reason the quantity of simultaneously interacting cross bridges and manifested by a muscle force is less than with its slow contraction. This complex of bents is realized in formation of certain style of functioning, including boxing.

**Conclusions:**
“Power style” boxers have not only absolute strength of blows higher but also total tonnage of blows as well as relative power of right blow. “Variable style” boxers have left side blow stronger. It points at the fact that among “variable style” boxers there is bigger quantity of lefthanders. Besides, it stresses that boxers with better coordination, which is characteristic for “variable style” boxers, have blow with not guiding arm is stronger.

The received data witness about higher special endurance of “quick” boxers. This group of boxers differs from other groups by better speed endurance.

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Cite this article as: Aksutin V.V., Korobeynikov G.V. Study of special capacity in boxers with different styles of fight. Physical education of students, 2014, vol.5, pp. 3-7. doi: 10.15561/20735279.2014.0501

The electronic version of this article is the complete one and can be found online at: http://www.sportpedu.org.ua/html/urlive-e.html

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Received: 07.06.2014
Published: 30.06.2014
DOSSING METHOD OF PHYSICAL ACTIVITY IN AEROBICS CLASSES FOR STUDENTS

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Ivano-Frankivsk National Medical University

Annotation. **Purpose**: reasons for the method of dosing of physical activity in aerobics classes for students. The basis of the method is the evaluation of the metabolic cost of funds used in them. **Material**: experiment involved the assessment of the pulse response of students to load complexes classical and step aerobics (n = 47, age 20-23 years). In complexes used various factors regulating the intensity: perform combinations of basic steps, involvement of movements with his hands, holding in hands dumbbells weighing 1kg increase in the rate of musical accompaniment, varying heights step platform. **Results**: on the basis of the relationship between heart rate and oxygen consumption was determined by the energy cost of each admission control load intensity. This indicator has been used to justify the intensity and duration of multiplicity aerobics. Figure correspond to the level of physical condition and motor activity deficits students. **Conclusions**: the estimated component of this method of dosing load makes it convenient for use in automated computer programs. Also it can be easily modified to dispense load other types of recreational fitness. **Keywords**: dosage, exercise, aerobics, student.

**Introduction**

One of ways of optimization of students’ physical education is increasing of motivation to practicing of physical culture and sense of responsibility for own health, formation of strove for healthy life style [8, 11, 16]. Rather promising step in solution of this problem is application of the most popular kinds of motion functioning in students’ physical education [5, 10, 14]. Concerning trainings of students’ age girls leading places in popularity rating are traditionally taken by different health related aerobics [5, 14]. Important characteristic of all aerobic trainings is the fact that that a lot of different movements are used in them. This peculiarity gives emotional attractiveness to such trainings and advantage over those kinds of aerobic, in which monotonous exercises of cyclic character are used. On the other hand, exactly this feature often becomes a reason of one of the most important aerobic problem – complexity of high quality control and load’s monitoring at different aerobic trainings.

To day there exists a lot of publications, which make ground for optimal parameters of load dozing in health elated trainings – walking, running, swimming, walking on staircase. There have been found dependences between cardio-vascular system’s responses and speed of movements, length of steps, kind of swimming, inclination of running surface that permitted to work out methods of prognostication of loads’ intensity in appropriate kinds of aerobics [19, 20, 21, 22]. In aerobic trainings it is more difficult to find such dependences owing to great variability of complexly coordinated movements, characterized by many parameters.

Alongside with high health related potential of aerobic it is very difficult to regulate its complexes in comparison with cyclic kinds of trainings [5, 18]. In our opinion, an important achievement on the way of unification of health related aerobics’ technologies is application off block method of aerobic choreography’s construction [1, 6, 7]. It permits to clearly structuralize content of complex to be used in training and, to some extent, to envisage loads. Such combinations serve as a base for further complexes’ complication and making them more various by means of using of many methodic techniques – variation of music accompaniment, variation of basic movements, involving of arms’ movements, using of turns and travelling, using of weights. However, their selection is often spontaneous and conditioned only by coach’s wish to make training program more interesting, without consideration of physiological purposefulness of certain methodic techniques’ application at trainings of certain contingent. It points scientific searches to improvements of loads’ simulation and dozing at aerobics’ trainings. At present there exist works, which ground means of loads’ optimization for persons with different physical condition with the help of regulation of musical accompaniment, alternating of arms’ and legs’ works, application of jump exercises, regulation of step-platform’s height and so on [4, 12, 13, 15]. The listed techniques permit to influence on trainings’ intensity but, alongside with it, they do not permit to determine degree of its change. Therefore the question about variation of duration and multiplicity of trainings, which depend on intensity, still remains unsolved. Dozing of loads in girl students’ aerobic trainings is complicated also by the fact that trainees differ by level of physical condition that require searching of means how to differentiate loads. In our opinion working out of method of physical loads’ dozing will facilitate solution of this problem, in which, as a criterion for regulation of loads’ parameters we used unified indicator, videlicet – metabolic equivalent of aerobic means’ intensity, in compliance with whose value it is possible to prognosticate duration and multiplicity of trainings, ensuring optimal scope of motion functioning.

The research has been fulfilled in compliance with topic 3.9 “Improvement of scientific basis of sports for all, fitness and recreation” of combined plan of scientific researches 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 research was to give basis for means of dozing of physical loads at aerobic trainings of girls students on the base of metabolic value of the used means.

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doi:10.15561/20755279.2014.0502
The tasks of the research stipulated determination of metabolic value of complexes of classic and step aerobics on the base of girl students’ pulse responses to the applied loads and determination of degree of its change under influence of different means of loads’ intensity regulation (change of music accompaniment temp, work with arms, change of step-platform’s height, application of weights).

The methods and material of the research: in the research 47 girl students of Ivano Frankovskiy national medical university participated. They were offered to fulfill at 1st training four 15 minutes complexes of classic aerobic (complexes KA-1, KA-2, KA-3, KA-4), at 2nd training – three 15 minutes complexes of step-aerobic (CA-1, CA-2, CA-3).

Complex KA-1 stipulated cyclic fulfillment of bloc combination of classic aerobic basic steps (in position hands on waist) based on 4 musical squares (4х32 counts). Temp of music accompaniment corresponded to 128-132acc/p/min. Complex KA2 was analogous to previous one but also stipulated additional arms’ movements, Temp of music was 128-132 acc/p/min. Complex KA-3 included legs and arms’ movements, applied in complex KA-2, but every arm was loaded with dumbbell of 1 kg weight. 128-132 accents per minute. Complex KA4 was analogous to complex KA-1, but temp of music accompaniment was increased up to 138-140 acc/p/min.

Complexes CA1, CA2, CA3 envisaged fulfillment of movements on step-platform. In complex CA1 the height of step-platform was 15 cm, in complex CA2 - 20 cm, CA3 - 25 cm. With it, choreographic combination in all three complexes was the same and consisted of basic steps of step-aerobic. Combination was based on 4 musical squares (4x32 counts).

In the course of researches we determined level of maximal oxygen consumption VO_{2max} of girl students as well as their pulse responses to loads of experimental complexes. On the base of dependences between heart beats rate (HBR) and oxygen consumption VO_{2} we determined metabolic equivalent of their intensity (MET) and, accordingly, kcalor value (kcal/p/min^{-1}). The obtained data we used for foundation of algorithm of dosing of physical loads’ parameters.

Results of the research
As a result of fulfillment of aerobic experimental complexes by girl students we determined, that the lowest by intensity was load of experimental complex KA1 that corresponded to 50.64 % from MCK (see table .1). Using of arms’ movements in complex KA2 facilitated additional increasing of HBR in average by 17.2 beats per minute and was 65.2 % from MCK. The same by physiological responses was load of complex KA4, which stipulated increasing of music accompaniment temp (67% from MCK). The load of complex KA3, in which weights were used was the most intensive – 76.2 % from MCK. Fulfillment of exercises on 15 cm step-platform (CA1) resulted in increasing of HBR up to 146. 7 ± 2, 0 b.p.m, that corresponded to 53.2% from MCK. Increasing of step-platform’s height up to 20 cm and 25 cm in complexes CA2 and CA3 facilitated increasing of intensity accordingly up to 69.6 % and 77.8 % from MCK.

Pulse responses and oxygen consumption during fulfillment of aerobic experimental complexes by girl students

<table>
<thead>
<tr>
<th>Complex</th>
<th>HBR</th>
<th>Intensity</th>
<th>VO_{2}</th>
<th>kcal.kg^{-1}hour^{-1}</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X±m</td>
<td>% from MPK</td>
<td>X±m</td>
<td>MET</td>
</tr>
<tr>
<td>KA1</td>
<td>14.0±2.7</td>
<td>50.46</td>
<td>21.2±0.6</td>
<td>5.7±0.2</td>
</tr>
<tr>
<td>KA2</td>
<td>161.2±3.1</td>
<td>65.2</td>
<td>27.2±0.8</td>
<td>7.4±0.2</td>
</tr>
<tr>
<td>KA3</td>
<td>174.1±2.7</td>
<td>76.2</td>
<td>31.9±0.9</td>
<td>8.8±0.3</td>
</tr>
<tr>
<td>KA4</td>
<td>163.5±2.7</td>
<td>67.0</td>
<td>2.9±0.9</td>
<td>7.7±0.3</td>
</tr>
<tr>
<td>CA1</td>
<td>146.7±2.0</td>
<td>53.2</td>
<td>2.2±0.6</td>
<td>29.2±0.4</td>
</tr>
<tr>
<td>CA2</td>
<td>165.8±1.9</td>
<td>69.6</td>
<td>6.0±0.1</td>
<td>8.0±0.1</td>
</tr>
<tr>
<td>CA3</td>
<td>175.9±1.8</td>
<td>77.8</td>
<td>6.1±0.1</td>
<td>8.1±0.1</td>
</tr>
</tbody>
</table>

According to determined pulse responses we determined level of energy supply of aerobic experimental complexes. In comparison with value of main metabolism, which is 1 MET, complex KA1 caused increasing of energy consumption 5.8 ± 0.2 times, complex KA2 – 7.5 ± 0.2 times, KA3 – 8.9 ± 0.3 times and KA4 – 7.8 ± 0.3 times.
Metabolic value of complex CA1 in respect to basal metabolism increased 6.0 ± 0.1 times, CA2 - 8.0 ± 0.1 times, CA3 – 9.1 ± 0.2 times. Using value MET, which is equivalent to 3.5 ml.kg⁻¹.min⁻¹ and knowing that caloric equivalent of 1 l of O₂ is approximately 4.85 kcal.⁻¹ we calculated caloric value of aerobic experimental complex. It was used as a criterion of intensity in the offered method of dosing of physical load.

When selecting parameters of physical loads one should remember that their effectiveness to large extent depends on to what extent they can ensure scope of motion functioning, eliminating energy consumption deficit, which appears as a result of immobile life style [17]. Results of researches, made by R. Pafenbarger and E. Olsen witnessed that minimal risk of morbidity was registered among persons, who have weekly scope of motion functioning not less than 1500-2000 kcal [9]. Just this value was adopted by us as the basis for determination of weekly scope of energy consumption, which shall be ensured by aerobic trainings. Appropriate scope of motion functioning can be ensured by variation of physical loads’ parameters, correlation of which is expressed in the so-called principle FIT: F - frequency, I - intensity, T - time. Dependence between these indicators and scope of physical loads can be expressed as equation:

\[ V = F \times I \times T \] (1),

where \( V \) – volume of loads in kcal.p.week; \( F \) – frequency of trainings in quantity of week days, \( I \) – metabolic equivalent of trainings’ intensity in kcal.kg.min⁻¹; \( T \) – time of one training in minutes.

In spite of the fact that minimal scope of week motion functioning was accepted as 1500 kcal/week., for persons of active life style it can be less. In connection with this, for optimization of loads’ dosing process at aerobic trainings it is important to determine individual deficit of motion functioning, the value of which is expressed by difference between recommended energy consumption of motion functioning and actual energy consumption:

\[ D_{mf} = E_{rec} - E_{act} \] (2),

Where \( D_{mf} \) is deficit of motion functioning; \( E_{rec} \) – recommended energy consumption for motion functioning (1500 kcal), \( E_{act} \) – actual energy consumption of motion functioning.

In this connection loads’ dosing in aerobic is reduced to selection of FIT parameters’ correlation, which permit to eliminate existing deficit of weekly motion functioning. Dependence between such indicators can be written as the following expression:

\[ D_{wmf} = FIT \] (3),

Where \( D_{wmf} \) is deficit of weekly motion functioning, \( F \) – multiplicity of aerobic trainings a week, \( I \) – intensity of trainings, \( T \) - time. Basing on caloric value of means, used at trainings, we can prognosticate total volume of energy consumption and effectively distribute it during week, varying parameters of duration and multiplicity of trainings.

In table 2 we present recommendations concerning rational levels and multiplicity of trainings for persons with different levels of physical condition (PCL), offered by L.Ya. Ivaschenko et al.[3]. These recommendations were modified by of intensity level expressing in them not only in % from MOK, but also in units, reflecting its metabolic equivalent.

<table>
<thead>
<tr>
<th>PCL</th>
<th>Intensity level</th>
<th>Multiplicity training.p.week⁻¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% MPK</td>
<td>MET</td>
</tr>
<tr>
<td>Low</td>
<td>40-45</td>
<td>3.2-3.6</td>
</tr>
<tr>
<td>Below middle</td>
<td>45-50</td>
<td>3.6-4.7</td>
</tr>
<tr>
<td>Middle</td>
<td>50-60</td>
<td>4.7-6.3</td>
</tr>
<tr>
<td>Above middle</td>
<td>60-65</td>
<td>6.3-7.8</td>
</tr>
<tr>
<td>High</td>
<td>65-70</td>
<td>7.8-8.4</td>
</tr>
</tbody>
</table>

With the help of table 2 we can judge degree of adequacy of some aerobic means to girl students’ functional potentials and solve the question concerning purposefulness and effectiveness of their application.

Recommendations on multiplicity of trainings in a week and information about caloric value of chosen means permit to calculate time of one training by formula:

\[ T = D_{mf} / FI \] (4),

where \( T \) – time of training (min); \( D_{mf} \) – deficit of motion functioning to be removed with aerobic trainings, kcal.week⁻¹, \( F \) – multiplicity of trainings, training/week⁻¹, \( I \) - metabolic equivalent of trainings’ intensity, kcal/min⁻¹.
It should be noted that energetic value of complex $KA1$ corresponded to $5.8 \text{ kcal/kg}^{-1} \text{/hour}^{-1}$. For 1 minute this value is $0.1 \text{ kcal/kg}^{-1} \text{/hour}^{-1}$ and is convenient for application as basic criterion of energetic value of a training.

Application of different means of intensity’s increasing results in increasing of energetic value of a training; that is why they were identified with metabolic factors of intensity. Relation of values of metabolic factors of intensity of classic and step-aerobic complexes to metabolic factor of intensity of complex $KA1$, permits to determine specifying metabolic coefficients, which make it possible to correct time of trainings in proportion to increasing of energetic value of exercises. Thus, in compliance with value of factor of aerobic basic complex, which is $5.8 \text{ kcal/kg}^{-1} \text{/hour}^{-1}$ its coefficient ($Kf_1$) corresponds to 1. Coefficient of first factor of first height of step-platform ($Kf_2$) corresponding to different level of physical condition and experimental testing proved its purposefulness [2].

When determining metabolic value of every of them and it, in its turn, permits to prognosticate more exactly energy consumption of exercises. Thus, in compliance with value of factor of aerobic basic complex, which is $5.8 \text{ kcal/kg}^{-1} \text{/hour}^{-1}$ its coefficient ($Kf_1$) corresponds to 1. Coefficient of first factor of first height of step-platform ($Kf_2$) corresponding to different level of physical condition and experimental testing proved its purposefulness [2].

Formula 4 and presented above coefficients of metabolic factors permit to determine rational parameters of physical loads according to algorithm, which stipulates the following steps:

1. Determination of deficit of motion functioning (Dmf), which shall be removed by aerobic trainings. Determination of quantity of aerobic trainings, which shall ensure appropriate energy consumption, i.e. multiplicity of trainings a week. It can be within 2-6 trainings a week and depends on level of physical condition and resources of trainees’ free time.

2. Determination of rational time of one training, which shall ensure required energy consumption. It depends on trainings’ intensity, which can vary within large limits. For making loads’ dozing procedure standard we offer, first, determine time of trainings with fulfillment of basic complex of classic aerobic ($KA$), whose metabolic coefficient of intensity is determined by multiplication of this complex’s caloric value, corresponding to $0.1 \text{ kcal/kg}^{-1} \text{/hour}^{-1}$. Depending on chosen approach, second factor is $0.95$, coefficient of second level of step-platform’s height ($Kf_3$) with value of $8.1 \text{ kcal/kg}^{-1} \text{/hour}^{-1}$ is equal to – 0.72, coefficient of third level of step-platform’s height ($Kf_4$), the value of which is $9.3 \text{ kcal/kg}^{-1} \text{/hour}^{-1}$ – 0.62, coefficient of factor, which was conditioned by involving of arms’ movements in work ($Kf_5$) with value of $7.5 \text{ kcal/kg}^{-1} \text{/hour}^{-1}$ – 0.77, coefficient of factor of increasing of music accompaniment rate ($Kf_6$), with value of $7.8 \text{ kcal/kg}^{-1} \text{/hour}^{-1}$ – 0.74, coefficient of factor of weights’ application ($Kf_7$), with value of $8.9 \text{ kcal/kg}^{-1} \text{/hour}^{-1}$ – 0.65.

Conclusions:

1. Determination of deficit of motion functioning (Dmf), which shall be removed by aerobic trainings. Determination of quantity of aerobic trainings, which shall ensure appropriate energy consumption, i.e. multiplicity of trainings a week. It can be within 2-6 trainings a week and depends on level of physical condition and resources of trainees’ free time.

2. Determination of rational time of one training, which shall ensure required energy consumption. It depends on trainings’ intensity, which can vary within large limits. For making loads’ dozing procedure standard we offer, first, determine time of trainings with fulfillment of basic complex of classic aerobic ($KA$), whose metabolic coefficient of intensity is determined by multiplication of this complex’s caloric value, corresponding to $0.1 \text{ kcal/kg}^{-1} \text{/hour}^{-1}$.

3. When using different kinds of varying of loads’ intensity (loads, having other metabolic equivalent), received as a result of all above rendered procedure, time of trainings shall be multiplied by error coefficient of the factor, which is used in training. If several metabolic factors are used, time of trainings shall be multiplied turn by turn by coefficient of every factor.

The worked out method of loads’ dozing was used with simulation of aerobic trainings for girl students with different level of physical condition and experimental testing proved its purposefulness [2].

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Received: 11.06.2014
Published: 30.06.2014
FORMING A HEALTH CULTURE OF FUTURE TEACHERS IN POLISH EDUCATIONAL ESTABLISHMENTS
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Kharkov National Pedagogical University

Annotation. Aim: to study the experience of the structure and system of training of future teachers in Polish schools. Material: content analysis of domestic and foreign authors. Used data from the survey of students of Polish universities. Also were used survey results through polish service ANKIETKA. For comparison, a questionnaire survey 35 students of the Faculty of Physical Education (future teachers of physical training) and 30 students – the future teachers of elementary school of Ukrainian university. Results: the study of Polish teachers consider health culture of a person as the ability to assess individual and community health needs using in everyday life hygiene and health regulations. There have been some differences among Ukrainian and Polish students in their health and health culture. Among the respondents, Polish students – the future teachers of physical culture, is dominated motives such as the improvement of the physical condition, strengthen self-esteem, as well as improved health. Polish students from other disciplines believe that the most important motive for the adoption of physical activity is a concern for the physical well-being and mental health. The majority of Ukrainian students (future teachers of physical culture) believe an important part of building health culture of their direct participation in various sports clubs, as well as the ability to organize physical culture, sports and educational work with students outside the classroom. Ukrainian students (other specialty) noted the need to improve health, enhance knowledge in specific subjects humanities and promoting healthy lifestyles. Conclusions: It is recommended to use the experience of preparing students of Polish schools in modern Ukrainian higher education.

Keywords: student, teacher, teaching, health culture, school.

Introduction
One of components of family education is formation of children’s positive attitude to own health. For this purpose family applies different approaches, which facilitate cultivation of such qualities as: respect to older people, care of younger persons, honesty, decency, proper behavior, healthy life style and other. In this aspect, formation of the mentioned qualities is closely interlaced with education of qualities, which are intrinsic to many years’ family traditions. Exactly in Poland family traditions include, for example, religious education. Recent years more and more families in Ukraine have started to follow this direction of education. Traditionally Poland has many years’ history of religious education through family relations of adults and children, school, religious communities. That is why it is purposeful to research specificities of religious family education in Poland through prism of formation of health culture. In the mentioned aspect such research can be considered an urgent one.

