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IMPROVEMENT OF COMPREHENSIVE ASSESSMENT OF SPECIALLY TRAINED CHILDHOOD AND ADOLESCENCE GYMNASTS

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Annotation.. In terms of the age of development and formation of sportsmanship athletes reliability and data set of benchmarks used in the management of the training process varies due to various circumstances. *Purpose:* to improve unit performance special psychophysical readiness gymnasts used in the management of the training process (n=38, n=44). *Material:* surveyed a group of gymnasts of children and youth of both sexes, members of the specialized sports schools for eight common indicators of psychophysical readiness. *Results:* reliability of measurements of these indicators and their information content in connection with the specific requirements of gymnastics metrically calculated using the methods of mathematical statistics. *Conclusions:* substantiated minimum set of the five most reliable informative indicators. The expediency of the calculation and use of the control system integrated assessment preparedness gymnasts, including index kinesthesia.

Keywords: gymnastics, control, integrated assessment, reliability, informativeness.

Introduction

It is a common knowledge that effectiveness of pedagogic process, including children and teen agers, to a large extent is conditioned by reliability and informative character of control results, which permit to realize this process in compliance with requirements of management [1, 3, 4]. In this connection it is necessary to pay attention to purposefulness of further improvement of control indicators' system, used for diagnostic of trainees' fitness, according to specific requirements of a certain kind of sports, and for prognosis of sport potentials on further stages of training. At the same time there exists concept of diagnostic reliability of measurements and informative character of the used control indicators [3, 5]. Alongside with it in literature we can meet data that in conditions of sportsmanship's mastering by trainees specific informative character of one and the same control indicators substantially change [10, 19]. Underestimation of this feature of some tests and indicators results in reducing of taken management decisions' quality in process of sportsmen's many years' training, because the taken by coach decisions are based, in such cases, on insufficiently reliable information.

Alongside with it we can assume that information character of one and the same control indicators, used in everyday training process, can vary, depending on biological peculiarities of forming of children's and teenagers' motion functions in their ontogeny. These changes can be connected with sensitive character of different motion abilities' development, peculiarities of acceleration, which can likely influence on informative significance of the used indicators in conditions of children's growth. As far as the process of psycho-physical development and formation of a person is of wavelike character it can result in the fact that some control indicators, used for evaluation of trainees' condition, can have different informative character at different stages of sportsman's age progressing. This opinion was expressed, in different interpretations, by other authors as well [2, 6-9, 12-18, 20].

Purpose, tasks of the work, material and methods

The purpose of the research is to improve block of indicators of gymnasts' special psycho-physical fitness, which are used in management of training process.

The tasks of the research:

- to metrically evaluate reliability of a number of commonly used control indicators, applied in conditions of age progressing and forming of gymnasts' sportsmanship;
- to ground informative character of these indicators in connection with specific requirements of sport gymnastic;
- to formulate complex of adequate indicators for objective evaluation of trainees' special fitness.

The methods of the research: we tested group of female gymnasts (n=38) of 11±4.0 years old and female gymnasts (n=44) of 12±3.2 years old, who study at children sport schools in Gdansk and Olstyn This contingent was formed in three age and qualification groups 9-10, 11-12, 13 and older years that permitted to increase identity of trainees, staff and, as a result, objectivity of marks, reliability and informative character of measurements.

Registration of control indicators was carried out in compliance with general metrological requirements, adopted in physical education and sports (see table 1). Group of control indicators included the most popular ones, which are used in practice for evaluation of gymnasts' fitness [10, 11].

So, we registered:

- speed-power abilities by value of relative force in elbow joints; time of reaching maximal force's value; keeping of maximal force value during 5 seconds (indicators 1, 2, 3); high jump from the spot on two legs (indicator 4). For registration we used strain gauge metering stand "Kettler" and strain gauge track "Globus";
- function of body balance was registered in test by Romberg before and after load at rate of seven rotations during 10 seconds around longitudinal axis of body (indicators 5, 6). For this test we used stand "Posturograf";

- time of motion response to light irritator and response of anticipation (indicators 7,8). We used computer program "Raptus".

For evaluation of the registered indicators' reliability we used method of linear correlation between results of repeated attempts (see table 1). These correlation coefficients - r_{tt} characterized compatibility of repeated measurements, i.e. reliability of every sport indicator.

For evaluation of informative character of these indicators we used method of range correlation (see table 2). With it we compared ranges of the tested in control indicators and ranges of their sportsmanship. Matrixes were calculated, considering reliability of tests' measuring (see table 1). It permitted to increase accuracy of informative character's evaluation [3, 19, 20].

Organization of the research. The logic of our research was built, considering the fact that sport gymnastic belongs to groups of sports with complex coordination of movements. In this case coordination skills' condition can be regarded as main, key feature. As far as human coordination of movements is of complex character, conditioned by development of speed-power qualities, specific endurance, flexibility, kinesthesia and so on, we thought that coordination skills can be evaluated objectively with the help of complex of psycho-physical condition's indicators, which to less or large extent influence on organization of sportsmen's free movements. As test criterion, which complexly reflected level of these qualities, indicator of sportsmanship can serve.

Basing on the above said, for evaluation of informative character of control indicators we used methods of correlation analysis in conditions of separated calculation of matrixes for every of sex and age group of the tested.

Results of the researches

Reliability of control measurements of the tested of different age, sex and qualification are presented in table 1 in the form of mean groups' values of linear correlation coefficients between metrical data of repeated measurements. As far as all correlation coefficients and indicators of measurements, variety made a difficult for processing data field we discussed only mean groups' values. However, even these, generalized materials were enough for us to affirm that in the groups of the tested there were gymnasts with different level of kinesthesia that resulted in low compatibility of repeated measurements' results in some indicators (see table 1).

Table 1

Reliability of control tests' measurements by indicator of compatibility of repeated attempts' results (r_{tt}) of different age female gymnasts (A) and gymnasts (B)

	Control indicators		Correlation coefficients, variety					
			9-10	V%	11-12	V%	13-16	V%
1	Relative force, Fmax, KG/kg	A	0.555	32.3	0.699	19.2	0.683	11.8
		B	0.685	29.5	0.580	21.3	0.709	19.3
2	Timer of reaching of Fmax, m.sec.	A	0.70	21.8	0.788	19.0	0.770	13.2
		B	0.375	19.9	0.800	11.4	0.799	12.1
3	Time of holding 5 cek, Fmax, m.sec.	A	0.609	22.5	0.707	24.0	0.713	17.7
		B	0.459	42.2	0.400	21.7	0.802	38.3
4	High jump from the spot, cm	A	0.413	50.0	0.590	32.5	0.791	19.9
		B	0.230	25.5	0.420	19.3	0.870	28.5
5	Stability in rest, field, mm ²	A	0.379	31.0	0.598	28.3	0.700	19.6
		B	0.079	40.6	0.603	23.0	0.713	20.8
6	Stability after load, field, mm ²	A	0.200	33.0	0.688	21.8	0.706	19.0
		B	0.433	49.3	0.600	33.6	0.740	34.6
7	Time of motion response, m.sec.	A	0.661	39.7	0.703	22.3	0.888	11.4
		B	0.500	59.0	0.444	54.2	0.699	39.1
8	Anticipation response, m.sec.	A	0.479	48.6	0.491	34.0	0.911	10.6
		B	0.391	43.8	0.595	18.5	0.600	19.3

When discussing these data we oriented on commonly adopted in sport metrology limits of reliability's levels of control measurements, where accessible reliability was within correlation limits 0.700-0.790; middle – 0.800-0.890; good – 0.900-0.940; excellent – 0.950-0.990.

As we can see in table 1, depending on age and qualification we notice general trend of increasing of measurements' reliability that witness about development of gymnasts kinesthesia. For example, if in group of 9-10 year old sportsmen accessible reliability was only in one indicator of female gymnasts ($r=0.701$), in group of 11-12 years old sportsmen – it was in five indicators ($r=0.699-0.800$), and in group of senior age sportsmen – practically in all measurements. The same situation took place in indicators of control measurement results' variety (V%), that also reflected stability of measurements and increasing of muscular sense of the trainees.

Thus, already at 11-12 years old age, with period of training of 3-4 years, practically all eight control indicators can be used for complex evaluation of trainees' special fitness. Having calculated reliability of these indicators' measurements (see table 1) we could objectively evaluate informative character of every of these indicators. I.e. we could clear up to what extent these indicators, which reflect specific motion skills, are interconnected with gymnasts' sportsmanship. These data of range correlation coefficients are presented in table 2.

Table 2

Informative character of indicators of female gymnasts (A) and gymnasts (B) as value of ranges' correlation in tests and in sum of all round events

	Control indicators	Sport qualification (degree)			
		III	II	I and CMS	
1	Relative force, Fmax, KG/kg	A	0.588	0.691	0.810
		B	0.477	0.389	0.759
2	Timer of reaching of Fmax, m.sec.	A	0.539	0.611	0.603
		B	0.402	0.709	0.800
3	Time of holding 5 сек, Fmax, m.sec.	A	0.399	0.608	0.777
		B	0.513	0.485	0.696
4	High jump from the spot, cm	A	0.714	0.752	0.699
		B	0.577	0.688	0.755
5	Stability in rest, field, mm ²	A	0.493	0.709	0.801
		B	0.517	0.689	0.817
6	Stability after load, field, mm ²	A	0.202	0.600	0.828
		B	0.511	0.716	0.883
7	Time of motion response, m.sec.	A	0.402	0.029	0.616
		B	0.093	0.712	0.698
8	Anticipation response, m.sec.	A	0.613	0.609	0.839
		B	0.590	0.792	0.880
9	Sum of ranges in tests and all round events	A	0.665	0.853	0.911
		B	0.781	0.889	0.900

As we can see in table 2, it is possible to objectively evaluate special fitness, including coordination of gymnasts of both sexes with the help of complex evaluation. Here coefficients of correlation with level of sportsmanship turned out to be the highest and were 0.853-0.911. In conditions of many years' training informative character of stability indicators of female gymnasts – 0.828 and gymnasts – 0.883 steadily raised; response of anticipation – 0.839 and 0.880; relative force in elbow joints – 0.810 and 0.759. In parallel, in these conditions mechanism of kinesthesia of the tested improved and identity of staff of age group increased by indicator of measurements' reliability. It was witnessed by expressed reduction of mean values of variation coefficients (V%) from, 37.2 in younger groups up to 17.4 – in elder ones. It proved high informative character of kinesthesia indicator in conditions of our research and purposefulness of its metrological foundation for further application in general block of control measurements.

Conclusions:

As a result of our researches, for evaluation of gymnasts' special fitness we recommend complex of five the most informative indicators, which meet specific requirements of sport gymnastic and metrological requirements of reliability and informative character. They include indicator of relative force in elbow joints; stability in test by

Romberg after rotating load around longitudinal axis of body; anticipation response to moving object; sum of ranges of the tested in this complex.

We should like to attract attention to the fact that reliability indicator in every of exercises of this block can be regarded as characterizing the status of kinesthesia, i.e. muscular sense of a sportsman. Considering specific features of gymnastic we can conclude that objective metric characteristic of kinesthesia's status can be used in system of control both for evaluation of bent to gymnastic at initial stage of training and for current and stage-by stage control. However, using of these indicators requires additional metric foundation in different conditions of pedagogic control.

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METHODS OF FORMATION READINESS OF THE FUTURE TEACHERS TO THE PATRIOTIC EDUCATION OF HIGH SCHOOL STUDENTS

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Annotation *Purpose*: develop method of training of the future teachers of physical culture to the patriotic education of high school students. *Material*: processed more than 100 literary sources. *Results*: defines the main approaches to understanding the concept of «readiness» in the training of future specialists. Develop the necessity of improving the professional training of future teachers of physical culture to the profession. Pedagogical conditions of implementation methodology training of the future teachers of physical culture to the patriotic education of high school students. During the implementation phase values important to mastering these skills: improving personal skills through participation in extracurricular activities, intensify research and independent work. *Conclusion*: it is proved that the effectiveness of the proposed technique is defined as the result of theoretical and practical training of future specialists to patriotic and educational activities with high school students.

Key words: methods, readiness, development, education, patriotic education.