Modern state of religious education and prospects of its influence can be seen by data of Ministry of culture of Ukraine (http://mincult.kmu.gov.ua). In report for 2013 there are such data: as on January 1st, 2013 religious network included 55 religious directions, within which 36 995 religious organizations function (in church there are 31 313 priests), including 87 centers and 295 administrations, 35 460 religious communities, 500 monasteries (with 6 834 monks), 370 missions, 81 brotherhoods, 202 religious educational establishments (with 19752 students), 13 157 Sunday schools. Religious life is elucidated by 384 church periodicals. For services, religious organizations use 23 814 temple and appropriate premises. Research of increment of religious institutions witnesses: for recent four years expansion of religious net have become steady and is within up to 2% and demonstrates trend to reducing of this increment. In 2012 the net of religious organizations increased by ¼% in comparison with previous year, while in 2011 this indicators was 1.8%, in 2010 – 1.9% in 2008 – 1.8%.

Law of Ukraine “On freedom of worship and functioning of religious organizations”, dt. 1991, is a legislative act, which regulated religious relations. This law is rather democratic by character. It meets international legislation’s standards in sphere of ensuring right for freedom of worship. This document is one more proof of urgency of the present research. At the same time, by the data of Bureau of public relations of USA state department (http://www.state.gov) in Ukraine there are numerous official religious holidays, in particular, Christmas, Easter, Trinity. On October 20th 2008 Ministry of education and science formed Public council on cooperation with Churches and religious organizations. All these permit to say about increasing influence of religion on education of youth in Ukraine. It is proved by opinion of M. Palinchak: “Problems of governmental-church relations in modern Ukraine were and are in center of increased attention both scientists and governmental bodies, public and religious organizations. They are at high level of social actualization”[5]. S. Tsenebko stresses that state shall control that school program on religious subject should be composed objectively, considering criticism and plurality of opinions [11].

Archbishop Avgustine supports this opinion:”Religious education’s problems shall be solved in two directions in Ukraine: 1. Christianization of secular education: introduction of extra-confessional, not maintaining by rites, subject “Christian ethic in Ukranian culture” in invariant part of general educational process; introduction of religious subjects in variant part of education as well as coordination of existing school programs with Christianity. 2. With participation of Ministry of education and science of Ukraine, development and creation of holistic centers of Orthodox education:
Orthodox kindergarten, Orthodox school, Orthodox gymnasium, religious schools, Seminaries, theological academy” [6].

That is why it is necessary to analyze Polish experience in religious education of youth in context of its influence of health of soul and body. It is known that Poland is one of the first countries of post-communist society, who adopted new democratic standards in worship. For example, by A. Dylus, M. Palinchak, s. Kholms Poland has historical traditions of national church, which had been formed long before formation of traditions of national state. It explains strong position of church even in period of socialism and ability to resist socialist regime [1, 4, 10].

Generalization of data of Polish literature on the mentioned problem proves that there are several approaches to formation of sound personality in family. The problem of formation of rising generation’s health culture through religious education was dealt with by: M. Likhodievska-Nimirko, Yu. Ynitsevska, K. Yankovskiy et al. They affirm that religion renders stabilizing and protecting influence on human psychic. First of all it protects psychic health and offers cooperation of tradition and dogma. It is known that religious person often demonstrates giving up of smoking, alcohol, drugs. Besides, social support, resulted from participation in religious life, helps to cope better every day problems, reduces anxiety and over-sadness, strengthen sense of welfare [15, 16]. The authors show the following religious means of resistance to diseases: religion is regarded as one of stress-resistant elements; human organism takes itself as personality, who is able to control own life decisions. At the same time there is also some negative influence of religion on health, which is reflected in denial of struggle or responsibility for any problems.

Health related education of schoolchildren in families was studied by: Y. Agustin, A. Bukovska-Yozvytska, B. Dumara, G. Kovaltchuk. Problems of formation of health culture in family in general were regarded by F. Adamskiy, Z. Bilanska-Osukhovska, Y. Bradshav, V. Tsikhon, Kh. Tsudak, Ye. Yankovska, A. Yanke. Psychology of family education was elucidated in works by: M. Braun-Halkovska, Ye. Mileska, K. Popilskiy, P. Porpeba, M. Rus, M. Kholpekyvych, Y. Khomplevych.

Researches of post-soviet period specialists witness about appearing of new approaches in family education, which are connected with approximation of church traditions to existing educational systems and their adaptation to modern conditions of family’s life. First of all it concerns observation of church holidays and rites in family. Concerning influence of church traditions on education of children in family it is manifested to less extent. In its turn, just observation of traditional church rules and duties can influence on development of a child and formation of his (her) skills of positive attitude to own health.

Analysis of presented points of view proves that problem of formation of mental health and health of body becomes urgent not only in medical sphere and sphere of psychology but also in pedagogic. Indeed, traditionally health of body and mentality is studied by medical specialists of different fields and, mainly, when life and health of a person id threatened. Hygienic doctors should have paid attention to healthy population, but hygienic specialists has distanced from human problems and concentrated attention on environment. Recent decades, mental status of an individual has been studied by psychologists, whom, in our society, person in the so called “third” state address. Spiritual health shall be cared of by “somebody other”, may be priest, - is the opinion of G. Apanasenko, based on the fact that “this problem is too complex and cannot be analyzed scientifically”.

In Ukraine, the problem of development of healthy personality through formation of health culture in family is was dealt in pedagogic science by O. Varetska, O. Vaschenko, S. Vokhor, O. Ionova, M. Lukyanchchenko, I. Petrov, A. Stepaniuk, O. Sukhomlinska, L. Suschenko, S. Cherneta, V. Shybiska et al.

Thus, researches of post-soviet scientists do not solve all problems of family education of child, basing on religious Canons with orientation on health culture’s formation.

The research has been conducted incompliance with financed by Ministry of education topic “Theoretical-methodic provision of formation of personality’s healthy life style in context of European integration”. (State registration № 0114U001781).

**Purpose, tasks of the work, material and methods**

The purpose of the work is analysis of approaches to religious education in Polish family in direction of formation of children’s health culture.

In the research we used results of questioning of Polish service ANKIEOKA.

**Results of the research**

In Poland relations between state and church are regulated by Constitution. Constitution of Republic Poland contains principles, which concern religion, in particular religious education in schools (cl. 48). Cl. 53 of Constitution guarantees freedom of worship and religion. Such freedom includes (see chapter 2 of cl. 53) right of parents for ensuring of moral and religious education of their children. Also such relations are supported in Laws: “On relations of state and Rome-Catholic church”, “On guarantees of freedom of worship”, “On social maintenance of the clergy”. For example, in Law “On guarantees of freedom of worship”, dt 17.05.1989 , in cl. 10 it is said that Poland is a secular republic, neutral for religion and world vision. It can be added by Concordant between state and Apostle Capital, which was signed in 1993p. and ratified in 1998. Main idea of Concordant is admission of religious freedom of every personality and religious communities. It also envisages optional teaching to catechism in schools.

It permits to consider Polish experience of children’s family education, oriented on religious relations, to be important also for Ukraine.
Yan Kokhanovskiy wrote that “in any conditions family medium plays very important role in health related education. It is a medium, in which health shall not be injured; it shall be hardened with healthy life style and formation of health culture of every member of family and family in the whole [3].

Family is the first environment, which influence on development and education of rising generation. It is a medium, in which young generation naturally accepts cultural, aesthetic, hygienic and health related values. In this medium personality receives practical and social skills, forms own identity.

As usual, process of education starts in family. Exactly family education, as a component of schoolchildren’s educational process contains important aspect of formation of future personality’s qualities, which would facilitate further development and create opportunities for personality to progress during all life. It plays important and key role in formation of personality and promotes personality’s progressing on all future stages of development. Family influences on physical and psychic health of child, forms personality teaches to make correct moral choice.

It should be underlined that formation of health culture as a component of family education contains great potentials for further harmonious development of child.

As per M. Demelia [13] family shall:
- creation, under existing material base, conditions, ensuring safety and satisfaction of child’s health related demands;
- creation of appropriate atmosphere, which would facilitate physical and psychic health, friendly attitude to child’s demands, sound hygienic competition, active, reasonable and systemic work on formation of health related skills and positions;
- organization of life, based on principles of somatic and psychic hygiene (daily schedule, proper sleeping, distribution of domestic duties).
- friendly cooperation with health protection establishments [18].

Health related education means not only receiving of knowledge; it also includes educational measures, oriented on development of proper attitude to health as to value. As a result, health related education has the task: to form young generation so that it could master social-cultural savings, related to health [14, 19].

Besides, schoolchildren shall have knowledge on formation of own health culture and surrounding people, because just health culture contains correlation: health culture-person-health culture. I.e. person creates health culture, is its carrier and manipulates it as a tool of creation of healthy life [17].

Analysis of system of values proves that the first place in value hierarchy of modern Polish youth is taken by family, the goes love and God. Next steps are truth, beauty, kindness, patriotism. On the base of researches, which were conducted in 2005 by Institute of public opinion, on the top of desired values of rising generation there are: happy family life, mutual love, friendship, kindness, respect to other people. Family is the most important value. So after entering EC, value benchmarks of poles can be presented in the following hierarchy: 1. Family happiness. 2. Good health. 3. Professional work. 4. Honest life. [12].

So, health related education is not only teaching to observe main hygienic rules, but also comprehensive educational functioning, which forms child’s individuality correctly and child’s attitude to health and health related culture.

In Ukraine principles of Christian ethic in primary school are presented by some programs, in particular by V. Tkachuk “Formation of children’s Christian ethic and moral health”, by M. Stelmakhovyvch - “Christian ethic in primary school”. Implementation of such courses, optional classes by agreement of parents, will render great influence on spiritual progress of young citizen of Ukraine [8, 9].

In opinion of T. Maryanenko modern pedagogic shall connect education and clear understanding of spiritual vertical of personality’s development, with division of kindness and evil, truth and false, beauty and ugliness. That is why youth shall be taught to vertical spiritual development, as far as most of them see only horizontal: development of abilities, mind, tastes, emotions. All they are important, but nevertheless, they are only supplements to spiritual development. Vertical, true, internal development is based on genuine, light spirituality, which determines sense and quality of life [12].

Thus, in opinion of Yu. Reshetnikov analysis of foreign experience does not mean its copying in practice of state-confessional relations in Ukraine. It is necessary to creatively understand it and use it in further reforming of social-humanitarian sphere in Ukraine, considering Ukrainian experience and specificities. It can be applied to experience of other countries in teaching of religion and courses of spiritual-moral orientation in state system of education [7].

It is also important to stress on close interconnection of education on the base of religious values with formation of human high moral qualities, responsible behavior and ability to resist negative influence of post-modern society [http://www.irs.in.ua/].

The conducted analysis of Polish and Ukrainian scientists’ works we can supplement with results of questioning. It will permit to determine interest of modern youth to the mentioned above problems of family and religious education of health culture.

Analysis of ANKJETKA data (http://www.ankietka.pl/) shows the following positions of respondents concerning healthy life style, health related space of family and health related education:
1). 10.34% practice sports once a week, 55.17% - 3 times a week and more often.
2). 77.57% - have active leisure (recreational trainings), 22.43%- have passive leisure (computer, TV).
3). Ecological way of life: 64.29% - have wish to protect environment, 7.14% - prefer family and friends, 14.29% - participate in information measures on protection of environment, 50.00% - want to save money.

4). Fast food and healthy way of life (Why do you eat fast food?): 12.00% - have no time for cooking, 46.00% - love fast food, 28.00% - to cope hunger quickly.

5). 35.71% - prefer healthy life style, 28.57% - ignore healthy life style, 35.71% - can not answer exactly.

6). Ability to master skills to resist stresses: 23.60% - do not want to increase knowledge on this subject, 49.44% - seek ways to avoid stresses, 50.56% - seek new methods of resistance to stress, 15.73% - seek knowledge of sources of stresses.

Unfortunately, results of many sociological questionings of Ukrainian schoolchildren and pedagogues witness about young people’s neglecting of health as important social value. For example, results of questioning of teenagers and headmasters of educational establishments, conducted in 2010 within international project “Health and behavioral responses of studying Ukrainian youth”, reflect far from being good picture of teenagers’ attitude to own health. For example there are from 20 to 78% of the questioned had experience in smoking (depending on age and place of studying); 55% of the questioned boys and 41% of girls tried smoking at age of 11-15 years old. 46% of respondents took alcohol in the same age. 16% of 15-17 years’ old age teenagers had experience in taking marijuana or hush. 38% of studying youth minimum once a year participated in street fights, 32% consulted doctors on cases of traumas. 42% of 15-17 years’ old age teenagers had sexual experience (55% of boys and 31% of girls). From 7 to 15% of teenagers (depending on place of studying) had sexual contacts in age up to 15 years old [2].

Thus, there is nearly no differences in solution of most important problems of healthy life style of Ukrainian and Polish youth. The most important problems are quality of eating, anti-stress measures, ecological environment, practicing of sports, active leisure.

Conclusions:
Thus, it is necessary to stress on importance of religious education in family through prism of formation of health culture and health related technologies. Important aspect of religious family education is personal example of adult members of family. Considering specificity of family education in Ukrainian family it is necessary to combine religious education in family and school. Also it is necessary to involve children indifferent health related measures, conducted by church and volunteers’ organizations.

It is necessary to increase role of family and extra-curricular education of pupils in context of health culture’s formation.

In Poland there exists widely spread practice of teaching of spiritual-moral subjects, which facilitate parents’ care of children’s health.

In compliance with decisions of education administrations there is an opportunity to ensure in Ukrainian family spiritual education of pupils, parents’ right for education of their children according to own world vision and ideas.

References:


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Received: 02.06.2014
Published: 30.06.2014
APPLICATION OF BIOLOGICAL FEEDBACK FOR ESTIMATION OF ANAEROBIC PERFORMANCE IN JUMPING TEST  
Kovalenko S.O., Nechyporenko D.L.  
Cherkasy National University  

Annotation. Purpose: - To determine the effect of biofeedback to determine the level of anaerobic performance of healthy young men. Material: The characteristics of physical performance in 60-seconds jumping test without and with visual and audible biofeedback (BFB) are determined at 23 healthy young men. Results: Significant individual peculiarities are found in performance features of 60-seconds jumping test both without and with BFB. The groups of performance indexes are maximum jumping height; jumping frequency and achieved performance level; correlation of jumping phases and achieved capacity of a separate jump; jumping dynamics during the test. The positive effect mostly on performance in BFB regime is found in the group of persons with low level of physical performance. Conclusion: The application of BFB in 60-seconds jumping test is proved to increase the objective character of measuring anaerobic performance. 

Keywords: biofeedback, physical performance, aerobic, jump.  

Introduction  
Modern professional sports require from sportsmen to have high level of fitness, achievement of which is possible only with the help of physical loads, close to extreme physiological potentials of human organism. Such loads result in overloading, which, in its turn, results in traumas of muscles, ligaments, joints and nervous structures of sportsman. That is why, recent time application of biological feedback (BF) in sportsmen’s rehabilitation and training has become so popular.  

Biological feedback is a technology, in the base of which there is complex of research, medical and prophylaxis procedures, which permits to receive information about status and changes of human physiological processes with the help of external feedback circuit with application of micro-processor and computer apparatuses. To day method of biological feedback, which appeared on the base of medicine, biology and technique, is successfully developing as separate branch of science and is widely practically used. BF is a modern method of therapy, which permits to improve or correct functioning of organism by activation of human reserve potentials.  

Conception of BF includes receiving of information about status or change of own functional state that permits for a patient or sportsman to master self-regulation of tested organism’s function. It, in its turn, is rather valuable mean of activation of organism’s functional systems.  

BF in sport training, fitness and rehabilitation is fulfilled on the base of different characteristics of variability of heart rhythm, electric myogram, strain data, biochemical parameters in the form of analysis of both visual and verbal information.  

It was proved that application of intensive BF with of video and verbal analysis can reduce strength of landing in jumps [Omate J.A. e.a., 2001]. At the same time, there is lack of researches, devoted to BF for determination of physical workability and its training.  

The present research is a component of combined plans of scientific-research works of Cherkassy national university, named after Bogdan Khmelnitskiy.  

Purpose, tasks of the work, material and methods  
The purpose of the work: determination of biological feedback’s influence on anaerobic workability of healthy young people.  
The tasks of the research: 1. Determination of content and sense of conception “biological feedback”; 2. Analysis of criteria for evaluation of anaerobic workability in 60 seconds’ jump test; 3. Determination of BF’s influence on different characteristics of anaerobic workability in jump test for persons with different workability.  
The methods: we carried out measurements of 23 healthy young men of 20-28 years old age, observing main bio-ethical principles of EC human rights’ and bio-medicine’s Convention (dt. 04.04.1997), Khelsinky Declaration of World medical association about ethic principles of scientific medical researches, which involve human beings (1964-2008). We fulfilled 60 seconds jump tests by methodic of Bosco C. e.a. After 40 minutes’ rest we again fulfilled the same test with application of biological feedback and visual control of flight time dynamic on monitor screen and hearing control of flight phase of jumps (frequency of sound signal – 400 Hz). We evaluated power of mechanical work of the whole test, frequency of jumps, value of maximal jump, correlation of their supported and unsupported phases, their dynamic during all test. Calculations and statistical analysis of data was carried out in electronic tables Excel.  

Results of the research  
At first stage we fulfilled visual analysis of dynamic of physical workability indicators of certain persons during all test. Dynamic and structure of supported and unsupported (flight) phases significantly differ by following characteristics:
1. Chaotic character or stability of indicators of one tested person during whole test.
2. Dynamic of changes of different indicators from the beginning to the end of the test.
3. Frequency of jumps, correlation of supported-un supported phases of compared persons significantly differ.

That is why we analyzed specific features of distribution of physical workability’s characteristics in sample of 23 healthy young men both with their determination in ordinary mode and in feedback mode (see table 1).

**Table 1**

*Distribution of physical workability’s characteristics, determined in 60 seconds’ jump test of healthy young men*

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Statistical data</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min.</td>
<td>Max.</td>
<td>M</td>
<td>σ</td>
</tr>
<tr>
<td><strong>Ordinary mode</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency, cycles/min.</td>
<td></td>
<td>45.99</td>
<td>85.12</td>
<td>62.4</td>
<td>10.2</td>
</tr>
<tr>
<td>Power, m/min.</td>
<td></td>
<td>24.47</td>
<td>51.37</td>
<td>34.98</td>
<td>7.74</td>
</tr>
<tr>
<td>Correlation, conv.un.</td>
<td></td>
<td>0.51</td>
<td>2.38</td>
<td>1.01</td>
<td>0.48</td>
</tr>
<tr>
<td>Power of jump, m/min</td>
<td></td>
<td>37.53</td>
<td>174.75</td>
<td>74.56</td>
<td>35.04</td>
</tr>
<tr>
<td>Maximal jump, m</td>
<td></td>
<td>0.56</td>
<td>0.74</td>
<td>0.67</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Feedback</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency, cycles/min.</td>
<td></td>
<td>47.82</td>
<td>82.91</td>
<td>69.22</td>
<td>8.89</td>
</tr>
<tr>
<td>Power, m/min.</td>
<td></td>
<td>26.71</td>
<td>51.31</td>
<td>39.08</td>
<td>7.33</td>
</tr>
<tr>
<td>Correlation, conv.un.</td>
<td></td>
<td>0.57</td>
<td>2.39</td>
<td>1.26</td>
<td>0.53</td>
</tr>
<tr>
<td>Power of jump, m/min</td>
<td></td>
<td>42.07</td>
<td>175.39</td>
<td>92.44</td>
<td>38.64</td>
</tr>
<tr>
<td>Maximal jump, m</td>
<td></td>
<td>0.56</td>
<td>0.82</td>
<td>0.66</td>
<td>0.06</td>
</tr>
</tbody>
</table>

For example minimal scatter of maximal jump height was in ordinary mode ($cV = 7.20\%$), and in feedback mode ($cV = 7.20\%$). Frequency of jumps and power of test fulfillment had a little bit higher inter-individual variability ($12,85$-$22,13\%)$. The highest distinctions belonged to correlation of jump phases and achieved power in separate jumps ($41,80$-$47,01\%)$. Thus, there are substantial inter-individual distinctions in characteristics of physical workability, achieved in 60 seconds’ jump test, which are the base for system of automatic evaluation. By scatters all these indicators can be divided in three groups: maximal height of jump; frequency of jumps and achieved level of workability; correlation of jump phases and achieved power of every separate jump.

During test all analyzed indicators had both positive and negative dynamic. To the largest extent, height of maximal jump reduced by the end of test. The trend to reducing of jump power was also rather expressive. Thus, indicators of workability’s dynamic during test also can be used in automatic system of its evaluation.

The measurements were carried out with registration of indicators of anaerobic workability of 23 healthy young men in compliance with standard protocol by Bosco C. e.a. (I) and with BF (II) (see table 2).