Introduction

As on to day training of future physical culture instructors at higher educational establishments for work on patriotic education at comprehensive schools is rather urgent. Such orientation of professional training stipulates provisioning of students with appropriate knowledge, forming of skills, ensuring of future physical culture instructors' readiness for realization of ideas of patriotic education on principles of national sports movement in the country.

In Russian pedagogic studying of training of future teacher for professional functioning was carried out by I.V. Abdutova, 2008 [1]; V.O. Bolotov, 2001; V.S. Volodina, 2007; M.S. Kashafutdinov, 2001; O.I. Mischenko, 1992; V.A. Slaktionin, 1976 et al.; in Ukraine – by S.V. Alexseyeva, 2007; V.A. Volkova, 2010; I.V. Gavrysh, 2006 [4]; M.T. Danylko, 2000; S.I. Kara, 2012; M.V. Karchenkova, 2006; O.P. Krayniuk, 2011[5]; V.I. Miroshnychenko, 2011 [7]; A.A. Myscheko, 2011 [8]; M.Ya. Romanyshyn, 2009; I. Tkachivska, 2009; M.V. Sheludiosheva, 2009 [9]; O.M. Onoprienko, 2014 [14], as well as by foreign specialists [10-13, 15-19]. Alongside with it, solution of problem of forming of future physical culture readiness for patriotic education of senior pupils has not been elucidated completely. That is why there is a demand in more specific studying of this problem.

Purpose, tasks of the work, material and methods

The purpose: development and foundation of methodic of forming future physical culture instructor's readiness for patriotic education of senior pupils.

The tasks: analysis of methodological, organizational and educational peculiarities of professional training of future specialists in physical culture; determination of main structural components of model of forming of future physical culture instructor's readiness for patriotic education of senior pupils; revelation of their interconnections and characteristics.

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

Results of the research

In modern pedagogic science readiness is determined as integrative personality's creation, which is a regulator and condition of successful professional teacher's functioning [4]. I. V. Abdutova defines readiness of students for patriotic education as complex individual-personality's creation, having purpose of mastering of theoretical, methodic, psychological-pedagogic knowledge and practical skills in organization of this process, presence of patriotism and positive motivation for patriotic education of pupils [1].

The level of pedagogical higher educational establishment students' fitness is determined by the following indicators: presence of formed patriotism; presence of positive motivation for pupils' patriotic education; having of theoretical and methodic knowledge in patriotic education; presence of skills in pupils' patriotic education [1].

In process of development of author's methodic of forming of future physical culture instructor's readiness for senior pupils' patriotic education we based on concept that educational process was a system, consisting of the following components:

- Purpose – results of mastering of a topic, section or the whole academic subject. By correlation of purpose as a method and result of mastering we can correct content or methods of teaching, is, owing to some reasons, the target is not achieved completely;
- Content – it influences on specifying of aims of studying and on choice of means of their realization – means, methods and forms of organization of pupil's (student's) studying, style of communication of teacher (lecturer) and pupil (student);

- Stimulating-motivational – is present in all other components of training process. Without its realization pupils (students) will not perceive purpose and tasks of teaching; evaluation of their knowledge will not have motivational character; teaching will be treated indifferently;

- Operational- active – means interaction between subjects of teaching [3, pg. 70–71].

Methodic of forming of future physical culture instructor’s readiness for senior pupils’ patriotic education includes the following stages of realization (see fig.1.):

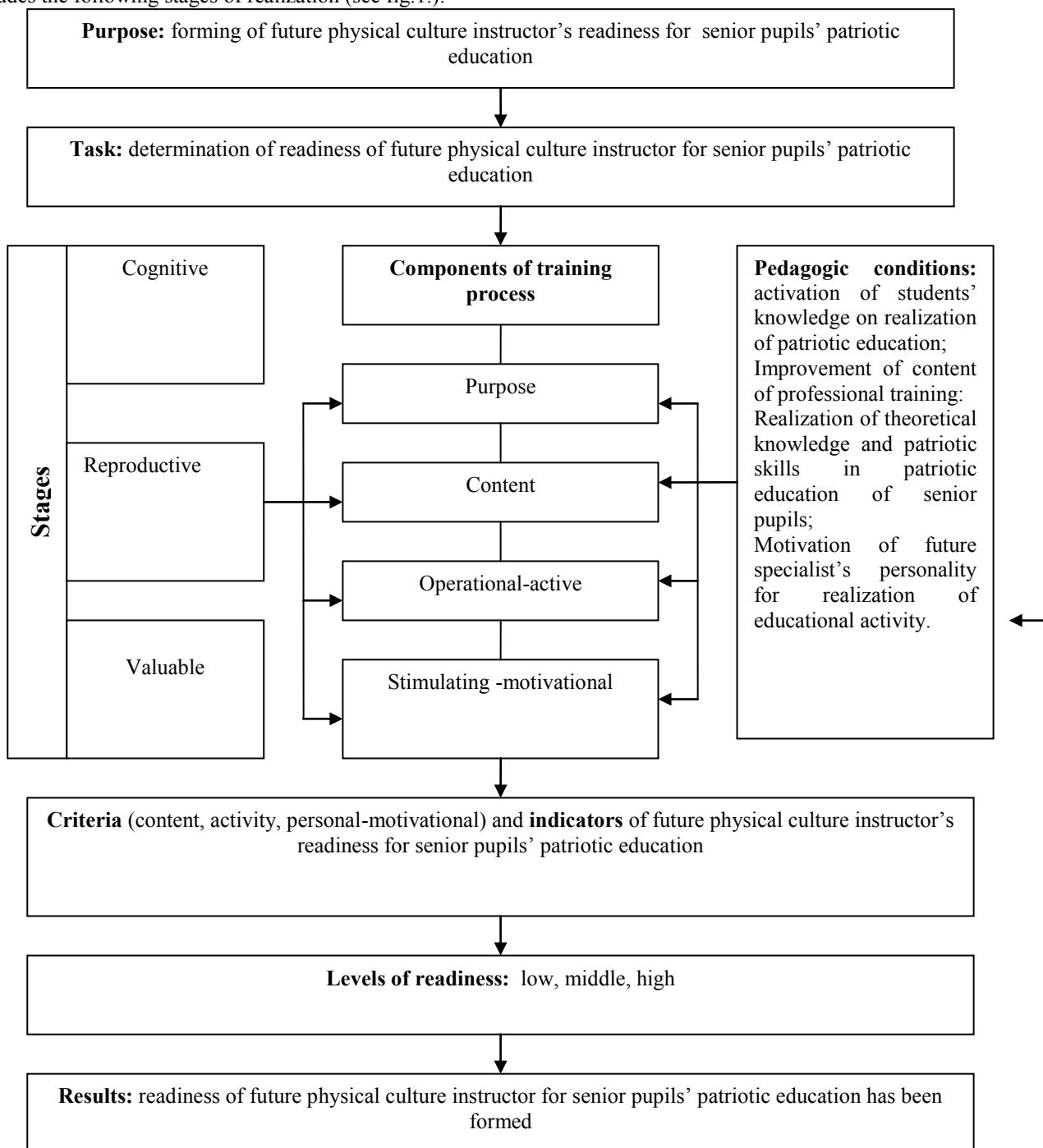


Fig.1 Model of forming of future physical culture instructor’s readiness for senior pupils’ patriotic education

I. Cognitive stage with purpose of forming of students’ understanding of patriotic education’s importance; familiarization of students with idea, forms, content, methods and principles of patriotic education; enriching of students with experience of teachers in order to familiarize students with educational practice.

The task is – familiarization of students with ideas, content and structure of patriotic education in system of secondary education.

On cognitive stage of forming of future physical culture instructors' readiness for senior pupils' patriotic education work with students envisaged the following forms: lectures, delivered by teachers, presentations (of disciplines "Introduction in specialty", "Theory and methodic of physical education", "Organization and methodic of sport-mass work", "Outdoor games and methodic of their trainings", "Professional functioning in sphere of physical education" at the account of introducing of additional topical blocks and special course "Patriotic education of youth on traditions of national physical culture").

It is necessary to stress that organizing teaching activity pedagogue shall internally project it on process of personality's formatting in respect to tasks of comprehensive, harmonious education: how educational material would facilitate formatting of scientific world-vision of students; how specially organized students' cognitive functioning would influence on their intellectual level, whether it help mastering techniques of independent cognitive work; how studied material would facilitate formatting of professionalism of future specialist; how content of academic material would influence on formatting of senses, beliefs, aesthetic taste, moral-spiritual values and so on [6].

On cognitive stage it was important for students to master the following skills: analysis of scientific – pedagogic literature, devoted to patriotic education of young generation in functioning of physical culture instructor; skill to watch, analyze and generalize experience of teachers' work for improvement of own functioning; mastering of theoretical material for enriching of knowledge about sense, content and methods of patriotic education of senior pupils.

Important pedagogic conditions of realization of cognitive stage of readiness formatting is activation of students' studying-cognitive functioning in realization of patriotic education in system of secondary education and improvement of professional training's content with the help of scientific information about schoolchildren's patriotic education.

II. Reproductive stage has purpose: students' functioning, oriented on their involving in educational process at the account of their active participation in practical classes and pedagogic practice.

The task is as follows: activation of students' functioning at practical classes on disciplines "Introduction in specialty", "Theory and methodic of physical education", "Organization and methodic of sport-mass work", "Outdoor games and methodic of their trainings", "Professional functioning in sphere of physical education", special course "Patriotic education of youth on traditions of national physical culture"; orientation of students on practical functioning in place of physical culture instructor in period of pedagogic practice.

The mentioned stage stipulates application of the following components of teaching:

- Content – students' functioning in process of practical classes;
- Operation-active – pedagogic practice.

Content-component envisages such forms of work with students: disputes, talks, quests, questioning, preparation of presentations, projects, creative and demonstrative works.

Operation-active component envisages such forms of works with students as: organizational, collective, individual. It should be stressed that successfulness of pedagogic practice is a complex indicators of student's professional readiness for instructor's functioning, which is determined by three levels:

I – formatting of professional-pedagogic knowledge and skills.

II – students' understanding of their readiness for practical functioning, determination of clear target and content.

III – professional orientation of future instructors, their conscious activity, interest to practicing of educational and sport-mass measures, proper attitude to fulfilled work [2].

In the process of reproductive stage's realization formation of future physical culture instructor's readiness for senior pupils' patriotic education it was important for students to master the following skills:

- Planning of educational-patriotic work with pupils in curriculum, extra-curriculum and out of school time;
- Working out of plans, scenarios of out-of-class educational measures;
- Creation of projects, creative works for realization of educational-patriotic influence on pupil's personality.

Important pedagogic condition of reproductive stage's realization is realization of theoretical knowledge and practical skills in patriotic education of senior schoolchildren.

III. Value-component means formation of students' attitude to patriotic education as to a certain value.

The task of value-component is formation of readiness of future instructor for patriotic education of senior pupils; perfection of personality's qualities for realization of own educational potentials as physical culture instructor.

There is a marked out stage, which stipulates such forms of students' work as independent and scientific-research, extra-curriculum functioning. In compliance with curriculum, practical training of students stipulates course works on theory and methodic of physical education in 7th semester.

In process of realization of value-component stage it was important for students to master such skills as: perfection of personality's qualities by means of participation in extra-curriculum functioning and activation of scientific-research and independent work.

Pedagogic condition of realization of value-criterion is motivation of future specialist's personality to fulfillment of educational activity.

Conclusions:

Thus, considering material, presented in the article, readiness of future physical culture instructor to senior schoolchildren's patriotic education we determine as complex formation, integral characteristic of personality, result of specialist's theoretical and practical fitness for educational-patriotic works with senior pupils, presence of positive motivation to patriotic education of rising generation. We think that application of offered by us methodic in educational process of higher educational establishment of pedagogic orientation will facilitate training of future physical education specialists' readiness to senior pupils' patriotic education with high quality.

The prospects of future researches are connected with development of didactic and methodic provisioning of professional training of future physical education instructor for patriotic education of senior pupils.