So, in 60 seconds’ test in conditions of biological feedback frequency of jumps, power of work confidently increase as well as correlation of flight and supported phases and power of pushing off. It permits to make conclusion about higher mobilization of the tested during testing and detecting of actual anaerobic workability in BF mode. The height of maximal jump in I and II did not differ.
Table 2

<table>
<thead>
<tr>
<th>Indicators</th>
<th>I</th>
<th>II</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency, cycles/min.</td>
<td>62.42±2.13</td>
<td>69.20±1.85</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Power, m/min.</td>
<td>34.98±1.61</td>
<td>39.08±1.53</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Correlation, conv.un.</td>
<td>74.56±7.31</td>
<td>92.44±8.06</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Power of jump, m/min</td>
<td>1.01±0.10</td>
<td>1.26±0.11</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Maximal jump, m</td>
<td>0.67±0.01</td>
<td>0.66±0.01</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

Frequency of jumps both in I and II was increasing during test and its dynamic in both modes did not differ. In period from 25 to 35 seconds from the beginning of test and further dynamic of change of power of work, of power during jump was less in BF mode and this reduction was not so significant as with standard protocol. So, changes of anaerobic workability in BF mode permit to maintain relatively uniform level during the whole test, mainly in period from 25 second after beginning and further.

We compared indicators of anaerobic workability of persons with relatively low level of it (less than 36 m/min$^{-1}$, N = 12) and relatively high level (more than 36 m/min$^{-1}$, N = 11, from them 7 – were sportsmen of high class). The persons of first group improved workability in BF mode, while in the second group increment was not confident. For example, power in first group was accordingly 28.58±0.90 m.min$^{-1}$ and 34.60±1.98 m.min$^{-1}$ (р <0.001), and in second group 41.95±1.30 m/min$^{-1}$ and 43.97±1.21 m/min$^{-1}$ (р >0.05).

Dynamic of change of workability during test also depended on achieved its level (see fig.1). Only persons with relatively low workability in period from 25 to 35 seconds had lower level of its reduction in BF mode than in mode I.

![Fig.1 Changes of workability during test in ordinary mode and in feedback mode (persons with different workability’s level). * - p<0.05; ** - p<0.01; *** - p<0.001.](image)

**Conclusions:**
1. Healthy young men have substantial individual features in characteristics of fulfillment of 60 seconds’ jump test in BF mode and in ordinary mode.
2. We can mark out the following groups of characteristics: maximal height of jump; frequency of jumps and achieved level of workability; correlation of jump’s phases and achieved power of every separate jump.
3. Dynamic of changes of physical workability during 60 seconds’ jump test also has substantial individual peculiarities that permit to include these indicators in system of evaluation of human functional state.

4. In mode of biological feedback, its positive influence is the most expressive in group of persons with relatively low level of physical workability.

5. Application of biological feedback in jump tests can be recommended for optimization of training of human anaerobic potentials.

The prospects of further researches imply their fulfillment with different contingents of persons, practicing physical culture and sports.

References
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Received: 20.06.2014
Published: 30.06.2014
Annotation. **Purpose**: explore physical development, the level of physical and technical preparedness of young weightlifters of different weight categories groups. **Material**: the study involved 36 athletes. Athletes age 14-15 years. **Results**: present physical development, the level of physical and technical preparedness of athletes who are preparing for the championship of Ukraine. Found that indicators body length athletes tend to increase with increasing weight category groups - by 15,0% (p <0,05). It is estimated that the active body mass index increases with sportsmen groups weight categories - by 20,0% (p <0,05). It is proved that the difference between the strength of the left and right brushes all weight categories of groups - 2.4%. The analysis of the indicators in the control of technical readiness exercises in the snatch. **Conclusions**: to determine the trends of physical development, the level of physical and technical preparedness of athletes of different groups of weight categories. Indicator is dynamometry athletes increased with increasing weight category groups - by 47,7% (p <0,05). **Keywords**: young, weightlifter, physical, development, level, preparedness.

**Introduction**

Intensive trainings with weight bar facilitate manifestation of maximal strength of junior weight lifters owing to strengthening of health and development of active muscular mass.

Желание победить в соревнованиях высшего уровня и улучшить результаты, устанавливают высокие требования к физическому развитию, уровню физической и технической подготовленности в тренировочном процессе юных тяжелоатлетов [1-4].

Analysis of recent researches and publications witnesses that most of authors in weight lifting wanted [1-4] to generalize results of study of physical condition indicators, levels of physical and technical fitness of the strongest junior weightlifters. With it in the course of study of physical condition and physical and technical fitness of junior weightlifters of different weight categories we have not found reasons of selection for competitions neither in theory and practice of weight lifting nor in domestic and foreign literature. That is why, on the base of analysis of coaches’ and sportsmen’s questioning we think that this problem shall be studied.

The work has been fulfilled in compliance with “Combined plan of SRW in field of physical culture and sports for 2011-2015” of Ministry of youth and sports of Ukraine by topic 2.8. “Improvement of sportsmen’s training in separate kinds of sports” (state registration number 0107U001647).

**Purpose, tasks of the work, material and methods**

**The purpose of the work** is analysis of indicators of physical condition, level of physical and technical fitness.

**The methods of the research:**


We analyzed physical condition’s indicators, levels of physical and technical fitness of 36 junior weight lifters of 1st sport degree. All junior weightlifters were divided into weight categories:: І – < 45 кkg, ІІ – 45 – 55, ІІІ – 56 – 70 kg.

**Results of the research**

We studied physical condition’s indicators, levels of physical and technical fitness of junior weight lifters. Indicators of mass body content of junior weight lifters are informative indicator of their functional potentials and level of fitness [1,3,4]. Thickness of junior weightlifters’ fat layer depends on hereditary factors, which can not be changed, but quantity of fat can be changed by regulating of physical loads volume and mode of eating. Index of active body mass (IABM) permits not only to compare fitness of different sportsmen but also permits to control of body mass increasing. Trainings of junior weightlifters and their eating permit increasing of muscular tissue [1-4].

We presented indicators of body mass content of 15-15 years old junior weight lifters of different weight categories (see table 1).
### Table 1

Indicators of body mass content of 14-15 years old weight lifters of different weight categories, *X ±m (n=36)*

<table>
<thead>
<tr>
<th>Groups of weight categories and confidentiality of differences (p&lt;0.05)</th>
<th>Indicator</th>
<th>Body mass, kg</th>
<th>Length of body, cm</th>
<th>Mass of fat tissue, % from body mass</th>
<th>IABM, conv.un.</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td></td>
<td>38.5±1.5</td>
<td>147.0±1.2</td>
<td>4.6±0.1</td>
<td>1.2±0.05</td>
</tr>
<tr>
<td>Second</td>
<td>(p&lt;0.05)</td>
<td>50.0±1.3</td>
<td>161.0±1.7</td>
<td>4.85±0.1</td>
<td>1.22±0.07</td>
</tr>
<tr>
<td>Third</td>
<td>(p&lt;0.05)</td>
<td>65.0±2.4</td>
<td>169.0±2.2</td>
<td>5.4±0.2</td>
<td>1.44±0.07</td>
</tr>
</tbody>
</table>

Analysis shows that mass of fat tissue of junior weight lifters increases with increasing of weight category – by 4.3 and 12.5 %, but only difference between first and second and between second and third are confident (p < 0.05); index of active body mass – by 1.6 % (p > 0.05) and 18.0 % (p < 0.05). This analysis witnesses that the greatest fat layer of junior sportsmen is on abdomen, which increases with increasing of weight categories accordingly - by 10.8 %, (p > 0.05) and 9.8 %, (p > 0.05); нижних конечностях - на 26.6 % (p < 0.05) и 31.5 % (p < 0.05); грудной клетки - на 10.0 % (p > 0.05) and 13.6 % (p < 0.05); на back - by 5.2 % (p > 0.05) and 20.0 % (p < 0.05); on superior limbs – by 13.6 % (p > 0.05) and 16.0 % (p < 0.05).

In our opinion distribution of fat layer on body segments of junior weight lifters depend on body mass and qualification of sportsmen and is individual by character [1,3,4].

### Table 2

Indicators of physical condition and level of physical fitness of 14-15 years old weight lifters of different weight categories *X ±m (n=36)*

<table>
<thead>
<tr>
<th>Groups of weight categories and confidentiality of differences (p&lt;0.05)</th>
<th>Indicator</th>
<th>Body segments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Chest</td>
</tr>
<tr>
<td>First</td>
<td>2.0±0.1</td>
<td>1.9±0.1</td>
</tr>
<tr>
<td>Second</td>
<td>2.2±0.1</td>
<td>2.0±0.1</td>
</tr>
<tr>
<td>Third</td>
<td>2.5±0.1</td>
<td>2.4±0.1</td>
</tr>
</tbody>
</table>

Analysis shows that length of body and chest and circumference, VCL, cm², dynamometry left hand, kg, right hand, kg, backbone, kg.
Analysis shows that indicators of body length (cm) have trend to increasing with increasing of weight categories – by 9.5 % (p < 0.05) and 4.9 % (p < 0.05); indicators of body length (sitting) (cm) – by 9.4 % (p < 0.05) and 7.4 % (p < 0.05); chest circumference – by 9.8 % (p < 0.05) and 8.5 % (p < 0.05); VCL cm$^3$ – by 13.3 % (p < 0.05) and 23.5 % (p < 0.05); dynamometry of left hand – 26.8 % (p < 0.05) and 13.3 % (p < 0.05); right hand – by 31.7 % (p < 0.05) and 6.3 % (p < 0.05); backbone – by 36.3 % (p < 0.05) and 8.3 % (p < 0.05).

Analysis shows that difference between strength of left and right hands of all weight categories is 2.4 %, that is proved by researches of advanced specialists [1,3,4].

In comparison with indicators of physical condition of junior weightlifters of second weight category they are higher among those, whose correlation of general physical fitness and special physical fitness is 75 and 25 %, 50 and 50 %; length of body (cm) – by 1.5 % (p > 0.05), body mass (kg) – by 3.0 % (p > 0.05), chest circumference (cm) – by 2.3 % (p > 0.05), VCL (cm$^3$) – by 10.9 % (p < 0.05).

We gave indicators of technical fitness of 14-15 years old weight lifters in jerk in table 3.

Table 3

<table>
<thead>
<tr>
<th>Weight category</th>
<th>Indicator</th>
<th>Length of body, cm</th>
<th>Time of fulfillment of pulling, sec</th>
<th>Height of rising, depending on body length, %</th>
<th>Height of fixing in phase of final acceleration, depending on length of body, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>Length of body, cm</td>
<td>147.0±1.2</td>
<td>1.39±0.02</td>
<td>76.5±0.2</td>
<td>66.5±0.2</td>
</tr>
<tr>
<td>Second</td>
<td>Time of fulfillment of pulling, sec</td>
<td>p&lt;0.05</td>
<td>p&lt;0.05</td>
<td>p&lt;0.05</td>
<td>p&lt;0.05</td>
</tr>
<tr>
<td>Third</td>
<td>Height of rising, depending on body length, %</td>
<td>149.0±2.2</td>
<td>1.47±0.03</td>
<td>77.5±0.1</td>
<td>67.5±0.2</td>
</tr>
<tr>
<td></td>
<td>Height of fixing in phase of final acceleration, depending on length of body, %</td>
<td>p&lt;0.05</td>
<td>p&lt;0.05</td>
<td>p&lt;0.05</td>
<td>p&lt;0.05</td>
</tr>
</tbody>
</table>

Analysis shows that time of fulfillment of pulling increases with increasing of weight category – by 0.7 % (p < 0.05) and 5.0 % (p < 0.05); height of rising, depending on body length – by 1.1 % (p < 0.05) and 0.1 % (p > 0.05); height of fixing in phase of final acceleration, depending on length of body – by 1.3 % (p < 0.05) and 0.1 % (p > 0.05), that is proved by researches of advanced specialists [1,3,4].

Conclusions

1. We have fulfilled analysis of indicators of physical condition, physical and technical fitness of junior weightlifters of different weight categories, who train for Ukraine junior championship.
2. We determined that indicators of body length have trend to increasing with increasing of weight category – by 9.5 % (p < 0.05) and 4.9 % (p < 0.05). We proved that index of active body mass increases with increasing of weight category – by 1.6 % (p > 0.05), and 18.0 % (p < 0.05); difference between strength of left and right hands of all weight categories was – 2.4 %; indicators of backbone dynamometry increase with increasing of weight category – by 36.3 % (p < 0.05) and 8.3 % (p < 0.05).
3. We have determined dependence of technical fitness in jerk indicators of junior weightlifters for different weight categories.

Further researches imply to fulfill in direction of studying of other training problems of different age and weight groups of weightlifters.
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Cite this article as: Lutovinov Iu.A., Martin V.D., Oleshko V.G., Lisenko VN., Tkachenko K.V. Physical development, the level of physical and technical preparedness of 14 - 15 year old young weightlifters of different weight categories groups. Physical education of students, 2014, vol.5, pp. 25-29. doi:10.15561/20755279.2014.0505

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Received: 16.06.2014
Published: 30.06.2014
PREPARATION FOR THE YEAR MAIN COMPETITION TEAMS IN BASKETBALL WITH HEARING IMPAIRMENTS WITH INNOVATIVE TECHNOLOGIES
Sobko I.N. The
Kharkov National Economic University

Annotation. Purpose: develop and prove experimentally comprehensive training program on the Ukrainian national team basketball with hearing impairment in the annual cycle for the major competitions. Material: The study involved 12 basketball hearing impaired 20-25 years old - female players team of Ukraine on basketball. Also analyzed the test results and competitive activity 12 basketball players with hearing impairments - Lithuanian team players. Results: We showed the need for a qualitative change in the training process through the development and application of innovative technologies. This allows a greater level of communication between the coach and athletes to intensify training process. Developed and experimentally substantiated comprehensive training program for the Ukrainian national team. In technical training device used light. This increased mobility, agility, activity and intensity workouts. In tactical training improved situational and planned change tactical drawing game using copyright protection of video tutorials with animated illustrations. Conclusions: A positive impact of the developed system for basketball training result in major competitions.

Keywords: basketball, Invasport, Deflimpiada, software, sound, technique, tactics.

Introduction
At present, Ukrainian sportsmen with different health problems participate in Para-Olympic and Deaflympic competitions [1, 2, 3, 4]. Their achievements at prestige international competitions facilitate strengthening of Ukraine authority at international sport community and create opportunities for disabled people to adapt in modern society and realize their social demands [8, 9, 13]. One of kinds of sports for disabled is deaflympic sport, where sportsmen with hearing problems compete [15, 19, 21]. Review of scientific publications showed that recent scientific researches reflect different aspects of physical education and sport trainings of people with hearing problems [1, 3, 4, 15, 19, 21]. But problems of training process’s organization, formation of sport fitness; problems of competition functioning of sportsmen with hearing problems have not been studied sufficiently yet. These problems are urgent as far as winning of highest sports prizes by disabled sportsmen in conditions of constant increasing of global competition in elite sports – is one of the most preferable possibilities for a country to declare itself at international level. In this connection main task of development of sports for disabled for long period of time is entering in three prize-winners of combined sport teams at Para-Olympic and Deaflympic Games in not official team event. The process of sportsmen’s training in deaflympic sports, in particular in basketball, can not be the same as the process of healthy sportsmen’s training. In this connection working out of system of basketball players’ with hearing problems in annual cycle, has acquired special importance [16, 17, 18, 20, 22, 23, 24]. This problem has not been elucidated sufficiently in recent scientific literature.

The research has been carried out in compliance with “Combined team of scientific-research works in sphere of physical culture and sports for 2011-2015”, by topic 2.4 “Theoretical-methodic principles of individualization in physical education and sports” (state registration number 0112U002001) and in compliance with scientific-research work, financed by Ministry of education and science of Ukraine for 2013-2014 and 2014-2015 “Theoretical-methodic principles of application of information, pedagogic and medical-biological technologies for formation of healthy life style”, (state registration number 0113U002003) and “Theoretical-methodic provisioning of formation of personality’s healthy life style in conditions of educational establishment in context of European integration”, (state registration number 0114U001781).

Purpose, tasks of the work, material and methods
The purpose of the research is to work out and experimentally prove complex program of Ukrainian basketball team training for sportswomen with hearing problems in annual cycle of preparation for main competition.

The methods of the research: theoretical analysis and generalization of special literature, methods of pedagogic testing, which included tests on special physical and technical fitness, method of determination of competition functioning’s effectiveness, pedagogic experiment; methods of mathematical statistics.

In the research 12 female basketball players of 20-25 years old age, with hearing problems participated. All of them were members of women combined basketball team of Ukraine. For comparative analysis we analyzed also results of testing and competition functioning of 12 female basketball players with hearing problems – members of combined team of Lithuania.

Results of the research
In connection with the fact that main competition of the season (autumn 2012 – summer 2013) was 22nd Deaflympic Games, we set the following tasks of training program [5, 6, 10, 16, 17]:

1. Determination of ways of combined Ukrainian basketball team’s (sportswomen with hearing problems) improvement in process of preparation for 22nd summer Deaflympic Games 2013.

2. Working out of up-to-date technology of combined Ukrainian basketball team’s (sportswomen with hearing problems) training on the base of advanced scientific and scientific-methodic achievements.

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doi:10.15561/20755279.2014.0506
3. Increasing of effectiveness of interaction and responsibility for results of combined work of managers, coaches, specialists and maintenance services in preparation for competition functioning of combined Ukrainian basketball team (sportswomen with hearing problems).
4. Creation of conditions for effective scientific-methodic, medical and medical-biological provisioning of combined Ukrainian basketball team (sportswomen with hearing problems).
5. Satisfaction of demand of combined Ukrainian basketball team (sportswomen with hearing problems) in high quality training on modern sport bases.
6. Provisioning of combined Ukrainian basketball team (sportswomen with hearing problems) with high quality equipment, facilities and apparatuses.

We solved directly first two tasks, the rest tasks were in competence of basketball federation of sportsmen with hearing problems.

For working out of complex training program, we, first of all, analyzed competition results of advanced world women basketball teams (sportswomen with hearing problems) at international competitions up to 2013.

As it is known, modern basketball, both of healthy sportsmen and sportsmen with hearing problems, is based, in its development, on the following [11, 12, 16, 17, 25]:
- full fledged rising of sportsmanship;
- the highest level of physical condition;
- flexible, variable tactic compositions.

With it we can observe constant trend to increasing of quickness in game situations with priority of quick breakthrough and early attack and, at the same time, “simplification” of tactic schemas of game and shortening of time for their realization. Teams are equipped with modern technique of handling ball; they show high motion activity in game without ball; they have variable techniques and effective operative thinking, high level of will and psychological stability. Especially it should be noted that players have increased physical condition and show universal characteristics in game roles. From one Deaflympic games to one notice a trend to increasing of countries-participators and quantity of sportmen. The quantity of teams, pretending to compete with leaders of world basketball also increases.

In table 1 we give comparative characteristic of results of leading women world teams (sportswomen with hearing problems) at Deaflympic Games in Italy (July 2001); Deaflympic Games in Australia (January 2005); at Deaflympic Games in Taiwan (September 2009); at European championship in Italy (September 2011); at Championship of Europe in Turkey (June-July 2012).

As we can see in the table combined Ukrainian basketball team’s (sportswomen with hearing problems) had not won prize places before 2011, but after World championship 2011, where it won 3rd place, it reduced sport results and took 4th place at European championship 2012. Relatively successful and stable are combined teams of USA, Lithuania, Sweden. Recent years, basketball in Greece has started to show progress.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ukraine</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>USA</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sweden</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Lithuania</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Greece</td>
<td>5</td>
<td>5</td>
<td>4</td>
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<td>3</td>
</tr>
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<td>Russia</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Italy</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Byelorussia</td>
<td>4</td>
<td>-</td>
<td>7</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Japan</td>
<td>-</td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>-</td>
</tr>
</tbody>
</table>

Balance of forces in basketball in period of preparation to 22nd summer Deaflympic Games 2013 witnesses that women combined teams of USA, Lithuania, Sweden, Ukraine and Greece are leaders of world basketball (see table 1).

The highest steady results in women’s basketball were achieved by combined team of USA – multiple champion of Deaflympic Games. Women team of USA is a winner of three Deaflympic Games - 2001, 2005, 2009; it has the highest team indicators and the strongest players of different game roles. Steady progress has been shown, recent years, by combined team of Sweden, which took first places at world and European championships. The closest challenger of Ukrainian team is combined team of Lithuania; it plays better than Ukrainian combined team, having won...
second places at world championship 2011 and at European championship 2012. In Italy (world championship) our sportswomen were defeated by Lithuanian in first game by 9 scores, in the second by 2 scores; in Turkey (European championship) they lost 30 scores.

Also we should note the progress of combined team of Greece, which, at world championship defeated Ukrainian team by 10 scores in first game and lost 6 scores in second game, having taken 4th place; but at European championship it defeated Ukrainian team twice: by 10 and 18 scores. This team is a promising one and has rather trained reserve.

The listed above teams are the most probable adversaries of Ukrainian combined team in fight for places in next deaflympic competition. It was assumed that at Deaflympic Games in Bulgaria medals would be probably won by teams of USA, Sweden, Lithuania and Ukraine (see table 2). Basing on analysis of teams’ main adversaries level – the task of Ukrainian combined team will be to enter the three strongest teams and ascend from forth place in rating to the third one.

<table>
<thead>
<tr>
<th>Teams</th>
<th>Preliminary prognostication of results of Deaflympic Games</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leader</td>
<td>USA</td>
</tr>
<tr>
<td>Probable</td>
<td>Sweden</td>
</tr>
<tr>
<td>adversary</td>
<td></td>
</tr>
</tbody>
</table>

Thus, analysis of modern women’s basketball (sportswomen with hearing problems) showed sharpening of fight for highest sport places, increasing of motivation and prestige of highest sport achievements.

Basing on analysis of the data, obtained in process of construction of training process for female basketball players with hearing problems for future competitions we made conclusion about qualitative change of training process at the cost of working out and application of innovative technologies, which would permit to raise communication level between coach and sportswomen and, thus, to intensify training process.

In power training, influence on speed-power and functional fitness were of the first priority.

In technical training main accent was made on perfection of techniques of ball handling and accuracy of throws, especially 3-scores, in extreme conditions. We used new means of control of training process for increasing of mobility, activity and intensity of trainings with the help of light devices that was innovative technology of our program [15].

In training of tactics we paid attention to increasing of specific weight of active forms of game both in defense and in attack with application of visibility’s method in mastering of tactic interactions and tactic schemas, basing on specificity of every certain adversary; besides it was necessary to perfect situational and planned changes of tactic picture of game in defense with the help of author’s video-aid with animations that also was innovative technologies in training of female basketball players with hearing problems [15].

Application of innovative technologies was the main novelty of our training program for female basketball players with hearing problems.

Stages of training of women combined basketball team of Ukraine (sportswomen with hearing problems) for 22nd Deaflympic Games 2013 in Bulgaria.

At 1st stage (August, September, October 2012) the task was improvement of functional state and physical fitness of female basketball players as the basis for further specialized technical-tactic and competition trainings. In training camp all main means were used, including competition exercises, oriented on group and team interactions. At this stage we developed individual plans of tactic trainings, considering individual tactic and physical fitness for players of different game roles. Also we implemented modern, scientifically grounded innovative technologies in training process.

For 2nd stage (November 2012 – April 2013) wave-like increasing of loads with comparatively high variety of differently oriented loads was characteristic; we created conditions for further qualitative improvement of special workability with certain reducing of loads for general physical fitness. We improved individual sportsmanship of players of different game roles, checked coordination in game of different game links, team tactic in defense and attack in extreme conditions. In order to control fitness of combined team’s players in competition conditions we increased scope of competition loads in control matches with strong adversary.

Final, 3rd, stage (May, June 2013) – was the stage of direct preparation for Deaflympic Games in Bulgaria. This cycle is devoted to complex perfection of all sides of players’ and team’s fitness as well as achievement of sport form’s peak for strategically important matches of Deaflympic tournament.

Independent on stage character of training we sistemically increased role of special physical fitness, improved technical-tactic sportsmanship of players, intensified training process, individualized trainings, including psychological one; ensured reliability and stability of female basketball players in conditions more complex than competition ones. All
these were oriented on facilitating basketball players’ optimal sport form at summer Deaflympic Games and on achievement of planned sport results.

**Training and competition loads of sportswomen with hearing problems – members of combined team of Ukraine in basketball in annual cycle 2012-2013**

With building of annual cycle [16, 17] we envisaged 2 macro-cycles (see table 3), from which the first macro-cycle implied mainly complex training and participation in Ukrainian championship among women teams of Supreme basketball league, season 2012-2013. Preparatory period included training cam of functional and physical orientation in Kharkovskaya region, Balakleya and finished by 1-3 matches with adversary of not high fitness. Special-preparatory period was of tactical orientation with application of innovative technologies [7, 15]. Competition period included tactic and game orientations: we fulfilled perfection of different sides of fitness, realized direct preparation for participation in competitions. Transitive period was directed to recreation of physical and psychic potential of sportswomen, preparation for the next macro-cycle.

In second macro-cycle training process became more specific; it stipulated targeted training for Deaflympic games. Scope of training loads became maximal alongside with full-dledged recreation and direct preparation for main competitions. Preparatory period started in Lvovskaya region, on sport base “Tysovets”, where integral training of sportswomen was ensured. Then, in Alushta city, control and pre-competition meso-cycle of preparatory period took place and they were oriented on creation of optimal sport form of basketball players, who had hearing problems. Besides, several control matches were conducted. Then they had 2-3 days for recreation. Competition period is direct participation in 22nd summer Deaflympic Games on August 4th-10th, 2013, in Sophia (Bulgaria).

Application of training program for basketball players with hearing problems in annual cycle rendered positive influence on indicators of physical and technical fitness, on competition functioning and results of main competitions. Experimental group basketball players (combined team of Ukraine) experiment resulted in confident improvement of tests “Skipping rope jumps for 1 minute, q-ty of times” (from 136.08 to 149.83 times, p<0.01), “High jump from the spot, cm” (from 30.83cm to 35.75 cm, p<0.05), “Pressing ups in lying position for 30 seconds, q-ty of times” (from 28.17 to 33.67 times, p<0.01), “Rising of torso from lying position for 30 seconds, q-ty of times” (from 26.17 to 34.17 times, p<0.001), “Jumps for quickness for 20 sec., q-ty of times” “picking ups at own backboard, quantity of times during game” and “picking ups at adversary backboard, quantity of times during game” (from 5.58 to 8.33 times, p<0.01), “2 scores throws, q-ty of hits from 21 throws” (from 5.83 to 7.33 times, p<0.05), “Special endurance, q-ty of throws for 5 minutes” (from 81.5 to 88.5 times, p<0.01), “Special endurance, q-ty of hits for 5 minutes” (from 32.42 to 44.17 times, p<0.001), “Middle distance throws, q-ty of hits from 21 throws” (from 11.42 to 14.17 times, p<0.05), “Middle distance throws, q-ty of hits for 40 sec.” (from 5.83 to 7.33 times, p<0.05), “2 scores throws, q-ty of hits from 21 throws” (from 5.83 to 7.33 times, p<0.05), “Middle distance throws, q-ty of hits for 40 sec.” (from 5.83 to 7.33 times, p<0.05), “Middle distance throws, q-ty of hits for 40 sec.” (from 5.83 to 7.33 times, p<0.05), “Special endurance, q-ty of throws for 5 minutes” (from 81.5 to 88.5 times, p<0.01), “Special endurance, q-ty of hits for 5 minutes” (from 32.42 to 44.17 times, p<0.001), “Middle distance throws, q-ty of hits for 40 sec.” (from 18.92 to 23 times, p<0.01). In control group (Lithuanian sportswomen) the same changes were less expressed and in most cases not confident.

Application of our worked out training program for female basketball players with hearing problems in annual cycle resulted in improvement of indicators of competition functioning. Experimental group members (combined team of Ukraine) fulfilled confidently more throws and hits from long distance than members of control group (combined team of Lithuania), who, before experiment, had equal indicators with members of combined team of Ukraine in some cases even better. Also such indicators as “picking ups at own backboard, quantity of times during game” and “picking ups at adversary backboard, quantity of times during game”, quantity of interceptions, improved; quantity of fouls of Ukrainian sportswomen’s reduced.

We also detected positive influence of the worked out training program for female basketball players with hearing problems in annual cycle with application of innovative technologies on result in main competition. At 22nd summer Deaflympic Games sportswomen of experimental group (combined team of Ukraine) showed confidently higher results than combined team of Lithuania (control group) by all indicators except the last and, accordingly, won gold and silver, moving aside combined team of Lithuania (which earlier was ahead of combined team of Ukraine) to the third place. It should be noted that as per preliminary prognosis combined team of Ukraine should take forth place in rating of leading teams of the world and the task was to take the third place. However, application of complex training program permitted for female basketball players to significantly improve results and take second place at Deaflympic Games.

We think that this success was conditioned, mainly, by introducing of innovative technologies in program, which implied application of light device for control of team during training and by application of video-aid on game tactic with animations of tactic combinations, developed especially for this team. Improvement of intensity was reached owing to new system of communication between coach and sportswomen. The offered by us new means of training process’s control helped to increase mobility, intensity and motor density of trainings of Ukrainian combined team, increase speed and effectiveness of perceiving of information about tactic interactions and to optimize training process.
<table>
<thead>
<tr>
<th>Macross cycle</th>
<th>1st macro-cycle</th>
<th>2nd macro-cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periods</td>
<td>Preparatory</td>
<td>Competition</td>
</tr>
<tr>
<td>Mesocycles</td>
<td></td>
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<tr>
<td>Meso -</td>
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<tr>
<td>Train</td>
<td>Kharkovskaya</td>
<td>Lvovskaya</td>
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<td>camp</td>
<td>a region, Balak</td>
<td>a region, base</td>
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<td></td>
<td>eya</td>
<td>“Tysovet”</td>
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<tr>
<td>Quantity</td>
<td>54</td>
<td>38</td>
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<tr>
<td>of trainings</td>
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<td>Quantity</td>
<td>4</td>
<td>6</td>
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<tr>
<td>of control</td>
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<td>games</td>
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<td>Correlation</td>
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<td>of loads (%)</td>
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<td>- physical</td>
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<td>- tactic</td>
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<td>Kind of control</td>
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</table>

Notes: 1 – involving meso-cycle; B – basic meso-cycle; CP - control-preparatory meso-cycle; PC – pre-competition meso-cycle; C – competition meso-cycle;
Conclusions:
1. Preliminary analysis of competition functioning of combined team of Ukraine (female basketball players with hearing problems) permitted to make conclusion about demand in qualitative change of training process at the cost of working out and application of innovative technologies, facilitating improvement of communication between coach and sportswomen and, thus, intensify training process.

2. We have worked out and experimentally proved complex program of training of combined team of Ukraine (female basketball players with hearing problems) in annual cycle for main competitions with application of innovative technologies. In technical training main accent was made on perfection of ball handling techniques and high accuracy of throws, especially 3 scores’ ones in extreme conditions. We also used new means of training process’s control for improvement of mobility, activity and tension of trainings with the help of light devices, which were innovative technology of our program. In tactic trainings we paid attention to increasing of specific weight of active game’s forms both in defense and in attacks with the help of method of visibility when mastering tactic interactions and tactic schemas, basing on specificity of every certain adversary. Besides, we perfected situational and planned changes of game’s tactic picture in defense with application of author’s video-aid with animations that also was innovative technology in training of female basketball players with hearing problems.

3. Application of worked out program in training of female basketball players with hearing problems in annual cycle resulted in improvement of competition functioning’s indicators. Basketball players of experimental group (combined team of Ukraine) fulfilled confidently more throws and hits from long distance than members of control group (Combined team of Lithuania), who, before experiment had equal with combined team of Ukraine indicators and in some cases even better. Such indicators as “pick ups at own backboard, quantity per game” and “pick ups at adversary’s backboard, quantity per game”, quantity of interceptions, improved; quantity of Ukrainan team’s fouls decreased. So we detected positive influence of worked out training system in training of female basketball players with hearing problems in annual cycle with application of innovative technologies on results of main competitions.

The prospects of further researches imply development of new technologies for disabled sportsmen, analysis of innovative technologies’ influence on competition efficiency, functional potentials, special and physical fitness of disabled sportsmen-representative of other sport games.

References:
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Cite this article as: Sobko I.N. The preparation for the year main competition teams in basketball with hearing impairments with innovative technologies. Physical education of students. 2014, vol.5, pp. 30-37. doi:10.15561/20755279.2014.0506

The electronic version of this article is the complete one and can be found online at: http://www.sportedu.org.ua/html/archive-e.html

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Received: 25.06.2014
Published: 30.06.2014
SALE LEISURE ACTIVITIES OF CHILDREN AND YOUTH IN OUT OF SCHOOL EDUCATIONAL ESTABLISHMENTS OF PHYSICAL CULTURE AND SPORTS DESTINATIONS

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Kharkov State Academia of Physical Culture

Annotation. **Purpose:** To determine the role of extracurricular educational establishments of physical culture sports direction in providing leisure activities for children and youth. **Material:** The results of the analysis of the scientific and methodological literature, statistical reports of the Ministry of Youth and Sports of Ukraine, authorities of Physical Culture and Sport, authorities the Department of Education and Science. **Results:** Based on the analysis of statistical reports determined satisfactory condition and leisure activities in non-school educational establishments physical culture sports direction. This is confirmed by an increase in the number of pupils and students dealing all kinds of physical culture health improvement work. Also, the decline in the number of pupils and students classified for health reasons for the special medical group. **Conclusions:** Our data showed that extracurricular educational institutions physical culture sports direction have a place in leisure activities. They play an important role in motor activity, substantial leisure and healthy lifestyles for children and young people of our country. **Keywords:** children, youth, health, leisure, out of school, educational, establishment.

Introduction

As on to day, at comprehensive educational establishments there have been existed negative trends to worsening of children’s and youth’s health. With age quantity of pupils, studying in main physical culture groups is reducing and quantity of pupils – members of special health groups is increasing [2, 3, 6]. Way of life renders decisive influence on children’s health as far as among teen-agers there exist risks of negative behavior (smoking, taking of alcohol and drugs) that greatly influence on general condition of health. For example, by results of sociological study “Attitude of Ukrainian youth to healthy life style” only 34% of children do morning exercises, 21% never practice walks before sleep, half of them (52%) sleep 8 hours. The received data witness about troublesome trend: many young people do not understand importance and purposefulness of physical loads, walks in the fresh air and full fledged sleep [4].

To day, for maintaining of children’s and youth’s proper health condition there shall be created conditions for physical culture or sports practicing, for active leisure. Extracurricular educational establishments of physical culture and sport orientation – commercial sport clubs, local public sport clubs, children-junior sport schools, sport circles and so on - become very important.

Analysis of scientific-methodic literature showed that for improvement of pupils’ health condition and motion functioning it is necessary, besides physical culture lessons, to use re-creational forms of physical education and apply health related technologies, which include: gymnastic exercises before classes, short physical warming up during lessons, physical exercises and outdoor games at big breaks, every day physical culture trainings in groups day care, independent trainings in extra-curriculum time, physical culture education at places of residence and etc. [3, 5, 9].

In scientific works the urgency of problem of children’s and youth’s motion activity’s weakening is underlined as well as reduction of health condition. The authors connect it with the fact that studying youth have unconscious negative attitude to physical culture, including not understanding role and place of physical culture leisure in this process [1, 3, 5, 6-8, 10-13].

The present research has been conducted in the frames of realization of combined plan of scientific-research work in sphere of physical culture and sports for 2011-2015 “Paradigm of healthy life style in discourses of physical education and sports” (code 1.3), of complex scientific project for 2013-2014 “Theoretical methodic principles of formation of children and youth personality’s physical culture as the basis of their health” (State registration number 0113U001205).

**Purpose, tasks of the work, material and methods**

The purpose of the research is determination of role of extracurricular educational establishments of physical culture and sport orientation in ensuring of children’s and youth’s leisure activity.

The tasks of the research: 1. To analyze status of children’s and youth’s leisure activity in extracurricular educational establishments of physical culture and sports orientation. 2. To determine role of extracurricular educational establishments of physical culture and sports orientation in ensuring of children’s and youth’s leisure activity.

Material and methods of the research: for solution of the set tasks we used analysis of literature sources and documents, Internet materials, methods of mathematical statistics. In our work we present results of analysis of scientific-methodic literature and statistical reports of Ministry of youth and sports of Ukraine.
Results of the researches and their discussion
Physical culture- sport leisure activity of children and youth ensures progressing of disciples’ physical skills, required conditions for full fledged improvement of health, hardening, full rest, training physical culture and sports, preparing of sport reserve for Ukrainian combined teams, acquiring of motives for healthy life style. [Excurricular educational establishments and local establishments/Ukrainian center of political management [Electronic resource]. - Address: http://www.politik.org.ua/vid/bookscontent.php3?b-4&c=155.]. Solution of tasks of children’s and youth’s physical culture-sport leisure activity shall be ensured by extracurricular educational establishments of physical culture and sport orientation.
Results of analysis of statistical reports of Ministry of youth and sports of Ukraine as per form № 2-ФК for 2012-2013 witness that quantity of persons, practicing sports increased y 0.7% in 2013 and is 1280611 persons. [Report of Ministry of youth and sports of Ukraine by form № 2-ФК “Report of physical culture and sports” for 2012 -2013: [electronic resource] // Official site of Ministry of youth and sports of Ukraine. Address: http: // www. kmu.gov.ua/sport/control/.] (табл. 1).

Table 1
Functioning of extracurricular educational establishments of physical culture and sport orientation in Ukraine

<table>
<thead>
<tr>
<th>Quantitative data:</th>
<th>2012</th>
<th>2013</th>
<th>+/− in respect to 2012</th>
<th>% in respect to 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total quantity of practicing sports:</td>
<td>1271593</td>
<td>1280611</td>
<td>+9018</td>
<td>+0.7</td>
</tr>
<tr>
<td>From them:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In children-junior sport schools, specialized children-junior sport schools of Olympic reserve</td>
<td>601993</td>
<td>607338</td>
<td>+5345</td>
<td>+0.9</td>
</tr>
<tr>
<td>In educational establishments of sport profile</td>
<td>5712</td>
<td>4729</td>
<td>-983</td>
<td>-17/2</td>
</tr>
<tr>
<td>In sport clubs</td>
<td>286871</td>
<td>291327</td>
<td>+4456</td>
<td>+1.6</td>
</tr>
<tr>
<td>Quantity of persons, who practice all kinds of health related physical culture, total</td>
<td>4876904</td>
<td>5100067</td>
<td>+223163</td>
<td>+4.6</td>
</tr>
<tr>
<td>Including:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In comprehensive educational establishments</td>
<td>1496792</td>
<td>1520353</td>
<td>+23561</td>
<td>+1.6</td>
</tr>
<tr>
<td>In vocational educational establishments</td>
<td>123761</td>
<td>118051</td>
<td>-5710</td>
<td>-4.6</td>
</tr>
<tr>
<td>In higher educational establishments of 1st and 2nd accreditations</td>
<td>212437</td>
<td>226051</td>
<td>+13614</td>
<td>+6.4</td>
</tr>
<tr>
<td>In higher educational establishments of 3rd and 4th accreditations</td>
<td>348777</td>
<td>396646</td>
<td>+47869</td>
<td>+13, 7</td>
</tr>
<tr>
<td>In local establishments at places of residence</td>
<td>827808</td>
<td>862589</td>
<td>+34781</td>
<td>+4.2</td>
</tr>
<tr>
<td>Quantity of local public children-junior sport clubs</td>
<td>891</td>
<td>878</td>
<td>-13</td>
<td>-1.5</td>
</tr>
<tr>
<td>Quantity of attendants of local-public children-junior sport clubs</td>
<td>94978</td>
<td>96556</td>
<td>+1578</td>
<td>+1.7</td>
</tr>
<tr>
<td>Quantity of pupils and students – members of special health groups, total</td>
<td>571827</td>
<td>523210</td>
<td>-48617</td>
<td>-8.5</td>
</tr>
<tr>
<td>Including:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In comprehensive educational establishments</td>
<td>395274</td>
<td>361507</td>
<td>-33767</td>
<td>-8.5</td>
</tr>
<tr>
<td>In vocational educational establishments</td>
<td>33448</td>
<td>26878</td>
<td>-6570</td>
<td>-1.6</td>
</tr>
<tr>
<td>In higher educational establishments of 1st and 2nd accreditations</td>
<td>45781</td>
<td>46423</td>
<td>+642</td>
<td>+1.4</td>
</tr>
<tr>
<td>In higher educational establishments of 3rd and 4th accreditations</td>
<td>68951</td>
<td>60400</td>
<td>-8551</td>
<td>-12.4</td>
</tr>
</tbody>
</table>
Quantity of persons, who practice all kinds of health related physical culture, increased by 4.6% (see table 1) that witnesses about activation of physical culture – sports and health related work with children and youth in Ukraine. At the same time educational establishments of sport profile and vocational educational establishments have negative indicators of physical culture – sports and health related work: quantity of trainees reduced by 17.2% and 4.6% accordingly, there.

Total quantity of pupils and students – members of special health groups - decreased by 8.5% in 2013 (in comprehensive educational establishments – by 8.5%, in vocational educational establishments - by 19.6% and in higher educational establishments of 3\textsuperscript{rd} and 4\textsuperscript{th} accreditation’s levels – by 12.4%). But in higher educational establishments of 1\textsuperscript{st} and 2\textsuperscript{nd} levels of accreditation the quantity of special health groups’ members increased by 1.4% (see fig.1).