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PARENTS' ATTITUDE TO EDUCATION OF CHILDREN IN CHILDREN'S AND YOUTH SPORTS SCHOOL

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Annotation. *Purpose:* to determine the attitudes of parents of young athletes to the educational process in youth. Objectives: to identify the expectations of the respondents in relation to the objectives, factors, key actors of the educational process. Material: parents (n = 22) pupils youth (Zaporozhye). *Results:* the main objectives of the educational process, parents believe their children purchasing habits for a healthy lifestyle. Just acquisition of skills necessary for socialization. Important goals are the recovery teaching loads and providing meaningful leisure activities for children. Found that the majority of parents are not supported targets educational process to achieve a higher athletic performance. As a result of the factors influencing the educational process called parents of the young athlete communication with the coach and team. Just overcoming their child difficulties encountered in training and competitions. Revealed that parents do not consider the planned educational activities effective factor in the educational process. *Conclusions:* from the educational process in the Youth parents expect improved health and assist in the socialization of children. Achieving these goals is associated with effective educational work of coaches, sports team influence, through their own efforts of the young athlete.

Key words: parents, education, sport activity, children, teenagers.

Introduction

To day improvement of effectiveness of children-junior sport schools' (CJSS) system is one of important governmental policy's directions in development of out of school education. Alongside with development of physical abilities in chosen kind of sports, ensuring of pupils' full fledged leisure, preparation of reserve of national combined teams, CUSS has one more important task – education of junior sportsman's personality, which envisages creation of conditions for perceiving of socially recognized values, formation of personality's qualities and standards of behavior.

At the same time education of children's and teenagers' socially important features in CJSS is complicated by the fact that organization of educational process in these establishments of additional education has rather formal character. There is absence of definite targets and tasks of education as well as connection between educational-training process and educational work. Little attention is paid to formation of favorable educational climate in academic groups. For educational work of CJSS coaches-instructors it is characteristic to apply very narrow range of educational methods and means.

Parents of junior sportsmen are important subjects of educational process in CJSS. Their expectations in respect to educational process can both coincide with ideas of coaches-instructors and contradict them. In latter case there are possible hidden or obvious conflicts between coaches and parents, facilitating child's too early leaving of sport.

Analysis of researches and publications, devoted to problems of educational process in CJSS and children's sport clubs [1-11; 13-17, 19], showed that their results do not answer the question about parents' attitude to educational methods, applied to their children in process of sport trainings. At the same time, research, fulfilled by D. Shields, B. Bridmayer, N. La Voy, F. Power on large sample of American sportsmen and their parents and coaches, permitted to reveal differences between attitude of sport functioning's subjects to ethic aspects of junior sportsmen's behavior at trainings and competitions [20]. Results of researches, fulfilled by M. Murrey, K. Body, L. Shownstead and K. Diffenbach, were determination of discordance between parents' ideas about proper coaches' behavior and their actual professional behavior [18]. These researches make basis for studying of problem but they are insufficient for exact characteristic of parents' attitude to educational process at CJSS.

The listed circumstances condition urgency of researching of junior sportsmen's parents to targets, key subjects and factors of educational process in children-junior sport schools.

The research has been carried out in the frames of scientific & research work "Scientific foundation of effective forms and methods of organization of functioning of children-junior sport schools' system" (state registration number 0112U005360), and in compliance with complex scientific project "Theoretical-methodological principles of formation of personality's physical culture of children and youth" (state registration number 0113U001205).

Purpose, tasks of the work, material and methods

The purpose of the research: determination of junior sportsmen parents' attitude to educational process at CJSS.

The tasks of the research: determination of respondents' expectations in respect to targets, factors and key subjects of educational process. We used the following *methods of the research:* *empiric* – questioning of CJSS pupils' parents; *theoretical* – analysis of questioning results; *statistical* – ranging, determination of concordance coefficient of Candull. Questioning was fulfilled with sample of 22 respondents.

For determination of CJSS disciples parents' attitude to education of their children in process of sport functioning, we carried out questioning of parents of a number of CJSS in Zaporozhye. The questioning was conducted by students of faculty of physical culture and sport management of Zaporozhye national technical university, in the course of scientific-research work at academic practice, under guidance of author of this article, in 2013-2014. Questionnaire was the tool of research in compliance with traditions of sociological researches.

The questionnaire contained questions of closed type as well as items, stipulating ranging of several judgments in compliance with respondent's opinion. Questions in the questionnaire were distributed in two blocks. The first block combined questions, concerning social and professional data about parents. The second block integrated items, touching parents' attitude to targets and key factors of educational process at CJSS. Processing of questioning results was carried out with the help of program Statistica 6.

Results of the research

Questioning covered 22 parents (7 men and 15 women). Among them 13.64% pointed that they were workers; 22.73% - office workers; 43.45% - entrepreneurs. 18.18% pointed "other business". 50% of respondents practiced sports in young age. Among them 3 had junior sport degrees, 5 – had adult sport degrees, 2 – were CMS and 1 – MS. 45.45% of respondent had higher education, 54.55% - secondary education. Distribution of respondents by age was as follows: from 25 to 35 years old – 36.4% of respondents; 35-45 years old – 50%, 45-55 year old – 13.6% of respondents.

Children of 36.36% of respondents practices kinds of sports with high coordination; of 31.82% - martial arts; of 31.82% - cyclic kinds of sports (short and middle distance run). With it, children of 4.55% of respondents attended CJSS less than one years; of 40.91% - from one to two years; of 22.73% - 2-3 years; of 31.82% - 3-4 years.

In general we think that that characteristics of sample witness that respondents, selected for questioning, were typical representatives of parents' contingent of CJSS disciples.

Generalization of answers to question "What is your opinion about prospects of your child in elite sports?" permitted to state that only 4.55% of respondents relate to their children's prospects as professional sportsmen "undoubtedly positively"; 22.73% - "positively under certain conditions"; 72.73% - "negatively". Such results of questioning proved thesis that great majority of parents have rather cautious attitude to the fact that their child can become a sportsman-professional. With it, parents, probably base on their own experience in sport practicing at CJSS or comprehensive school and on existing in social consciousness prejudices. The received results showed also that parents support their children's practicing sports not for their professionalization but basing on other motives.

On the base of generalization of respondents' answers to question "How sport practice influence on formatting of personality?" we found 9.09% of positive answers; 81.82% of "positive, but under certain conditions", and 9.09% - of negative answers.