Analysis od statistical reports showed that in 2013 quantity of persons, who practice all kinds of health related physical culture, increased by 4.6%, including: quantity of children and teenagers of 6-18 years old age – by 2.4%, quantity of teenagers and youth of 19-35 years old age – by 5.3% (see table 2).

Therefore, it is necessary to pay more attention to propaganda of healthy life style at governmental level; to promote, with the help of SMI, involving of children and youth in motion functioning, healthy life style, full fledged leisure, formation of personality’s physical culture.
Conclusions:
1. 1,280,611 children and youth were involved in sport-oriented leisure in extracurricular educational establishments in Ukraine in 2013. Quantity of persons, practicing all kinds of health related physical culture is 5,100,067. 9,656 persons attend local-public sport clubs. During 2013 quantity of pupils and students – members of special health groups – reduced by 48,617 persons. Functioning of extracurricular educational establishments renders positive influence on this indicator: quantity of persons, who practice all kinds of health related physical culture, increased by 23,561 persons, in local establishments – by 34,781 persons.

2. Results of conducted research witness that extracurricular educational establishments of physical culture-sport orientation play important role in leisure activity, in ensuring motion functioning and healthy life style of children and youth of our country.

The prospects of further researches imply study of new alternative approaches to ensuring of physical culture-sport leisure activity of children and youth.

References:
TO THE QUESTION OF THE FORMATION OF PERSONAL QUALITIES OF FUTURE DOCTORS BY MEANS OF COMBAT SPORTS

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Crimean State Medical University named after S.I. Georgievsky

Annotation. *Purpose:* to provide theoretical analysis of the notion of “assertiveness” and rationale of approaches to the development of future doctors’ assertiveness by means of combat sports (Sambo and Judo). *Material:* analysis of regulatory documents, literary sources. *Results:* the author has analysed the essence of the notion of assertiveness, and ideas about the relevance of the quality in doctors’ professional activity. The notion of assertiveness has been defined as the subject quality of an individual integrating initiative and willingness to take risks in difficult situations, self-confidence and positive attitude towards others, the ability to freely make decisions and be responsible for their consequences, persistence in protecting one’s own rights and achieve life goals. It has been shown that the key component of assertiveness manifestations are technologies of subject-subject interaction, that provide mutual correctness and effectiveness of acceptable relations. Means of the combat sports have been viewed as instruments of the development of future doctors’ personal qualities. The potentialities of assertiveness formation by means of the combat sports have been defined. *Conclusions:* the introduction of the combat sports elements in the professionally applied training of medical university students is an important issue of nowadays, which needs theoretical substantiation and methodical support. *Key words:* assertiveness, doctors, students, professional training, professional activity.

Introduction

Personality’s qualities of future medical worker – assertiveness, tolerance, empathy condition to large extent successfullness of professional functioning, development and self realization of personality on all stages of life. For formation of these qualities it is necessary to apply adequate tools of training, which can be methods and means of physical culture, in particular, pedagogic potential of some kinds of sports [14]. Foundation of application and selection of means and methods of physical education for targeted development of personality’s qualities of future medical doctor are urgent in context of requirements to professional functioning, presented in FSES HVT (Federal state educational standards of Higher vocational training) by direction of training 060101 – Medical functioning [http://www.edu.ru/db-mon/mo/Data/d_10/m1118.html].

Assertiveness of personality and peculiarities of its formation were regarded in works by R. Alberty, E. Bern, S. Bishop, G. Volpet, Ph. Devis, V. Cappony, S.V. Kovaliov, R. Kokh, A. Maslow, T. Novak, Ye.N. Pekhota, G. Rassel, V.G. Rometk. Formation of assertive skills and features of students was reflected in works by V.V. Davydiv, V.A. Kan-Kalik, S.V. Kravtsova, Ye.A. Mukhmatulina, A.V. Petrovskiy. Recent years assertiveness has been being regarded as one of psychological mechanisms of development of children’s social adaptation (Yu.V. Shyltsova) [17], of teenagers (I.V. Popova) [11], of students (Ye.V. Khokhlova) [13]; as the source of successfullness of personality’s adaptation (V.A. Shamiyeva) [16]; as a tool of monitoring of targeted personality’s development (L.V. Oganin) [8]. However, martial arts have not been studied yet as a tool of formation of assertiveness in the process of physical education.

The work has been fulfilled in compliance with SRW works of Crimea state medical university, named after S.I. Georgievsky.

Purpose, tasks of the work, material and methods

*The purpose of the research* is theoretical analysis of conception “assertiveness” and foundation of approaches to development of future medical doctors’ assertiveness by means of sport martial arts.

*The methods and organization of the research:* analysis of legal documentation, literature sources, analysis and synthesis of the received information, method of pedagogic projection, generalization of own pedagogical experience of sambo and judo training.

Results of the researches

In Federal state educational training standards of higher vocational training by directions 060101 – Medical functioning – it is noted that specialist shall be trained for prophylaxis, diagnostic, treatment, rehabilitation, psychological-pedagogic and scientific-research professional functioning [http://www.edu.ru/db-mon/mo/Data/d_10/m1118.html]. All above listed kinds of activity stipulate presence of doctor’s personality qualities, which could ensure effective interaction with other people. Ability to feel other person’s condition, sympathize and empathizes other’s sufferings, but, alongside with it, to firmly and persistently solve professional tasks are still more often regarded as features, vitally important for medical doctor.

“Assertiveness” is not always used in psychological-pedagogic literature unequivocally, as far as it has many semantic variants in certain contexts. In Big Psychological dictionary “assertiveness” is defined as human ability to firmly defend own rights without suppressing the rights of other people [3, pg. 38]. “Assertiveness” is regarded as personality’s feature, defined as autonomy, independence on external influence and opinions, ability to independently regulate own behavior [7, pg. 138]. Recent years, in opinion of L.N. Shakirova, “assertiveness” has been being

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doi:10.15561/20755279.2014.0508

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understood as self-confidence, readiness to take independent decisions and be responsible for their after effects [15, pg. 141].

V.A. Shamiyeva defines “assertiveness” as subjective property of a personality, which includes initiative and readiness to risk in difficult life situations, self-confidence and positive attitude to other people, ability to freely take decisions and be responsible for their after-effects, persistence in defense of own rights and achieving of own life targets, oriented on self-progressing [16, pg. 12].

In every of presented above definitions key component is technology of organization of subject-to-subject interaction, ensuring mutual correctness and effectiveness of permitted relations. In context of professional training of future medical doctor it is urgent that in contrast to destructive manipulation and aggression, assertive behavior should be regarded as adequacy in certain life situation.

In opinion of S. Stein and G. Book, assertiveness includes three main components: a) ability to express feelings and thoughts (feel and express anger or warm feelings); b) ability to openly express ideas and thoughts (express opinion, not yielding to pressure and keep certain position even if is it is emotionally difficult and if you can loose something with it) and c) ability to defend own rights (don’t permit other people to use you) [20].

Ye.V. Khokhlova marks out, as main components of assertive personality’s structure, personality’s and behavioral characteristics: positive openness, emotional opposition to inertial behavior, energy as expression of inner force, required for creative activity, persistence as sound expression of own position; courage in creative functioning, suspiciousness as indicator of development of sound and creative search; sound anxiety as indicator of active life position and inner tension in contrast to laziness; self-confidence as indicator of attitude to oneself and to other people as to values; social brevity and initiative in social contacts as expression of active cognition; time orientation of personality, connected with cognition and caused by value of cognition [13, pg. 8].

Assertiveness means not only quality, ensuring effectiveness of professional contacts in social-economic professions. V.A. Shamiyeva thinks that assertiveness, as complex personality’s feature, fulfils system-formation function in structure of subject’s personality and is the basis of personality’s adaptation potential [16, pg. 5]. Assertiveness, as a property of a personality of adaptation’s subject permits not only to adapt to variable conditions of life activity but also to construct such relations with surrounding world, which would facilitate creative progress, expansion of personal freedom and own development on the base of responsibility for choice of own feelings, actions and attitude to oneself and to other people [16, pg. 10]. The rendered definitions and estimations of assertiveness unequivocally witness that this personality’s characteristic is an important attribute of medical doctor’s professionalism, as far as it permits for personality to flexibly adapt to quickly changing conditions, preserves social and mental health of representatives of social-economic professions.

Practical training of assertiveness implies formation of non-verbal interaction skills, ability to estimate the state of other person, practical knowledge about people’s behavior in different life situations. In our opinion effective tool of targeted formation of future doctors’ assertiveness can be means and methods of sport martial arts.

A. A. Solovyov defines concept “martial arts” as combat of two persons, one-to-one, without fire arms [12, pg. 7]. Sport martial arts – are a kind of sport competition, in which two participants physically compete for determination of a winner in their combat, using only physical strength, or different sport equipment or/and cold arms [12, 19]. Effectiveness of sport martial arts in training of professional applied qualities is connected with the fact that they develop physical, psychic and social qualities of trainees simultaneously [4, pg. 20].

Studying formation of qualities, required by a person in everyday life, by means of physical culture, G.B. Shustikov and V.V. Fudimov present results of questioning of respondents, who practiced different kinds of sports. Questioning results of wrestlers witness that owing to sport martial arts 95.1% of respondents formed independence, 89.9% – brevity, 72.0% – decisiveness; 68.4% – ingenuity; 60.2% – self-control; 53.4% – forbearance; 54.0% – independence; 54.3% – ability to take decisions; 51.0% – attentiveness [18, pg. 166].

The purpose of martial arts is, acting in frames of existing rules, fulfill techniques, which can cause maximal physical damage to adversary or put him in unfavorable position and, of course, to defend against analogous adversary’s techniques. It is affirmed that martial arts, like other kinds of arts, is important for humanity as a mean of holistic social perception of individual personality, his (her) intellectual progressing, his (her) taking of collective experience, ancient wisdom, certain social-historic interests, strives, ideals [6, pg. 89]; in training of sambo sportsman personality is on the first place [5, pg. 5]. The specialists’ opinions, rendered by us, witness about potentials of sport martial arts as a tool pf formation of personality’s qualities of future medical doctor, assertiveness in the first turn.

Evaluating comprehensively pedagogic potential of sport martial arts, A.K. Bielov regards conflict, fight as training of behavior, art of control over situation, art of relationships’ regulation by power means, art of vitality and, at last, as combat art [1, pg. 3]. In context of our research this opinion actualizes involving of sport martial arts’ means and methods in professional training of medical HEEs’ students.

Sport martial arts are powerful stimulus for formation of ideal of holistic and viable personality [9, pg. 3]. This ideal includes understanding of such fundamental functions as strive for self-perfection, self control, self defense against aggressive, destructive influences. Partial arts trainings facilitate development of moral-will features. S.B. Petrygin notes that moral-will qualities are complex dynamic formation and are characterized by integral manifestation of thoughts, wishes, actions and their realization in adequate behavior [10, pg. 18]. In permanently complicating conditions of life martial arts trainings are not only tool of assertiveness’s formation but also they permit to ensure individual character of training and appeal to student’s personality. Personality-oriented physical education – is
complex, full fledged influence on personality by means of physical culture, when, alongside with solution of other tasks, the first priority belongs to development and actualization of physical culture and health values, formation of important for personality motives, knowledge and skills, as well as first experience of independent and safe usage of physical culture and health improvement means [2, pg. 3].

Educational process in medical higher educational establishment is, first of all, oriented on formation of cognitive and technological components of professional training. Formation of personality’s qualities of future specialists, ensuring effective professional communication, is possible at physical education lessons, owing to application of sport martial arts’ means and methods. Universal skills of interaction and effective communication, including non-verbal component, facilitate development of assertiveness, readiness for cooperation and mutual activity with future patents and colleagues. With it, as a result of mastering of sambo techniques student shall receive ability to defend: his (her) views and own opinion, take in consideration opinion of other people and different positions in communication and interaction with interlocutors; admit existence of different points of view, which can not coincide with his own; in mutual functioning – to come to common decision and come to agreement with opponent even in situations, when own interests can suffer; plan and realize cooperation with patients, using different methods of interaction; settle friendly relations, facilitating fruitful cooperation, with colleagues; formulate clear for patients thoughts, considering mental level of interlocutor; prove, argue and defend “up to the end” own position without insulting for interlocutor arguments; put questions, required for fulfillment of own activity, without tension or shyness; try to use and constantly perfect communicative, non-verbal means. In our opinion discipline “Physical education” is universal for formation of assertive and communicative skills of future medical doctors, while application of martial arts’ means and methods permits to more effectively solve this task of professional training.

Conclusions:
Concept “assertiveness” is defined as subjective property of a personality, which integrates initiative and readiness to risk in difficult life situations, self confidence and positive attitude to other people, ability to freely take decisions and be responsible for their after effects, persistence in defense of own rights and achieving of life targets. Key component of assertiveness is technology of subject-to-subject interaction, ensuring mutual correctness and effectiveness of permitted relations.

The presented above definitions and characteristics of concept “assertiveness” unequivocally witness that such personality’s quality is demanded in professional functioning of medical workers; permits for personality to flexibly adapt to quickly varying conditions, facilitate preservation of doctor’s social and psychic health. Discipline “Physical education” is universal for formation of assertive and communicative skills of future medical doctors. We offer to develop assertiveness of future medical doctors by introduction of sambo and judo principles in program of physical education.

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Cite this article as: Khripunova L.D. To the question of the formation of personal qualities of future doctors by means of combat sports Physical education of students, 2014, vol.5, pp. 43-47. doi:10.15561/20755279.2014.0508

The electronic version of this article is the complete one and can be found online at: http://www.sportpedn.org.ua/html/archive-e.html

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Received: 25.06.2014
Published: 30.06.2014
Introduction

As practice of work at school shows not only physical culture teaches fail to ensure schoolchildren’s orientation on health improvement, active life style; that is why it is necessary to consolidate efforts of all teachers and for this purpose it is required to form their orientation on value potential of physical culture in period of their studying at HEEs. It shall result in such level of physical culture, which would be characterized by activity on physical, spiritual and mental self-perfection [6, 7, 9]. Solution of these tasks lies in the structure of discipline “physical culture” in HEE and the purpose of this discipline is to facilitate rising of level of not special physical education. Main property of such education is involvement in physical culture – sport functioning both independently and, when students train not independently but in groups, in which collective is the subject of activity [4]. Achievement of educational level in field of physical culture is characterized both by knowledge, theoretical and practical-methodic fitness and its influence on formed of motivational sphere, motion functioning and level of physical development and physical fitness [1, 8].

Such complex task can be solved only in case of organization of effective physical education’s system with increasing of role of professional-applied physical fitness [2, 3]. Students of pedagogic HEEs to larger extent require such not special physical education, because after their graduation they shall deliver to their pupils not only knowledge but own vision of healthy life style [11, 12].

Orientation on mastering of physical culture values and self-perfection depends on how reasonably students evaluate condition of own health and physical fitness.

In compliance with researches [8, 10, 14, 18-20], if they evaluate highly indicators of own physical condition and are satisfied with level of own development, it is unlikely that they could have strong motivation for practicing of physical culture. That is why it is important to know to what extent subjective evaluation corresponds to actual indicators, which can be determined by appropriate methods of research.

With non-compliance of students’ subjective evaluation of own health and physical fitness with actual condition there appears the task to show to future teachers what undesirable consequences can appear if they would be unprepared for professional activity in school [5, 13, 15-17].

Especially important is adequate self-estimation of own physical condition and physical fitness by extramural students because they have no compulsory physical culture classes and the task of self-perfection and achievement of proper physical fitness can be solved only independently. It conditions urgency of our researches.

Purpose, tasks of the work, material and methods

The purpose of the research is to study adequacy of physical skills’ self estimation by girl student of primary education’s faculty, who study at different forms of education, as a stimulus for motivation to self perfection.

The methods and organization of the research: the researches were carried out with 1st and 4th year girl students of primary education’s faculty (full time and extramural students, 120 persons in total).

We used methodic of physical condition’s self-estimation [10], methodic of express-evaluation of physical health by G.A. Apanasenko, motion tests for coordination (shuttle run 4x9 meters); tests for strength (hand dynamometry), for flexibility (bending from standing position), methods of mathematical analysis.

Results of the researches and their discussion

Methodic of self-estimation of physical health envisages putting of marks (in points from 1 to 6) by code questions, which characterize: health, coordination, physical activity, body slimness, sport bents, physical “Self”, appearance, general self-estimation. Every scale includes certain questions. Scales “health” and “self-estimation” consist of 8 questions, i.e. maximal quantity of points is 48 that are taken as 100%. Other scales consist of 6 questions each, i.e. 36 points are taken as 100%. Comparing percentage by scales, it is possible to determine the degree of expressiveness of one or another girl-students’ quality.
Adequacy of self-estimation of physical health, physical fitness to actual condition can serve as a stimulus for motivation to self-perfection. Basing on results of objective indicators’ measurements (somatic, physical) we made conclusion about level of full time and extramural girl students’ physical condition. We registered low level of 4 year’s extramural girl students’ physical fitness. So there appears a question, if these girl students understand that they are not physically prepared for future professional activity? To answer this question we compared results of some tests and self-estimation of girl students (see table 1).

Health was evaluated by methodic of G.A. Apanasenko in points and compared with self estimation by scale “health” in percents. Percentage was distributed by levels: 50-60% - low level; 61-70% - below middle; 71-80% - middle; 81-90% - above middle; 91 and higher – high level. In columns we rendered quantitative results in appropriate units and qualitative – according to certain level. Basing on comparative analysis of testing results and self-estimation we can affirm that all girl students overestimated their health, referring it to “middle” level.

Great difference was noticed in self-estimation of extramural girl students. Their actual result in points, based on measurements of morphological functional indicators, was 3, 5-3, 6 points that can be referred to “low” level of physical health, i.e. their overestimation equals to two levels. Full time girl students also overestimated their physical health by one level, because their points were in zone “below middle”.

For determination of body slimness by objective indicators we used body mass index (kgm $^{-2}$). Result of 22 kgm $^{-2}$ was regarded as normal. 4th year extramural students overestimated their slimness, having actual IBM 23.1 kgm $^{-2}$.

Coordination of movements was evaluated by test 4x9 meters’ run. 2nd year full time students reduced their self estimation to level below middle, while their result (11. 5 sec.) can be regarded as “middle” level. 4th year full time girl students estimated themselves adequately (“middle level”). Extramural girl students overestimated their coordination: 2nd year girl students overestimated themselves by one level (with their actual level “below middle”) and 4th year girl students had overestimation by two levels (with actual level “low”).

Inadequacy of estimation of strength was registered in all girl students. We compared results of “hand dynamometry” test (kg) with levels of self estimation. 2nd year full time students estimated their strength in the worst way (“below middle”) that to larger extent corresponded to actual “low” level. 4th year full time girl students estimated their level as “middle” with actual results “below middle”.

Overestimation of extra-mural girl students was by two levels. Actually their results were on low level, while their self-estimation was “middle level”.

Flexibility was estimated in test “bent from sitting position, cm”. In the whole girl students underestimated themselves, having determined their level in the frames from “low” to “middle”. Underestimation of 2nd year girl students was two levels and 4th year girl students – one level.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Comparative characteristic of actual state and self-estimation of girl-students’ physical fitness</th>
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<tbody>
<tr>
<td>Indicator</td>
<td>Type of evaluation</td>
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<td></td>
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<td>Health, points</td>
<td>Test, points</td>
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<td>Self-evaluation, %</td>
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<tr>
<td>Body slimness and index of body mass IBM</td>
<td>Test, kg.m$^{-2}$</td>
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<tr>
<td></td>
<td>Self-evaluation, %</td>
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<tr>
<td>Coordination</td>
<td>Test, sec.</td>
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2\textsuperscript{nd} year extramural girl students underestimated themselves by 2 levels and 4\textsuperscript{th} year – by one.

The most adequate self-estimation was made by girl students about their endurance. We compared it with results of restoration after test “20 squatting during 30 sec.” Their time of restoration was within 2-2.8 minutes that corresponds to functional level “below middle”. After analyzing of 6 indicators, determining, to some extent, functional indicators of physical health and physical fitness of girl students, we marked out three groups: objective evaluation and self estimation coincide (0); overestimation of own characteristics (+); underestimation of own abilities (-). Thus, we found that 50% of 2\textsuperscript{nd} year full time girl students overestimated their abilities by one level, 3% and 17% (one indicator) correspond to objective evaluation.

In 4\textsuperscript{th} year of full time form of studying coincidence of two kinds of qualitative mark coincides up to 50%. Overestimation concerns two indicators: strength and health, underestimation – flexibility.

Among 2\textsuperscript{nd} year extramural girl students 33% of marks coincide with objective and 50% - overestimate their abilities by two levels. The most inadequate self estimation was registered in 4\textsuperscript{th} year girl students. 60% of them overestimate their abilities and in 50% - by two levels.