The obtained results were interpreted by us in the following way: in general parents support children's trainings at CJSS, marking their high educational potential. They recognize significance of sport practices as favorable medium for formation the most important social values and main ways and means, which lead to achievement of these values. [Encyclopedia-dictionary on psychology and pedagogic, 2013. - http://psychology_pedagogy.academic.ru/20195/%D0%A6%D0%95%D0%9D%D0%9D%D0%9E%D0%A1%D0%A2%D0%98_%D0%A1%D0%9E%D0%A6%D0%98%D0%90%D0%9B%D0%AC%D0%9D%D0%AB%D0%95]. However, with it, they think that such educational medium in CJSS shall not be considered as existing a priori but depends on purposefully created pedagogic conditions.

The question "Shall coach instructor fulfill functions of pedagogue?" 95.45% of parents answered positively and 4.55% - negatively. As we see from the received answers parents of CJSS disciples think that sport pedagogues shall be responsible for cultivating of socially important values in their children(in particular values, connected with sport activity).

Understanding of purposes of educational process in CJSS by parents was reflected in ranged row, the highest items of which were:

- Acquiring of healthy life style skills (middle rank -2.0);
- Creation of conditions for socialization of junior sportsman after finishing of his sport career (middle rank - 2.18);
- Facilitating recreation of children and teenagers after academic and other loads (middle rank - 2.27);
- Creating of conditions for ensuring of substantial leisure (middle rank - 3.95).

Analyzing the received data we can see that purposes of educational process in CJSS are understood by parents as strengthening of their children's health and as solution of different problems, connected with socially important functioning. With it, purposes of educational process, which are associated with achievement of higher sport results are not supported by parents (we should note that concordance coefficient of Candull (0.86) pointed at high degree of concordance of respondents' opinions).

As main factors, which ensure educational process in CJSS, parents called the following:

- Individual communication of coach with disciples in training and competition functioning (middle rank - 1.77);
- Communication of children with each other (middle rank - 2.23);
- Independent overcoming of difficulties by sportsman during competitions (middle rank - 2.55);
- Independent overcoming of difficulties by sportsman in training process (middle rank - 3.45).

We should note such factor as practicing of different educative measures, which took the last item with middle rank of 8.41 in this rating. With it concordance coefficient of Candull (0.92) pointed at high level of respondents' concordance.

The received ranged row permitted to state that main factors of educational process are, in parents' opinion, communication of children with coaches-instructors and team-mates as well as self education of junior sportsman in process of overcoming of physical and psychic difficulties.

Generalization of data, received in the course of our research, permits to say the following:

- Most of parents support their children's studying at CJSS, marking high educational potential of these schools. In other words the recognize significance of sport practices in aspect of perceiving of the most important social values by their children;

- Great majority of parents have cautious attitude to the fact that their children can become sportsmen-professionals;

- Purposes of educational process in CJSS are understood by parents as strengthening of their children's health and formatting of personality's values and qualities, important for successful socialization. With it, purposes of educational process, which are associated with achievement of higher sport results are neglected by parents;

- Parents of CJSS disciples think that communication with coaches-instructors and team-mates as well as self-education of junior sportsman in process of overcoming of physical and psychic difficulties are key factors of educative process;

- Parents do not consider planned measures to be effective factor of educational process.

Conclusions:

Thus, parents expect health improvement and facilitating socialization of their children from educational process in CJSS. Achievement of these aims is connected with effective educational work of coach-instructor, influence of collective and own forces of junior sportsman.

The promising direction of the research we consider conducting of analogous research with greater sample. Also we think that it is necessary to generalize data and reveal contradictions between opinions of coaches, parents and CJSS disciples in aspect of organization of educational process.

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JUSTIFICATION REVITALIZING BODY OF PERSONS "THIRD AGE" BY MEANS OF PHYSICAL EDUCATION

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Annotation. *Purpose:* based on sound theoretical analysis and empirical results explain the feasibility of application of physical education for slowing the aging process people "third age". *Material:* the study included men and women 50 and 60 years, with different rates of aging and indifferent attitude toward physical activity. *Results:* revealed that the highest number of examinees is aging rapidly accelerated pace. Determined directly proportional relationship between the rate of aging and functionality of the body examined. Established the dominance of biological markers of cardiovascular and respiratory systems in the determination of the aging process of the human body. *Conclusions:* we recommend the use of exercise for the revitalization of biological aging changes individuals «third age».

Keywords: *aging, biological age, revitalization, anti-aging, face the third age.*

Introduction

Problem of rehabilitation (from Latin re- renewal and vita – life), anti-ageing, rejuvenation, longevity is rather urgent in our country. Recent years, population's health in Ukraine has been causes troubling [14]. Our country holds surely the last place in Europe by life span. Sharp increasing of age people for recent time caused demand in more profound research of this social group in different aspects: bio-medical, psychological, gerontologic, social, economic and other [9].

Main reason of such status is diseases of cardio-vascular system, diabetes, obesity, especially of aged persons, which are conditioned by style of life. For example, as per data of WHPO, human health depends on medicine only by 10-15%, on genetic factors – by 15-20%, on environmental factors – by 20-25% and on 50-55% on conditions of life [5,11,12].

One of main reasons of functional disorders in organism and of too early ageing is insufficient motion functioning. Inactive way of life first of all results in changes in cardio-vascular and respiratory systems, which, with ageing, are one of the weakest links of organism [5,13].

It is known that physical functioning in elder age positively influences both on whole organism and on its separate systems. Such functioning gives good self feeling, removes some health troubles, permits to look younger, to increase own workability, postpone helplessness.

In 90-s og 20th century there appeared and started to develop new sector of medical science – anti-ageing. It is interesting that anti-ageing, in contrast to, for example, gerontology, which deals with treatment of aged people and extension of their life span, is oriented on prophylaxis of diseases, application of methodic, which slower ageing processes ion order for a person to be young as long as possible, to feel good and to be full of energy, to have full fledged life [6].

As on to day medial science offer the whole arsenal of methods for extension of human life span – the so-called gero-protectors. Possibility to prolong life span was experimentally proved for anti-oxidants, lathyritics, adaptogens, neurothrops, glucocorticoids, sex hormones, hormones of growth, melatonin, immune-simulators and mimetic [7]. However, application of medical means is limited in connection with weakening of liver's and kedneys' functioning, poly-morbid states, frequent allergies and complications after medicals. Besides, in opinion of many specialists there is no chemical gero-protector with undoubtedly proved positive effect. In this connection non-medical geriatric methods, based on using of organism's internal potentials or environmental factors shall be paid attention to [11,12].