Such inadequacy of self estimation of own physical abilities by extramural girl students is, likely, connected with absence of actual testing of their physical condition, owing to absence of physical culture classes: both practical and consultations. There is no program of physical education for extramural girl students, which could orient them on self-training and independent trainings with further control tests, corresponding to professional-applied physical requirements. All these negatively influence on motivation of extramural students for improvement of their professional-applied physical fitness.

**Conclusions:**

The conducted researches of methodic of physical condition’s self estimation and on methodic of physical health and physical fitness indicators’ measurements permit to determine objectiveness of self estimation, which influence on motivation for self-perfection.

It was cleared up that absence of compulsory practical physical culture trainings of extramural girl students with mandatory control of physical fitness during academic year negatively influences on objective sensation of own physical condition that does not facilitate motivation for improvement of professional-applied physical fitness.

The prospects of further researches imply working out of organizational-methodic conditions, which would facilitate increasing of adequacy of physical abilities’ self estimation by extramural girl students in system of independent trainings.
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THE EFFECTS OF STRETCHING EXERCISE ON HEMODYNAMIC RESPONSES AND POST-EXERCISE HYPOTENSION IN NORMOTENSIVE WOMEN STUDENTS

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Annotation. Aim: The aim of the present study was to evaluate acute effects of SE on post-exercise hemodynamic responses for 1-h in normotensive sedentary young women. Methods: Sixteen women (21.56±1.21yr; 159.6±0.5 cm; 54.53±6.02 kg) were randomly assigned to SE (n = 8) and control (C) groups (n = 8). SE group performed 20 stretches for the whole body. Each SE was repeated 2 times. Rest interval between repetitions and movement 10 s were considered. Systolic blood pressure (SBP), diastolic BP (DBP), mean arterial BP (MAP), rate pressure product (RPP), pulse pressure (PP) and heart rate (HR) were measured during 1-h (minutes: 0.15, 30, 45 and 60) in SE and C groups. Results: There were significant decreases (P<0.05) in SBP, DBP, and MAP, after SE from 15 to 30 min of recovery than baseline. RPP also decreased significantly (P<0.05) after SE from 15 to 45 min when compared with baseline. But SE did not cause any significant changes in PP when compared with C group. Hemodynamic responses were not altered during the control trial. Conclusions: The results of this study showed that an acute SE lead to PEH. Therefore, SE may be an interesting training strategy to acutely decrease BP in young women.

Keywords: stretching, blood pressure, hypotension, student, girl.

Introduction

High blood pressure or hypertension (HT) is a risk factor for developing cardiovascular disease (CVD) and according to the World Health Organization (WHO) reports, each year more than 7 billion people in the world will die due to this disease (Melo et al., 2006). According to the American College of Sports Medicine (ACSM), even a modest 3 mmHg drop in systolic blood pressure (SBP) and diastolic blood pressure (DBP) at rest is associated with reduced cardiac mortality by 5 to 9 percent (Pescatello et al., 2004). Although pharmacological interventions are effective for reducing the blood pressure (BP), but the side effects of antihypertensive drugs have been proposed (Chobanian et al., 2003). Therefore, a lifestyle change for instant exercise is very important for the management of BP.

It has been shown that active individual have a lower risk of becoming hypertensive than those that are sedentary (Cardoso et al., 2010). Evidence suggests implementing regular exercise leads to decrease BP and the risk of CVD (Corrick et al., 2013). BP may decrease below pre-exercise baseline levels after different muscular work, this response is known as post-exercise hypotension (PEH) (Halliwill et al., 2013). This phenomenon could be clinically significant, because it tend to maintain BP of hypertensive subjects transiently at lower levels during different times of the day, especially when BP is at its highest level (Moraes et al., 2011). PEH has been investigated with various exercise including aerobic exercise (Mohebbi et al., 2010), resistance exercise (Rezk et al., 2006), water exercise (Terblanche et al., 2012), and concurrent exercise (Keese et al., 2012). The mechanisms that cause PEH are complex and multifactorial. It may be mediated by decrease in sympathetic nervous system, cardiac output, and vascular resistance or changes in the release of vasodilator substances (MacDonald., 2002). The decrease in total peripheral resistance induced by exercise usually results from increased bioavailability of nitric oxide (NO, a potent vasodilator) produced by endothelial cells in response to autonomic, hemodynamic and humoral stimuli (Santana et al., 2013).

Special populations such as the elderly and obese may have physical or musculoskeletal limitations and some individual due to inaccessibility gymnasium and high costs, may not have the ability to participation in conventional exercise modalities. Stretching exercise (SE) is an important component of fitness training (Farinatti et al., 2011) and it used in exercise programs for muscle injury prevention (Cipriani et al., 2012). Mechanical stress induced by SE can affect hemodynamic responses (Farinatti et al., 2011). Although it is clear that SE enhance flexibility (Cipriani et al., 2012), but its effect on hemodynamic responses and PEH is unclear. Recently, vong et al. observed that eight weeks of SE resulted to decrease in BP in obese postmenopausal women (vong et al., 2013). A previous study has reported that stretch stimulus to rat’s pulmonary vascular endothelial cells leads to an increase release of NO (Kuebler et al., 2003). Hotta et al. also demonstrated that acute SE improves peripheral circulated by production of NO (Hotta et al., 2013). The role of SE in the production of NO (Hotta et al., 2013), this model of physical activity may lead to PEH. It has been shown that stretched muscle fibers activate mechanoreceptors, which elicit cardiovascular regulation through parasympathetic inhibition and sympathetic activation (Drew et al., 2008). The fall in heart rate (HR) immediately post-exercise is a sign of parasympathetic nervous activity (Cole et al., 1999). Because of the increased vagal activity is associated with a reduced risk of mortality (Cole et al., 1999), we assessed changes in HR during post-exercise recovery. Rate Pressure Product (RPP, index of myocardial oxygen consumption) or Robinson index is the product of HR and SBP (Nagpal et al., 2007). Decrease in RPP post-exercise, indicating improvement in cardiac function (Pirotrowicz et al., 2009). Mean arterial pressure (MAP) is a product of cardiac output and systematic vascular resistance (MacDonald., 2002). Given that PEH May be result from reductions in cardiac output, total peripheral resistance, or both (Santana et al., 2013). Therefore, the calculation of this parameter can help us when discussing the results. Pulse pressure (PP) defined as the difference between SBP and DBP, is an indicator of arterial compliance and used in
assessing the risk of heart disease (Franklin et al., 1999). Among the indicators of cardiovascular risk assessment, most emphasis is on the PP (Franklin et al., 1999). Thus, evaluate the changes PP post-exercise may be useful. Therefore, because information on the effect of SE on the PEH seems to be lacking, the purpose of these study was to examine the effect of SE on PEH and post-exercise hemodynamic responses in normotensive sedentary young women.

Material and Methods

Subjects
Sixteen women volunteered for this study. All subjects completed the short version of the International Physical Activity Questionnaire (APAQ) and were considered sedentary. Subjects were randomly assigned to SE (n = 8) and control groups (C, n = 8). The inclusion criteria were: normotensive, weight normal, no regular exercise training in the previous 12 months. The exclusion criteria were: use of drugs that could affect cardiovascular function, (i.e. beta-blockers and inhibitors of angiotensin-converting enzyme), smoking, have any cardiovascular and osteomyoarticular problems that could affect performance during SE, being in menstrual bleeding cycle, and SBP and DBP greater than 139 and 89 mmHg respectively. Volunteers completed a thorough physical examination, including a medical history, BP assessment, anthropometric, and orthopedic evaluation prior to participation in the experimental sessions. Moreover, all volunteers signed a written consent and were informed about the risks and benefits of the present study which was approved by the ethical Committee of the Department of Sport Sciences, University of Guilan. Demographic characteristics of subjects are shown in Table 1.

Anthropometric, body fat percentage, and hemodynamic parameters
Height was measured using a wall-stadiometer, by precision of 1 mm. weight and body composition was determined by In Body System (0.3, Korea). SBP and DBP using a standard mercury sphygmomanometer (ALPK, Japan) and HR were measured by an electronic HR monitor (Polar PM80, Finland). The measuring procedure was in accordance with the recommendation of the American Heart Association (Fletcher et al., 1995) and was conducted by an experienced researcher. RPP, MAP and PP were estimated by conventional equations.

Acute exercise session
SE group completed familiarization program prior to testing. During the familiarization subjects were advised regarding proper performance of stretches. Experimental session was conducted in a temperature-controlled room (23 ± 1°C) between 9:00-11:00 am. Subjects refrained for at least 48-h from intake of caffeine or alcoholic beverage and severe activity that demanded high energy before testing. Before the exercise protocol, in order to measure baseline BP and HR, Subjects seated for 10 minutes and then 5 recordings were taken at 2 minute-intervals. The lowest and highest BP recorded values were removed and the remaining three were averaged to determine of baseline BP. At the end of 10 minutes, HR was measured only once. Immediately after the SE, BP and HR were measured at 0, 15, 30, 45, and 60 minutes with subjects seated. Same parameters were measured for C group without performing any type of exercise. Procedure of SE: researcher closely supervised the SE, which were conducted on a floor mat and focused on whole body major muscles: pectorals major and minor, latissimus dorsi, bicep brachial, triceps, deltoid, trapezius, illiopsas, gluteus, quadriceps, hamstring, leg adductors and gastrocnemius. The 20 stretches were performed in the standing, sitting, and lying position. Each SE was repeated 2 times. The stretched muscle was held for 30 s at point of maximal exertion (defined as RPE > 18). Rest interval between repetitions and movement 10 s were considered. Subjects counted from 1 to 30 during the 30 s stretch to avoid holding their breath during the stretching. Total time SE lasted approximately 38 minute.

Statistical Analysis
All data are presented as mean ± standard deviation (SD). Independent t-tests was used as appropriate and repeated measures analysis of variance was used to determine the degree of difference SBP, DBP, MAP, HR, RPP and PP between baseline values and at 0, 15, 30, 45, and 60 minutes in C and SE groups. Statistical significance was accepted at the P<0.05.

Results
In C group, SBP, DBP, HR, MAP and PP, did not changed significantly. Figure 1 presents mean values of SBP, DBP and MAP during 1-h after the experimental session. The SBP, DBP and MAP was significantly decreased (P<0.05) at time points of 15 to 30 after SE when compared with the baseline values. Table 1 shows the changes in HR, RPP, and PP from baseline values to 1-h after experimental sessions. HR was significantly increased immediately after SE when compared with baseline value. However, HR at time points of 15 to 60 was significantly reduced. RPP decreased significantly at time points of 15 to 45 when compared with baseline value. But, SE did not any significant changes in PP.

Table 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Exercise</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, yr</td>
<td>21.87±1.25</td>
<td>21.25±1.64</td>
</tr>
<tr>
<td>Height, cm</td>
<td>159.1±0.06</td>
<td>158.2±0.05</td>
</tr>
<tr>
<td>Weight, kg</td>
<td>55.86±4.40</td>
<td>53.20±7.37</td>
</tr>
<tr>
<td>BMI, kg/m²</td>
<td>22.10±1.94</td>
<td>21.17±2.06</td>
</tr>
<tr>
<td>Fat, %</td>
<td>28.19±6.31</td>
<td>32.09±5.84</td>
</tr>
</tbody>
</table>

Values are shown as mean ± SD or numbers (%), BMI = body mass index.
Table 2: HR, RPP and PP variability parameters in the C and SE groups

<table>
<thead>
<tr>
<th>Trials</th>
<th>HR</th>
<th>PP</th>
<th>RPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-exercise</td>
<td>80±5.24</td>
<td>50.75±4.77</td>
<td>10105±536.4</td>
</tr>
<tr>
<td>Post-exercise</td>
<td>86±6.41*</td>
<td>49.75±6.45</td>
<td>10490±368.6ε</td>
</tr>
<tr>
<td>15 min</td>
<td>77±5.13†</td>
<td>48.87±7.30</td>
<td>9222.5±484.2*¥</td>
</tr>
<tr>
<td>30 min</td>
<td>75.5±5.13†</td>
<td>50.25±4.86</td>
<td>9017.5±811.7*¥</td>
</tr>
<tr>
<td>45 min</td>
<td>73.5±5.21†</td>
<td>49.12±5.44</td>
<td>8831±590.1*¥</td>
</tr>
<tr>
<td>60 min</td>
<td>76.5±5.42†</td>
<td>51.12±4.32</td>
<td>9528±729.5€</td>
</tr>
<tr>
<td>Pre-exercise</td>
<td>84±8</td>
<td>47.25±8.41</td>
<td>10024±1027.5</td>
</tr>
<tr>
<td>Post-exercise</td>
<td>84.2±7.9</td>
<td>47.23±8.44</td>
<td>10490±368.6</td>
</tr>
<tr>
<td>15 min</td>
<td>83±5.13</td>
<td>47.25±7.62</td>
<td>9222±484.2</td>
</tr>
<tr>
<td>30 min</td>
<td>82±6.05</td>
<td>46.25±9.76</td>
<td>9017±811.6</td>
</tr>
<tr>
<td>45 min</td>
<td>82.5±6.02</td>
<td>46±8.34</td>
<td>9802±736.3</td>
</tr>
<tr>
<td>60 min</td>
<td>81.5±6.02</td>
<td>46±8.41</td>
<td>9528±729.5</td>
</tr>
</tbody>
</table>

Values are shown as mean ± SD or numbers (%). HR = heart rate, PP = pulse pressure, RPP = rate pressure product
* Significant difference from pre-exercise (P<0.05)
€ Significant difference from 45 min (P<0.05)
† Significant difference from post-exercise (P<0.05)
# Significant difference between the two group (P<0.05)

Discussion
The results indicate that SE induced a drop in BP and RPP when compared with the control session. The absence of any decrease in BP during the non-exercise control trial shows that, decreasing the BP levels after SE are due to the exercise effect and not to the normal diurnal BP variations. It was research has demonstrated that acute exercise (aerobic, resistance, water, and concurrent) induce PEH (Mohebbi et al. 2010; Rezk et al. 2006; Terblanche et al. 2012; Keese et al. 2012). But the effects of SE have not been investigated. The novelty of this study was the acute of SE lead to PEH. To the best of knowledge, this is the first report of the effects of stretching exercise on PEH. The mechanisms underlying the PEH are not fully understood. Changes in the neural control of the circulatory system and the release of vasodilator agents are may be related with the PEH (Lockwood et al., 2005). Lansman et al. showed that a single stretch stimulus to vascular endothelial cells instantly enhanced the opening frequency of Ca²⁺ channels in the cell membrane (Lansman et al., 1987). SE could increase Ca²⁺ inflow into vascular endothelial cells by stretch activated Ca²⁺ channels (Singer et al., 1982). This increase leads to augmented calcium-dependent NO production from vascular endothelium (Singer et al., 1982). In the present study, we have observed PEH in SBP, DBP and MAP. Therefore, the PEH induced by SE may be due to NO production from vascular endothelial cells. It has been shown that, when muscle stretching and contraction occur simultaneously (which is property of the static stretching method, due to the muscle spindle reflex), type III fibers and metaboreceptor activated, and may induce parasympathetic inhibition and baroreflex stimulation and contribute to an increase in the hemodynamic responses (Farinatti et al., 2013). It is accepted that during SE there is a parasympathetic withdrawal and sympathetic stimulation, resulting in increases of the HR (Goldberger et al., 2006). Our study also revealed that HR was significantly increased immediately after SE and then gradually returns to the baseline value. Although SE did not lead to significantly decrease in HR below baseline level during the recovery period, but RPP for 30 minutes was lower compared with baseline value. Also, the RPP is the product of HR and SBP, any changes of these parameters can affect the RPP value. However, reducing the RPP may be more related with reduction in SBP. The present study does not provide explanations about the mechanism by which SE simultaneously decreases post-exercise BP and RPP in normotensive young women. One possible mechanism underlying the effects of SE on BP and RPP may be related to the decrease in sympathetic nervous activity. Pagani et al. found a significant decrease in low-frequency component SBP (a marker of vascular sympathetic activity) after stretching training (Pagani et al., 1997). Another possible mechanism is an improved endothelial-mediate vasodilation. A recent study showed that a 15 min SE acutely improved NO-mediated vasodilation (Hotta et al., 2013). Nevertheless, it is possible that SE via releasing of NO and decrease in sympathetic nervous activity contributed to PEH and fall in RPP. The study has limitations that should be considered. The small sample size that was utilized and the voluntary in this study were normotensive women, limiting the extrapolation of these to individual with other characteristics. Moreover, PEH mechanisms were not investigated. Additionally, blood sample measures should be considered for future researches, including the analysis of vasodilator metabolites, particularly NO. The assessment of sympathetic nervous activity following SE.
Conclusions
In normotensive women, SE decreases BP and RPP during the post-exercise period. This decrease persist for 30 min. These findings, if reproducible in hypertensive subjects, may have clinical implications.

Acknowledgments
The authors gratefully acknowledge the all subjects whom cooperated in this investigation.

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Received: 25.06.2014
Published: 30.06.2014
Annotation. Purpose: One of the important problems in sports training of top class tennis players is the optimal planning of direct preparations for the main competitions of the season. In this respect, the aim of the study is a retrospective analysis of the direct preparation to compete in the Girls’ Tennis Europe Junior Masters. Material: Research material was composed of training plans of the best Polish player in the Juniors category, M.L. The analysis concerned the time structure, the total training volume and the proportion of the applied training means. Results: It was found that, regardless of the methodological and organisational determinants of specific training solutions, the direct preparation to the competition should meet the generally accepted principles in the theory of training, among others, connected with periodization of training and the phasic system of shaping the form. Direct competitive preparation may significantly vary in specific cases. Conclusions: An efficient, proven in certain circumstances model of preparation may be inefficient in others. Key words: tennis, training, girls, planning, competition.

Introduction
One of the important problems in sports training of top class tennis players is the optimal planning of direct preparations for the main competitions of the season [8, 11]. Tennis tournaments are played practically throughout the year, and the leading players (WTA rank 1-20) usually compete in 18-24 tournaments a year. For these reasons, proper planning of competitions is the key issue in a tennis coach’s job, when he/she has to make choices of major, basic and control tournaments [4, 5, 7, 10].

A female tennis player’s optimal preparation to the main event is difficult and requires high coaching skills, among others, appropriate planning of the starting calendar, taking into account the athlete’s individual adaptive capabilities and her sports level, variability of training means, basic parameters of the training work and competition practice [2, 3, 6].

These problems are not too frequently covered in the available literature. Even in the most successful papers devoted to tennis it is difficult to find practical, concrete information on how to prepare for a tournament. Most of the publications concern technique or methodology, and less the cognitive value.

Therefore, the objective of this paper is an analysis of an extremely successful direct preparation to compete in the Girls’ Tennis Europe Junior Masters (Italy, 2002).

Material and methods
The research material was composed of training plans of the best Polish player in the Juniors category, M.L. M.L.’s year-long training plan and resulting from it the 31-day period of preparation to the Girls’ Tennis Europe Junior Masters in 2002 in Italy were analysed. Only eight best players from the Tennis Europe (TE) ranking list participated in the tournament. Player M.L. began the season in the 56th place in the TE ranking and completed it in position No. 6, which allowed her to start the Girls’ Tennis Europe Junior Masters (Italy, 2002).

The conducted analysis mainly concerned the time structure of training (the composition and the duration of mesocycles and microcycles), the total volume and the proportions of the applied training measures.

Results
Direct preparation to the Girls’ Tennis Europe Junior Masters in 2002 (Italy) took place from 16 September to 17 October 2002 (31 days).

The time structure of training was composed of 5 microcycles and consisted of 3 phases (Fig. 1): recovery, intensification and supercompensation.

The recovery phase consisted of three microcycles: passive recovery (1st microcycle) and a training camp in Zakopane – 10 days (2nd-3rd microcycle). This phase focused on recovery and shaping the basis of physical fitness. The purpose of the training camp in Zakopane was to create a functional basis (aerobic). Training was characterized by large volume (up to 5 hours, with 2-3 training units) at a small load intensity. General training means accounted for 92% and special ones for only 8% of the load. Training took place in all areas of energy provision, with particular regard to aerobic effort. This type of effort amounted to ≈75% of the total volume of performed work and was made by run/walks in the mountains, team games, and swimming – a continuous method (constant and variable). Training of anaerobic and anaerobic-aerobic effort constituted ≈25% of the total volume of the performed exercises. In this respect an intermittent method was applied at a stadium, in a judo hall and in a gym.
The intensification phase mainly consists in work on perfecting the technique and tactics (63%) and special physical preparation (16%), with a much lower number of comprehensive training (Fig. 2).