That is why, problem of searching of effective ways to increasing and preservation of motion functioning of "third age" persons is rather urgent and acute as well as improvement of such persons' physical fitness with the help of physical culture means.

Purpose, tasks of the work, material and methods

The purpose is to ground, on the base theoretical and empiric material, purposefulness of application of physical education means for slowing of organism's ageing processes of "third age" persons.

The methods of the research: analysis, synthesis, anthropometry, functional tests (test by Shtange, test by Gnechy, VCL, static balancing, BP), method of determination of biological; age by V.P. Voytenko.

Results of the research

Age changes in organism are a reason of worsening of physical condition and mental state of aged persons, increasing of disabled among them and solitary persons, who need assistance.

Ageing of every person is individual and is characterized from qualitative point of view by type of ageing, from quantitative – by speed of ageing and from point of view of ageing structure – by correlation of ageing temps of different organism's systems, i.e. by ageing profile [7].

Knowing reasons, mechanisms and main directions of human functional changes it is possible to offer methods of correction of ageing processes.

In opinion of some authors fight with ageing shall be oriented on the following:

1. Reduction of harmful factors' after-effects (stresses, unfavorable environment);
2. Stimulation of organism for repairing mechanisms and mechanisms of cells recreation;
3. Slowing of metabolism processes (diets, fast).

Considering impossibility of compete stopping of negative factors' influence or significant slowing of metabolism it is necessary to maximally stimulate organism's repairing systems. For this purpose the following measures are offered [7]:

1. Increasing of organism's immune potentials;
2. Application of medical preparations;
3. Physical exercises.

For diagnostic of human individual health it is necessary to have integral criteria for its evaluation. One of such criteria is temp of biological ageing. It is known that by determining of biological age it is possible to evaluate the temp of ageing.

All known, as on to day, methods of determination of biological age do not permit to measure the degree of molecular-genetic "wear out", caused by worsening of human organism's functions, while distinctions between conditions and way of life of different population strata vague correlations between markers of ageing and life potential. And nevertheless, even with such restrictions biological age remains one of the most confident indicators of human life potential [8].

Human biological age, its composition can be purposefully corrected in order to change temps of human ageing both by medical means and with the help of physical culture.

It is impossible to avoid ageing but it is possible to slow down its temps, to make life active in this period. It has been proved that deficit of muscular functioning – hypodynamia – forces involution changes in organism And in complex with other factors results in too early, pathological ageing. That is why physical exercises, forces of nature, hardening, rational diet, labor and rest, which support optimal functioning of organism's main systems, are effective means of prevention from too early ageing and continuation of human labor functioning.

Physical activity is one of the best health related means for aged people. It is known that regular physical loads are required in case of cardio-vascular diseases, osteo-arthritis, osteoporosis, hypertension and etc. [7,15].

Ageing processes are accompanied by changes in many systems and organs of aged persons that to large extent reflects in their motion functioning.

Physical trainings for aged persons are oriented on solution of the following tasks:

- Strengthening of health, counteraction to involution processes, preservation of general and physical workability, prolongation of active life span;
- Stimulation of compensatory-adaptation responses to environmental factors' influence, raising of general tonus and organism's hardening;
- Prophylaxis of diseases or prevention from their progressing, support of central nervous, cardio-vascular and respiratory systems' functioning, stimulation of metabolism;
- Strengthening of muscles, improvement of joints and backbone mobility, support of motion skills, correct posture;
- Forming of demand in systemic of physical trainings, acquiring of theoretical knowledge and practical skills in independent realization of the knowledge and self-control.

We tested 152 persons of 50-60 years old age (79 men and 73 women), who were relatively healthy but indifferent to motion functioning.

Measuring of biological age was carried out as per method of V.P. Voytenko (2001), which included "battery of tests" of different complexity. Logical schema of ageing evaluation of consisted of the following stages:

1. We measured biological age (BA) for a certain individual by clinic-physiological indicators. For determination of BA we used the following formulas:

Men:

$$BA=44.3+0.68 \times SET+0.40 \times SBP-0.22 \times DBP-0.004 \times VCL-0.11 \times BPin+0.08 \times BPex-0.13 \times SB$$

Women:

$$BA=17.4+0.82 \times SET+0.005 \times SBP+0.016 \times DBP+0.35 \times PBP-0.004 \times VCL+0.04 \times BPin-0.06 \times BPex-0.11 \times SB$$

Where: SET – subjective evaluation of health by the tested (with the help of questionnaire, consisting of 29 questions)

SBP – systolic blood pressure, mm.merc.col.

DBP – diastolic blood pressure, mm.merc.col.

PBP – pulse blood pressure, mm.merc.col.

VCL – vital capacity of lungs, ml.

BPin – breathing pause after inhale.

BPex – breathing pause after exhale.

SB- static balancing, sec.

We calculated proper biological age (PBA) of individual by his (her) calendar age (CA). For determination of PBA we used the following formulas:

Men:

$$PBA=0.661 \times CA + 16.9$$

Women:

$$PBA=0.629 \times CA + 15.3$$

Having calculated index (BA-PBA) we determined by how many years the tested in ahead of his (her) peers in expressiveness of ageing or by what value he (she) lags behind.

From these tests we noticed clear trend to significant increasing of quantity of the tested men and women in group with accelerated ageing (59% of men and 49.3% of women). Sharply accelerated temp of ageing was registered in 16% of men and 13.7% of women. The least numerous was group with physiologically normal (8% of men and 15.1% of women), delayed (14% of men and 16.4% of women) and dramatically slow temp of ageing (3% of men and 5.5% of women) (see fig.1).