The volume of work is reduced to 3-4 hours a day and the intensity gradually increases. The content of classes in the intensification phase is presented in Table 1.
Table 1

The content of training in the intensification phase (4\textsuperscript{th} microcycle)

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Morning classes</th>
<th>Afternoon classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>07.10</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>22</td>
<td>08.10</td>
<td>=&gt; Basketball technical training - 120 min</td>
<td>=&gt; Swimming pool (=500 m) - 1 hour</td>
</tr>
<tr>
<td>23</td>
<td>09.10</td>
<td>=&gt; Basketball technical training - 90 min</td>
<td>=&gt; Perfecting the technique and tactics, playing task combinations with a sparring partner – 90 min.</td>
</tr>
<tr>
<td>24</td>
<td>10.10</td>
<td>=&gt; Perfecting the technique and tactics, playing task combinations with a sparring partner – 120 min.</td>
<td>=&gt; Basketball technical training - 90 min</td>
</tr>
<tr>
<td>25</td>
<td>11.10</td>
<td>=&gt; Training footwork on the court – 60 min</td>
<td>=&gt; Perfecting the technique and tactics, playing a combination of tasks with a sparring partner – 120 min.</td>
</tr>
<tr>
<td>26</td>
<td>12.10</td>
<td>=&gt; Task sparring – 90 min</td>
<td>=&gt; Perfecting the technique and tactics, playing task combinations - 120 min.</td>
</tr>
<tr>
<td>27</td>
<td>13.10</td>
<td>=&gt; Perfecting the technique and tactics, playing task combinations - 60 min.</td>
<td>=&gt; Training footwork on the court – 60 min</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>=&gt; Control games – 60 min</td>
</tr>
</tbody>
</table>

In the supercompensation phase, the volume of work decreases again and amounts up to 2.5 hours a day in two training units. A lot of training time is devoted to the improvement in techniques and tactics (50%), control games (25%) and special preparation (19%) (Fig. 3).

![Fig. 3 Proportions of training means in the supercompensation phase, %](image)

---

61
The detailed content of classes in the supercompensation phase is presented in Table 2.

### Table 2: The content of training in the supercompensation phase (5th microcycle).

<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Flight to Italy</th>
<th>=&gt; Training footwork on the court – 60 min</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>14 Sep.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>15 Sep.</td>
<td>=&gt; Perfecting the technique and tactics, playing task combinations 60 min. =&gt; Compensating exercises – 30 min.</td>
<td>=&gt; Task sparring – 60 min</td>
</tr>
<tr>
<td>30</td>
<td>16 Sep.</td>
<td>=&gt; Perfecting the technique and tactics, playing task combinations 60 min.</td>
<td>=&gt; Training footwork on the court – 30 min =&gt; Control games – 60 min</td>
</tr>
<tr>
<td>31</td>
<td>17 Sep.</td>
<td>=&gt; Control games – 60 min</td>
<td>=&gt; Control games – 60 min</td>
</tr>
<tr>
<td>32</td>
<td>18 Sep.</td>
<td>Tennis Europe Junior Masters</td>
<td></td>
</tr>
</tbody>
</table>

### Discussion

Planning of direct competitive preparation (dcp) to the main tournament of the season in the category of younger juniors (14 years old) seems to be fully justified and at present does not raise any doubts among tennis professionals. Many authors [1, 9, 12] emphasise the fact that 14-year-old girls are beginning to compete in professional tournaments, and at the age of 17-18, and sometimes even at 16, already achieve the highest level of skills and preparation, winning tournaments of the highest rank.

Ivo Van Aken [3] stresses that already in younger juniors one-year planning should take into account the main start and preparing for it, and in 15-year-old players, one can already plan 2-3 peaks of form. In 16-year-old tennis players the planning is close to the one characteristic of adults.

Analysing M.L.’s direct preparation to compete in the Girls’ Tennis Europe Junior Masters (2002), it should be noted that training during that period was of a custom character, and the way of its implementation deviated from the generally accepted "standard" to which some tennis coaches are used and with which they identify their factual competence.

This situation resulted from irregularities in the planning of year-long training preceding the mentioned period. The player competed in an excessive number of tournaments, far beyond the capabilities of an athlete at this age – 24 (86 singles matches and 44 doubles matches). M.L.’s starting practice was based on cycles of 4-5 tournaments in a row. An important shortcoming of such training was also a lack of adequate amount of rest – the transition period was one of the most underrated periods in M.L.’s yearly training.

Numerous scientific studies and practical experience of the best coaches in the world [9, 10, 12] unequivocally indicate that in youth categories in a single cycle of competitions players should not play more than three tournaments. This position is consistent with the main objective that training should meet at a given stage of long-term training [3, 9].

The effect of M.L.’s such scheduled training was injuries and a decline in both physical and mental form in the mid-season. During the World Championships in August, the athlete lost 70% of the matches, and the two next tournaments (Polish Masters and B. Tomaszewski’s Cup) were also unsuccessful. After the Polish Masters the player was scheduled to prepare directly to compete in the main tournament of the Girls’ Tennis Europe Junior Masters (2002).

However, given the player’s state, it was decided that she should devote the first microcycle (11 days) to rest, thus reducing the period of training in direct preparation to 3 weeks.

The second significant change was the content of the second 10-day microcycle. Trainings took place in the mountains, and so in conditions rather unspecific to tennis, and the player was deprived of contact with a racket for the next days.

The purpose of these changes in the structure of direct competitive preparation was to create conditions for full recovery after a strenuous competitive season, and what is extremely important, for mental restitution (the so-called hunger for tennis). Due to such a unique situation, the intensification phase lasted only 7 days and the supercompensation one – 4.

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28 14 Sep. Flight to Italy => Training footwork on the court – 60 min
29 15 Sep. => Perfecting the technique and tactics, playing task combinations 60 min. => Compensating exercises – 30 min. => Task sparring – 60 min
30 16 Sep. => Perfecting the technique and tactics, playing task combinations 60 min. => Training footwork on the court – 30 min => Control games – 60 min
31 17 Sep. => Control games – 60 min => Control games – 60 min
32 18 Sep. Tennis Europe Junior Masters
Therefore, in this variant of direct competitive preparation training was mainly aimed at the restitution of the player’s general physical and mental disposition, at the expense of specialized training. The traditional variant of direct competitive preparation, with great intensification of training, saturated mainly with specialized means, in this case would probably deepen the player’s overtraining.

Unfortunately, the proposed direct competitive preparation met with a lack of understanding on the part of the club coaches, who could not imagine that training 2 weeks before the main start was dominated by means of a general character and argued for a continuation of special competitive preparation only on the court.

In the Girls’ Tennis Europe Junior Masters (2002) M.L. was seeded with number 6. Having completed so scheduled direct competitive preparation, the contestant reached the final, where after equal fight, she won the European Vice-Championship.

Conclusions

As a result of the conducted study and the analysis of literature, one can draw the following conclusions:

1. Among many factors that have an impact on the construction of direct competitive preparation one should mention: the calendar of tournaments, the amount of time remaining to prepare for the main competition, the nature of preparations (orientation of classes, the type of applied means) and the volume of the basic parameters of the training work (volume and intensity) preceding the given period.

2. Regardless of the methodological and organizational determinants of specific training solutions, direct competitive preparation should meet the principles generally accepted in the theory of training, among others related to the periodization of training and the phase system of shaping sports form.

3. Appropriate proportions of the applied means and the overall volume of loads is of fundamental importance in constructing individual phases of direct competitive preparation.

4. In specific cases direct competitive preparation may significantly vary. An efficient, proven in certain circumstances model of preparation may be inefficient in others. Each cycle is a unique process.

References

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Cite this article as: Jagiello M., Jagiello W. Final preparations to the girls' tennis Europe Junior Masters. Physical education of students, 2014, vol. 5, pp. 59-64. doi:10.15561/20755279.2014.0511

The electronic version of this article is the complete one and can be found online at: http://www.sportpeda.org.ua.html/archive.html

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Received: 25.06.2014
Published: 30.06.2014
THE COMPARISON OF THREE TYPE OF EXERCISE SEQUENCE ON MAXIMUM STRENGTH IN UNTRAINED YOUNG MEN

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University of Guilan, Rasht, Iran

Annotation. **Aim:** The purpose of this study is comparison of three type of exercise sequence on maximum strength in untrained young men after 8 weeks of resistance training. **Methods:** Prior to the training program, participants were randomly assigned to three groups. One group began with upper to lower body (G1) while another performed lower to upper body (G2) or one exercise in upper body and one exercise in lower body order (G3). Training frequency was three sessions per week with at least 48 h of rest between sessions for a total of 24 sessions in the 8-week period. One repetition maximum (1RM) was assessed for all exercises at baseline and after 8 weeks of training. **Results:** The results indicate that the maximum strength increased after all sessions, but the increase was not significantly different between groups (p < 0.05). These results indicate that performing exercises first in upper-body/lower-body or alternate in a bout of resistance exercise was not to lead difference in maximum strength. **Conclusions:** These results indicate that one exercise in upper body and one exercise in lower body order not provided greater strength gains than both muscle group upper and lower body exercises (p < 0.05).

**Key words:** muscle strength; exercise sequence; untrained men.

**Introduction**

When prescribed appropriately with other key prescriptive variables (i.e. load, volume, repetition velocity, failure versus non-failure sets, rest interval between sets and exercises), the exercise order can influence the efficiency, safety and ultimate effectiveness of an resistance training program (Simao et al., 2012). It is generally recommended that exercises involving multiple joint exercises be placed at the beginning of a training session because this exercise sequence would result in the ability to resist higher loads. The rationale for performing multiple joint exercises in the beginning of a training session is that total work (repetitions × resistance) is greater when compared to performing single-joint exercises first, and may result in greater long term strength gains (Sforzo et al.). However, Kraemer and Ratamess suggested the general recommendation for exercise order of performing multiple joint exercises first can be changed depending on the goals of the training program (Fleck SJ, Kraemer et al.). Observed that performing multiple joint muscle group exercises at the early of an exercise sequence resulted in significantly larger repetitions compared to when the single joint were performed early in an exercise sequence (Sotoodeh et al.). Showed exercise order can facilitate the power developed during an exercise placed at the end of a training session despite reductions in total work and number of repetitions performed in a set (Spreuwenberg et al.). Finally, recommended if the strength and conditioning professional wants to maximize the Athlete’s performance in one specific resistance exercise, this exercise should be placed at the beginning of the training session (Gentil et al.). To our knowledge, methodological training studies manipulating three type of exercise sequence and the investigation of the influence on strength have not been conducted. Therefore, the purpose of the present study was to examine the comparison of three type of exercise sequence on maximum strength during 8 weeks of training in untrained young men.

**Methods and material**

Thirty-six untrained young men from the Iran University of Guilan were randomly assigned to three groups. One group (23.7 ± 1.5 years, 74.5 ± 4.0 kg, 175.1 ± 2.0 cm, 24.4 ± 1.5 kg m\(^{-2}\)) trained with upper to lower body group exercises (G1) (n = 12). The second group (22.4 ± 1.4 years, 72.7 ± 4.4 kg, 172.2 ± 4.5 cm, 23.2 ± 1.9 kg m\(^{-2}\)) trained using lower to upper body muscle group (G2) (n = 12). The third group (24.8 ± 1.6 years, 75.9 ± 4.4 kg, 175.3 ± 3.0 cm, 24.2 ± 1.9 kg m\(^{-2}\)) trained with one exercise in upper body and one exercise in lower body order (G3) (n = 12) and continued performing the regular military physical activity component during the 8 week period, but not the resistance training program. There were no significant differences between groups in anthropometric parameters or one repetition maximum (1RM) prior to training. In addition, diet was the same for all participants throughout the course of the study. Inclusion criteria were the following characteristics for all participants: (a) were physically active, but had not taken part in resistance training for at least 6 months prior to the start of the study; (b) not performing any type of regular physical activity for the duration of the study other than the prescribed resistance training; (c) did not have any functional limitations for the resistance training program or the 1RM tests; (d) not presenting any medical condition that could influence the training program; and (e) did not use any nutritional supplements. All participants read and signed an informed consent document after being informed of the testing and training procedures to be performed during the study. The 1RM tests were performed on two consecutive days for all exercises as described previously. Two weeks of familiarization took place prior to the 1RM tests (four sessions) (Simao et al.). The 1RM tests were performed following the anthropometric measurements on the first day. After 48 h, the 1RM tests were repeated to determine test–retest reliability. The heaviest load achieved on either of the test days was considered the pretraining 1RM. No exercise was allowed in the 48 h between 1RM tests, so as not to interfere with the reliability results. The 1RM was determined

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doi:10.15561/20755279.2014.0512
In fewer than five attempts with a rest interval of 5 min between 1RM attempts and 10 min were allowed before the start of the test for the next exercise. Following the 8 weeks of training, the 1RM test was performed similarly to the pre-training test in order to compare the strength changes in those exercises. Again, the highest load achieved in both days was considered as the 1RM. The exercise sequence for G1 was barbell bench press (BP), machine lat pull down (LPD), seated machine shoulder press (SP), leg press (LP), seated machine leg extension (LE), seated machine leg curl (LC). The exercise sequence for G2 was LP, LE, LC, BP, LPD and SP. The exercise sequence for G3 was BP, LP, LPD, LE, BS, and LC. All exercises for three groups were performed for three sets. In addition, an experienced strength and conditioning professional supervised all training sessions. Frequency of the training program was three sessions per week with at least 48 h of rest between sessions and 2 minute between sets and exercises. Twenty-four sessions were performed during the 8 weeks training period. Prior to each training session, the participants performed a specific warm up, consisting of 20 repetitions with approximately 50% of the resistance used in the first exercise of the training session. During the exercise sessions, participants were verbally encouraged to perform all sets to concentric failure and the same definitions of a complete range of motion used during the 1RM testing were used to define completion of a successful repetition. Adherence to the program was 100% for all groups. The total work performed by G1, G2 and G3 were calculated by multiplying the number of sessions by the number of sets and resistance load (session × sets × load).

Intra-class correlation coefficients (ICC) were used to determine 1RM test–retest reliability. The ICC method was used based on a repeat measurement of maximal strength. Coefficient of variation (CV) was used to calculate within-subject variation (CV% = standard deviation/mean) × 100). All variables presented normal distribution and homoscedasticity. Following two-way (time) by three-way (groups) ANOVAs (time [baseline vs. 8-week training] × group [G1 vs. G2 vs. G3]) was used to analysis for differences among the groups in the 1RM and kilogram of body mass (1RM load/body mass). When appropriate, follow-up analyses were performed using Fisher post hoc tests. T-Tests were used to analysis for differences between 1RM test and retest, pre and post training, and between the total works in three training programs. An alpha level of \( p \leq 0.05 \) was considered statistically significant for all comparisons.

### Table 1

Intra-class correlation coefficients (ICC) and range values in kg for each exercise, between 1RM tests and retests at baseline and after 8 weeks.

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Baseline 8 week</th>
<th>Baseline 8 week</th>
<th>Baseline 8 week</th>
<th>Baseline 8 week</th>
<th>Baseline 8 week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Bench press</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
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<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
</tr>
<tr>
<td>Lat pull down</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
</tr>
<tr>
<td>Shoulder press</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
</tr>
<tr>
<td>Leg press</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
</tr>
<tr>
<td>Leg extension</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
<td>( r = 0.99 ), ( r = 0.99 ), ( r = 0.99 )</td>
</tr>
</tbody>
</table>

### Results

The results indicate that the maximum strength increased after all sessions, but the increase was not significantly difference between groups (\( p < 0.05 \)). These results indicate that performing exercises first in upper-body/lower-body or alternate in a bout of resistance exercise was not to leads difference in maximum strength.
Discussion

The purpose of this study was to examine the comparison of three type of exercise sequence on maximum strength in untrained young men. To our knowledge, this was the first study to investigate the chronic effects the comparison of three type of different exercise sequence. The current results revealed not significant differences in strength gains in large muscle group (lower-body) than small muscle group (upper-body) exercises. Also, significant differences were not found in lower and upper-body muscle group exercises between the different exercise sequences, suggesting exercise order may be particularly important during the initial stages of resistance training in untrained men, mainly in large muscle group exercises. Generally, the length of the rest interval between sets is prescribed based on the training goal. The recommended rest interval increases when programs are designed for strength or power (e.g., 2–5 minutes) and decreases when programs are designed for hypertrophy (e.g., 30–90 seconds) or muscular endurance (e.g., less than or equal to 30 seconds) (rest interval) (Willardson et al). compared two protocols; one using eight sets of 8–12 repetitions of arm exercises versus eight sets of 10RM of the leg press followed by the same arm training (Hansen et al). The authors of the study reported large muscle group exercises for the lower body performed early in a training session have a stimulatory effect on small muscle group exercises for the upper-body performed later in the same session (Hansen et al). In contrast to what was found by Hansen et al., our findings indicated arm exercises provided greater strength gains when performed early in the training session. This discrepancy can be associated to the fact that the sessions investigated in our study involved only exercises for the upper-body and had the same total work. This difference in total work might have influenced the results of the study by Hansen et al., as well as the fact the exercises used were for different parts of the body. It is very difficult to compare our results with previous similar studies, since none of these studies investigated chronic effects of exercise order on strength. In addition, all previous studies used trained participants. However, the current study investigated the influence of resistance training sessions in untrained men. The different exercise orders did increase strength differently in three muscle group lower and upper body or alternate exercises throughout the course of the study, but the increase was not significantly difference between groups. Nevertheless, it should be noted three training groups revealed significant increases in strength over the course (8 weeks) of the training period in all exercises. Another interesting point to observe was the strength progression in each exercise in three sequences (Fig. 1). The 1RM strength progression was higher for the exercises performed earlier in a training session for three training groups, but the increase was not significantly difference between groups. The current results are in agreement with previous studies (Sforza and Simão et al) and suggest whenever an exercise is performed last in an exercise sequence or training session, performance of that particular exercise may be negatively affected. This is true whether the exercise involves large or small muscle groups. This negative effect on exercises performed later in a training session needs to be considered when designing programs for both athletes and fitness enthusiasts. Simão et al. investigated the influence of different exercise sequences on the number of repetitions performed in a group composed of both men and women with at least 2 years of recreational resistance training experience. The exercise sessions,
consisted of performing three sets of each exercise with a resistance of 10RM and 2-min rest periods between sets and exercises. The results demonstrated performing either large or small group exercises for the upper-body at the end of an exercise sequence resulted in significantly fewer repetitions compared to when the same exercises were performed early in an exercise sequence (Simão et al). A more recent study suggested a similar phenomenon in trained women when both upper and lower body exercises are performed in the same exercise session (Simão et al). The previously mentioned studies demonstrated that an exercise performed last in a training session, is negatively affected in an acute manner whether the exercise involves large or small muscle groups (Sforzo et al). Our findings revealed those effects can influence the results also in a chronic manner. These results suggest the exercise most important for the training goals should be placed at the beginning of the training session for larger strength gains, independent of the size of the muscle groups involved. Early muscular strength gains (during the first few weeks of training) are predominantly mediated by the increase in motor unit firing rate (Gabriel et al). Thus, an increase in muscular strength without hypertrophy is commonly observed in the initial stages of resistance training. However, we are unaware if our results are associated with neuromuscular adaptations only, given that muscle volume and hypertrophy were not assessed. Therefore, additional investigations with longer interventions and using procedures to assess muscle volume and hypertrophy are necessary to promote further understanding of the chronic effects from the exercise order.

Conclusions
Our results indicate that performing exercises first in upper-body/lower-body or alternate in a bout of resistance exercise was not to leads difference in maximum strength. Results also suggest that whenever one exercise is the last of a sequence performed in a training session, its performance will be negatively affected. Applying the results to exercise prescription, a large to small muscle group order might be more beneficial for untrained men, when trying to improve health.

Acknowledgements
The authors are grateful to the subjects who participated in this study.

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Received: 25.06.2014
Published: 30.06.2014
EMOTIONAL COMPETENCIES OF THE FORTHCOMING PHYSIOTHERAPISTS AND PHYSICAL EDUCATION TEACHERS

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University School of Physical Education in Wroclaw

Annotation. Purpose. Defining the level of emotional intelligence of students – prospective physiotherapists and physical education teachers. Material and method. The study was conducted amongst students of University School of Physical Education in Wroclaw. There were 134 students from Physiotherapy Department and 254 students of Physical Education Department tested. In the research the tool to diagnose emotional intelligence was used: Emotional Intelligence Scale by Matczak et al. Results. In assessing the level of emotional intelligence the differences between students groups were pointed out due to their field of study and gender. Average emotional intelligence for all groups was at the moderate level although prospective teachers reached higher scores. Students of Physiotherapy and subjects constituting the control group showed lower level of studies parameter and the results were similar. Different levels of emotional intelligence are also visible in the results obtained by women and men. Women in each group receive higher scores than men. Conclusions. Emotional competencies of the subjects are at the moderate and low level, which is not a satisfactory result. Higher predispositions should be expected of people who choose teaching or physiotherapist professions, because it is required by specificity of the work they intend to carry on. Therefore, it seems necessary to pay special attention to the development of these competencies in the course of the study.

Key words: emotional intelligence, student, teacher, physiotherapist.

Introduction

The proper functioning in relationships with others is an essential skill especially for those people whose profession requires constant communion with people. Amongst these professions are with no doubt teaching and physiotherapist profession. People who are engaged in these professions should have a high level of emotional and social competence, as work both with the student and the patient requires specific interpersonal skills. Emotional intelligence is responsible for the quality and the level of these skills and it is defined as For the quality and the level of these skills is the responsibility of emotional intelligence, which is defined as a set of capabilities that determine the use of emotions to solve problems in social situations [1].

Goleman [2] more accurately describes emotional intelligence, saying that it is the ability of motivation and perseverance in the pursuit of goal, ability to control impulses and urges to meet them later, ability to control own emotions, and regulate the mood and not give up to sad feelings that break up the thinking process, ability to optimistically looking into the future, as well as empathy and social behavior. Qualities and skills that make up emotional intelligence promote proper interpersonal relationships and often are critical to the success in life and profession [3], as well as significantly protect against the appearance of burnout syndrome, which is a typical phenomenon of the so-called social professions [4,5].

Emotional intelligence by Salovey, Mayer and Caruso [6] is a fourfold construct. First component is the perception and expression of emotions - it is the ability to perceive and recognize emotions in oneself and others. The second component is the ability to assimilate emotions to support cognitive processes. The third component - understanding emotions - includes knowledge about the experience of the emotional sphere. The fourth component - managing emotions - refers to the ability to consciously regulate own emotional states and moods as well as other people. In this concept, efficiency of emotional intelligence is strongly emphasized [7].

For the purpose of this study, the focus was on a single element being a part of emotional intelligence model, namely the ability to recognize emotions in other people based on their facial expressions. For the physiotherapist and teachers the face of a patient/student is often the first source of information that should be properly read already in the initial phase of the relationship because it can have an impact on its further course. During the conversation, the educational situation or intervention interpretation of emotions from facial expressions should occur on a regular basis to foster constructive communication and to help taking appropriate actions. Please note that in interpersonal communication the non-verbal message is about 65% of the information [8], which is why it is extremely important to be able to properly interpret these messages.

As pointed out by Wronka [9], the reception and interpretation of the information contained in human faces is a complex perceptual process, based on visual stimuli of dynamic variation. Although it happens very quickly, it is characterized by high reliability.

However, the accuracy of reading and interpreting the facial emotions varies in humans. Some people make it more accurately and some less - it depends on their individual skills and abilities.

Purpose

The aim of this study was to determine the level of emotional intelligence of students - forthcoming physiotherapists and physical education teachers. Emotional competencies are crucial for these professions, so it was assumed that people who want to perform these professions in the future should have a high level of emotional sensitivity.
Material and methods

The study was conducted in 2014 among the students of the Academy of Physical Education in Wroclaw: 134 individuals from the Department of Physiotherapy and 254 students of the Department of Physical Education. All students of Physiotherapy declared desire to work in their profession, and the teaching profession is going to perform 43% of the students of Physical Education. These are mostly people who decided to perform this profession while they were choosing the course of study. Other people from a group of students of Physical Education, despite the fact that studying in pedagogical university do not see themselves in the role of a teacher. Such students were use in the analysis of the test results as a reference group.

In the research the tool to diagnose emotional intelligence was used: Emotional Intelligence Scale by Matczak et al. [10]. In the construction of the scale the focus was put on the basic emotional abilities, namely the ability to recognize emotions in other people based on facial expressions. The test material contains 18 photographs of two actors who express a variety of emotional states. On the answer sheet, each image has a set of six names of emotions assigned to it, both positive and negative. Studied subject must assess whether the face in the photograph expresses those emotions and select one of three possible answers: expresses, doesn't express, it is difficult to say.

The results were converted to raw stems which were interpreted as follows: for low results the range from 1 to 4 stems were adopted, 5 to 6 stems were selected for average results (standard), and the results in the range of 7 to 10 stems were interpreted as a high scores.

Results

In assessing the level of emotional intelligence, the differences between the two groups of students were shown due to their course of the study and gender.

The average emotional intelligence for all groups was at the average level (5-6 stens), although slightly higher results were achieved by forthcoming teachers. Physiotherapy Students and individuals creating control group showed lower levels of the studied parameter, and the results were similar. The variation in the emotional intelligence is also visible in the results obtained by women and men. Women in each group receive higher scores than men (tab.1).

<table>
<thead>
<tr>
<th>SEX STUDY GROUP</th>
<th>Women</th>
<th></th>
<th></th>
<th>Men</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of people</td>
<td>Average</td>
<td>Standard deviation</td>
<td>Number of people</td>
<td>Average</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>Physiotherapists</td>
<td>79</td>
<td>75,04</td>
<td>11,73</td>
<td>55</td>
<td>73,15</td>
<td>9,69</td>
</tr>
<tr>
<td>Teachers</td>
<td>53</td>
<td>75,54</td>
<td>8,71</td>
<td>56</td>
<td>73,55</td>
<td>9,15</td>
</tr>
<tr>
<td>Reference group</td>
<td>70</td>
<td>74,58</td>
<td>8,52</td>
<td>75</td>
<td>72,87</td>
<td>13,76</td>
</tr>
</tbody>
</table>

Analysis of the distribution of different levels of emotional intelligence showed that among students - forthcoming physiotherapists and teachers and individuals in the control group, the smallest group consisted of those presenting a high level of emotional intelligence, followed by group of people with low levels of the studied characteristic, and the most numerous group was represented by those with average level of emotional intelligence. The distribution of the numerical amount of the respondents’ gender was shaped similarly (Fig. 1, 2). The numerical amount of group of students with a high level of emotional intelligence was significantly different from the numerical amount of groups presenting average and low levels of the characteristic.
Fig. 1. Level of the women’s emotional intelligence and the studies department

Fig. 2. Level of the men’s emotional intelligence and the studies department

Conclusions
According to the research results, it can be said that emotional competencies of the subjects are at the moderate and low level, which is not a satisfactory result. Higher predispositions should be expected of people who choose teaching or physiotherapist professions, because it is required by specificity of the work they intend to carry on.

Emotional competencies promote proper interpersonal relations, because achieving personal goals happens simultaneously with maintaining good relations with partners of the interaction.

A high level of competence in the area of interpersonal relations is also associated with better adaptation to changes in life, greater plasticity of behavior and attitudes in a variety of social situations and lower rates of anxiety, depression or loneliness [11].

In relation to emotional and social competencies we can talk about having or not having certain predispositions of the personality which affect those competencies to a high degree. But more importantly, predispositions themselves may not be sufficient, however in their absence it is possible to master behaviors and skills to raise the quality of these competencies.

Direct impact on the level of social competencies has the so-called social training, carried on during everyday life, study or work situations, as well as during the course of special training [12].

The training focused on developing the professional and social emotional skills is necessary, especially in professions based on close interpersonal relationships. [13].

Therefore, in the preparation of candidates for future teachers and physiotherapists, it is essential that in addition to factual knowledge and skills also focus on developing personal qualities and social and emotional competencies. This sphere is highly neglected in Polish universities, where special classes developing interpersonal skills of students run only occasionally [14].

Such activities are widespread for many years in the United States. Possibilities for training are directed to people engaged in professions known as aid professions in which it is necessary to have a high emotional competencies and social skills to cope with stress.
The starting point for creation of educational programs is the concept of emotional intelligence. Its components allow to appoint the overall framework of emotional competencies, both personal and social that condition the effective functioning in the professional role. Therefore these programs include actions to improve self-awareness, self-regulation, motivation, empathy and social skills. Among the latter are the most important skills: ability to create of relationships, leadership, communication, ability to influence the lives of others, ability to catalyze changes, ability to soften conflicts [2].

Considering interpersonal effectiveness one can bear in mind that it can be shaped by all kinds of stimuli relating to social behavior. It is particularly important to stimulate:
- the ability to decode social rules and analyze the situation,
- cognitive empathy and provision of social reinforcement,
- the ability to view own and other people expressive behavior,
- the ability to create positive self-image,
- the ability to get rid of fears and social restrictions,
- assertive behavior,
- the ability to influence,
- the ability to communicate properly and solve conflicts,
- constructive ways of dealing with stress [15].

Classes that teach above mentioned skills and influence personal development of students should be conducted in all schools, especially those who are preparing to work in direct and close contact with other human being.

The offer of such classes has been developed by the author of this article it is being implemented among the students of the University School of Physical Education in Wroclaw.

References

INTRODUCTION
As medical technologies have developed in modern society, average human life span has been gradually extended and mortality rate has been decreased, so the number of old people is increasing worldwide (Hyung and Kim, 2001). As a result, issues in aging of population along with maintaining the quality of life have become serious problems (Hong et al., 2005). The proportion that the elderly population takes is rapidly increasing in Iran.

In this population, there is a higher observed prevalence of chronic diseases such as hypertension (Nesterov et al., 2009); especially in women. Currently, it is estimated that among postmenopausal women, the prevalence of hypertension may reach 80%. (De Lyra Júnior at al., 2006). The treatment of hypertension includes pharmacological and nonpharmacological interventions (Bacon et al., 2004; Roberts et al., 2002). Among the nonpharmacological interventions, regular exercise has been recommended in the prevention (Cornelissen et al., 2010). Among the principal physiological benefits of physical training in hypertensive patients are reductions in heart rate (HR) and peripheral vascular resistance (Collier et al., 2008). These factors are related to the fall of systolic and diastolic blood pressure (BP) (MacDonald et al., 1999). In addition to improvements in BP, aerobic training is associated with a reduction of weight, body fat percentage (BF%), body mass index (BMI) and waist to hip ratio (WHR), which often is above the reference values in hypertensive subjects (Ferrara et al., 2002).

The efficacy of aerobic exercise for lowering blood pressure (BP) in postmenopausal women, especially those with only modest BP elevations, has not been established. Importantly, aerobic exercise training often results in increases in maximal aerobic capacity and reductions in body weight. Because maximal aerobic exercise capacity and body weight are independently associated with BP in humans (Blau et al., 1984; McGowan et al., 2006); at least some of the BP-lowering influence of regular exercise in a particular population may be related to these factors rather than to a primary effect of exercise per se (Fagard., 2006).

However, there are controversies about the effects of regular exercises compared with the studies on blood pressure. Beside the studies reporting that there have been positive developments in the blood pressure as a result of acute exercise (Berg et al., 1983; Foger et al., 1994), there are also studies stating that there have been improvements as a result of not acute but long term exercises (Sucic and Oreskovic 1995; Yanagibori et al., 1993).

The effects of aerobic exercise training on cardiovascular and metabolic parameters in hypertensive postmenopausal women remain unclear and controversial. Some studies indicate beneficial effects (MacDonald et al., 1999; Moraes et al., 2011); and others report no significant changes (Church et al., 2007; Stewart et al., 2005). These effects seem to depend on duration, intensity, and frequency of the exercise (Moraes et al., 2011; Manson et al., 2002).

This study aimed to evaluate the effects of 8 weeks of aerobic on body composition and blood pressure in postmenopausal women.

MATERIALS AND METHODS

SUBJECTS
The target population consisted entirely of postmenopausal women in city of Rasht in Iran. Among them 20 healthy postmenopausal women with similar age and weight were randomly divided into intervention and control groups. Also, none of the subjects were taking any medication, including antihypertensives or aspirin, and all were non-

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doi:10.15561/20755279.2014.0514
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smokers. 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 Rasht Branch, Guilan, Iran.

**Anthropometrics**
Whole-body plethysmography (Bod Pod; Life Mea-surement Inc., Concord, CA, USA) was used to assess body composition (Katch et al. 1967), and body weight was measured using the Bod Pod scale. Height was measured using a stadiometer to the nearest 0.5 cm, and body mass index was calculated as weight (kg) per height $^2$(m$^2$).

**Haemodynamic monitoring**
Blood pressure was measured by a trained investigator by standard sphygmomanometry following a quiet rest for 15 min in the supine position. SBP and DBP were measured manually at the brachial artery after the resting period and at the start of each testing session using the first and fifth Korotkoff sounds, according to American Heart Association standards (Kirkendall et al. 1981).

**Exercise training**
The exercise group participated in an 8 week supervised aerobic exercise program. The exercise group trained for 50 min/day, and the program was composed of 3 steps: warm-up for 10 min, aerobic exercises for 30 min (which consisted of treadmill running for 30 min at intensity of 60–80% of their heart rate reserve (HRR)), and cool down for 10 min. The exercise group trained for 3 day/week for 8 weeks, while the control group was asked to maintain their normal sedentary activities. Exercise intensity was monitored during the training sessions by using a Polar real time system (Polar S610, Finland).

**Statistical Analysis**
SPSS statistical software (version 18) was used to analyze. Both descriptive (mean and standard deviation) and inferential statistical were used to analyze the data Paired t-test and independent t-test.

**Results**
**Subjects**
Subject age data are present in table 1. The results showed that BF%, WHR, BMI decreased and Lean body mass increased significantly in training group after 8 weeks training (P<0.05), while BF% significantly increased in control group. Saavedra et al., (2007), applied water aerobics on healthy 43.1 ± 9.7 years old middle-aged females twice a week for 8 months. They established that the values of the last tests of BW and BFP after 8-month exercise were significantly different from the

<table>
<thead>
<tr>
<th>Subject characteristics</th>
</tr>
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<tbody>
<tr>
<td>Aerobic exercise (AE)</td>
</tr>
<tr>
<td>Control group (CG)</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>52.50±3.83</td>
</tr>
<tr>
<td>51.40±3.06</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items</th>
<th>Exercise</th>
<th>Pre-exercise</th>
<th>Post-exercise</th>
<th>Paired t-test</th>
<th>P Value</th>
<th>Independent t-tests</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI; Body mass index</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>kg/m2</td>
<td>Exercise</td>
<td>30.56±3.41</td>
<td>29.27±2.33</td>
<td>3.26</td>
<td>0.01*</td>
<td>2.10</td>
<td>0.002*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>29.27±2.33</td>
<td>29.37±2.30</td>
<td>-2.96</td>
<td>0.64</td>
<td>1.18</td>
<td>0.003*</td>
</tr>
<tr>
<td>WHR</td>
<td>Exercise</td>
<td>0.91±0.10</td>
<td>0.87±0.04</td>
<td>1.25</td>
<td>0.02*</td>
<td>1.37</td>
<td>0.03*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>0.91±0.10</td>
<td>0.92±0.09</td>
<td>-1.87</td>
<td>0.45</td>
<td>0.02*</td>
<td>0.003*</td>
</tr>
<tr>
<td>Muscle mass, kg</td>
<td>Exercise</td>
<td>0.67±0.03</td>
<td>0.71±0.02</td>
<td>-0.041</td>
<td>0.27</td>
<td>0.02*</td>
<td>0.03*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>0.67±0.02</td>
<td>0.67±0.02</td>
<td>0.00</td>
<td>0.00</td>
<td>1.15</td>
<td>0.27</td>
</tr>
<tr>
<td>Body Fat, %</td>
<td>Exercise</td>
<td>32.72±3.63</td>
<td>28.52±2.72</td>
<td>3.15</td>
<td>0.01*</td>
<td>1.07</td>
<td>0.04*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>32.61±2.52</td>
<td>32.77±2.53</td>
<td>-1.15</td>
<td>0.27</td>
<td>1.75</td>
<td>0.05*</td>
</tr>
<tr>
<td>SBP (mmHg)</td>
<td>Exercise</td>
<td>13.10±1.52</td>
<td>11.40±1.26</td>
<td>3.28</td>
<td>0.01*</td>
<td>3.55</td>
<td>0.001*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>12.60±0.96</td>
<td>12.60±1.34</td>
<td>0.00</td>
<td>1.00</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>DBP (mmHg)</td>
<td>Exercise</td>
<td>8.10±0.99</td>
<td>7.60±1.03</td>
<td>1.23</td>
<td>0.05*</td>
<td>1.94</td>
<td>0.035*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>8±0.47</td>
<td>8.60±0.23</td>
<td>-1.32</td>
<td>0.22</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

**Discussion**
Epidemiologic studies have shown that sedentary life relates to the increases of age and heart disease. Obesity is one of the factors that cause heart disease. Beneficial effects of aerobic training programs on body composition and blood pressure have been evaluated. In the current study, BMI and fitness were both independently associated with the risk of hypertension. The results showed that BF%, WHR, BMI decreased and Lean body mass increased significantly in training group after 8 weeks training (P<0.05), while BF% significantly increased in control group. Saavedra et al., (2007), applied water aerobics on healthy 43.1 ± 9.7 years old middle-aged females twice a week for 8 months. They established that the values of the last tests of BW and BFP after 8-month exercise were significantly different from the
Based on previous studies, Aerobic exercise, adds up the exercise capability of your body to use fat as a substrate increases and total fat oxidation during. In addition, there is a high correlation between the content within the muscle and insulin resistance. It may be suggested that the body mass increases due to increased blood flow and capillary in skeletal muscle and adipose tissue. Lipolyze triacylglycerol is high, and the transfer of fatty acids from blood to muscle sarcoplasm is high; these are the effects on fat during exercise and these effects support by activation of certain enzymes in the oxidative pathway, supports this process. Aerobic exercise activates lipoprotein lipase and increased lipoprotein lipase (LPL) activity may play an important role in reducing insulin resistance during exercise (Irving et al., 2008; Fenkci et al., 2006). Elderly women have increased pulse and blood pressure compare to young people. However, exercise decreases the blood pressure and gives positive effects (Jeon et al., 2010). During exercise, changes in blood pressure is due to the activation of sympathetic nerves and the reduction of parasympathetic nerve stimulation which causes increase in the systolic pressure but the diastolic pressure maintains its level. However, exercise causes drops in both systolic and diastolic pressure (Martynov, 2007).

Our findings are similar to those reported in the Heritage family study,26 which showed small changes (o3mmHg) in resting SBP and DBP in normotensive to mildly hypertensive subjects following a longer and progressively more intense training programme (20 weeks, 55–75% VO2max) (Wilmore et al., 2001). Hagberg et al., (1989), also demonstrated a decrease in SBP (20mmHg) in hypertensive men following 9 months of low- to moderate-intensity aerobic training, with a concomitant decrease in DBP (11–12mmHg) (Hagberg et al., 1989). Fagard, (2006), who has shown that AE decreases in BP in normotensives of _3.0 (SBP)mmHg and _2.4 (DBP)mmHg with even greater reductions in resting BP in hypertensives (_6.9 and _4.9mmHg in SBP and DBP, respectively) (Fagard,. 2006). One previous study reported that 4 months of endurance training in middle-aged men resulted in no changes in resting SBP and o5mmHg decrease in resting DBP. Our results support these earlier studies (Hagberg et al., 1989; McGowan et al., 2006).

Clarkson et al., (1999), indicated that endothelium-dependent dilation in young men enhanced by aerobic exercise training was beneficial in preventing CV Diseases. These exercises maintain a high level of fitness, prevent age-related decline of microvascular NO-mediated vasodilator function, the higher levels of NO confer anti-atherogenic benefit and prevent microvascular dysfunction in humans (Clarkson et al., 1999). It is worth mentioning that regular moderate intensity exercise can be used to improve metabolic risk factors such as insulin and leptin levels in overweight/obese postmenopausal women (Frank et al., 2005). Furthermore, exercise per se has been shown to be an important factor in the reduction of hypertension by decreasing the elevated activity of the sympathetic nervous system (SNS). According to Mueller, exercise may reduce the resting blood pressure and sympathetic outflow even in normal individuals (Mueller, 2007). It is important to point out that almost two decades ago two cohort studies also demonstrated that regular physical activity prevents the development of hypertension, moreover it has been found to lower the blood pressure in hypertensive individuals (Greenland et al., 2010; Vianna et al., 2012).

Aerobic exercise training promotes the reduction of risk factors of cardiovascular diseases in postmenopausal obese hypertensive women. Results of this work can be employed by clinicians to help postmenopausal women to overcome the increased risk of morbidities associated with menopause.

Conclusion
Based on these finding, it seems that a period of aerobic training for 8 weeks can be effective as a non-pharmacological treatment strategy for improvement some physical fitness and body composition indexes, blood pressure in postmenopausal women. Furthermore, there is a need for appropriate health education emphasizing the importance of cardiovascular health at this level of education.

Acknowledgement
The authors would like to thank the postmenopausal women for their willing participation in this study.

References


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**Cite this article as:** Shahram Gholamrezai, Mina Zali, Ramin Shabani, Rastegar Hoseini. Effect of 8 weeks of aerobic on body composition and blood pressure in postmenopausal women. *Physical education of students,* 2014, vol.5, pp. 74-78. doi:10.15561/2075279.2014.0514

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Received: 25.06.2014
Published: 30.06.2014
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- National Research University Belgorod State University,
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SCIENTIFIC EDITION (journal)


Editorial to the publisher department KSADA:
certificate DK №9860 20.03.2002.

designer - Masterova Y.
editing - Iermakova T.
administrator of sites - Ulanchenko Y.
designer cover - Bogoslavets A.

passed for printing 30.06.2014.
Format A4.
PRINTHOUSE (B02 № 248 750, 13.09.2007).
61002, Kharkov, Girshman, 16a.