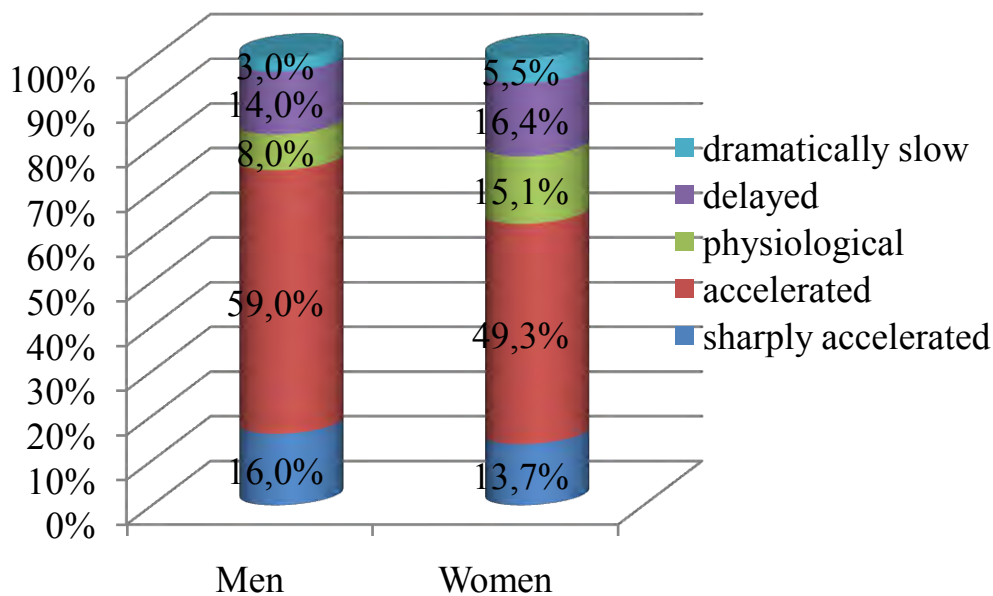


Fig.1. Temp of ageing of 50-60 years old men and women

By quantitative indicators of cardio-vascular system we observed reverse dependence on ageing temp (see table 1). I.e. increasing of BP happens with acceleration of ageing temp ($p < 0.05$).

As it is known in big arteries, with ageing, sclerotic thickening of wall tissue happens as well as atrophy of muscular lining, reduction of vessels' elasticity. As per the data of some researchers elasticity of big arteries of 70 years old persons reduces two times, comparing with 20 years old persons [7]. Such loss of elasticity results in overconsumption of energy by heart for overcoming vessels' resistance and in increasing of BP in aorta.

Table 1

Parameters of respiratory system's functional potentials and static balancing of 50-60 years old persons with different temp of ageing

Sex	Quantity n=152	Breathing pause at inhale (BP _{in}), sec	Breathing pause at exhale (BP _{ex}), sec	VCL ml	Static balancing (SB), sec.
<i>Dramatically accelerated temp of ageing</i>					
men	13	43.8±4	21.2±3	2830±262*	15.5±12*
women	10	34.8±0.4	15.6±2	1490±31,6*	3.5±1*
<i>Accelerated temp of ageing</i>					
men	47	43.3±5	21.9±4	3327±219*	36.4*
women	36	35.6±3	17.2±2	2111±261*	5.5±3
<i>Physiological temp of ageing</i>					

men	6	40.3±6	20.7±3	3550±54	55.8±9
women	11	35.4±2	18.5±4	2436±120	10.6±11
<i>Delayed temp of ageing</i>					
men	11	39.5±4	21±3*	3963±80	79±10*
women	12	39.8±4	18.6±3*	2600±241*	13.1±12
<i>Dramatically slow temp of ageing</i>					
men	2	44.5±4	32±4*	4150±495	112.5±10
women	4	37.2±5	18±3	3125±95*	11.7±9

Notes: * – confident difference by similar indicators of physiological ageing $p < 0,05$.

Basing on change of quantitative parameters of respiratory system's functioning, we determined that with increasing of ageing temp both of men and women there happen reducing of indicators, which characterize maximal productivity of energy supply system of physical workability. It is reflected in decreasing of parameters of breathing pause at inhale (BP_{in}), at exhale (BP_{ex}) and vital capacity of lungs (VCL) ($p < 0,05$). Accordingly organism's functional adaptation potentials reduce, which play great role in determination of involution processes (see table 2).

Table 2

BP values and subjective evaluations of 50-60 years persons' health with different ageing temps

Sex	Quantity n=152	Subjective evaluation of tested (SET)	Systolic BP (SBP), mm.merc.col.	Diastolic BP (DBP), mm.merc.col.	Pulse BP (PBP), mm.merc.col.
<i>Dramatically accelerated temp of ageing</i>					
men	13	6.8±2*	125.5±7	85.1±5	40.5±6
women	10	13.2±2*	143.8±4*	84.1±5*	60±7
<i>Accelerated temp of ageing</i>					
men	47	4.4±1	127.8±6*	85.1±5	42.7±6
women	36	11.1±2	140.5±3	79±5	62±5
<i>Physiological temp of ageing</i>					
men	6	4±0.6	122.5±2	82.5±2	40±3
women	11	10.3±2	139.4±3	77.9±5	61±6
<i>Delayed temp of ageing</i>					
men	11	4.6±0.8*	120.5±5	80.5±10	40±5
women	12	6.9±2*	135.4±6	76.8±6	59,6
<i>Dramatically slow temp of ageing</i>					
men	2	1.5±0.7*	115±7	70±14	45±7
women	4	5.2±1*	127.5±6*	79.5±4	48±8*

Notes: * – confident difference by similar indicators of physiological ageing $p < 0,05$.

Changes in respiratory system of aged persons are connected with structural changes of external breathing system. Rib gristles loose elasticity, connection of ribs with vertebrae reduce mobility, atrophy of inter-ribs' muscles and diaphragm, which participate in breathing, takes place. It results in decreasing of chest's and diaphragm's excursion and is accompanied by worsening of indicators of breathing. Such changes in respiratory system reduce VCL, time of breathing pause at inhale and exhale, breathing volume and etc.

Conclusions:

We have determined that physical culture as a mean of non-medical influence is one of the most effective method of prevention from weakening of organism's adaptation potential, progressing of pre-morbid state and prevention from too early ageing.

We have revealed that for main quantity of the tested men (59%) and women (49.3%) accelerated (pathological ageing was characteristic. It witnesses about purposefulness and need in revitalizing of aged persons' organisms.

The obtained values of functional potentials of respiratory, cardio-vascular systems, of static balancing and health subjective evaluation by the tested are in direct dependence on ageing temp. It witnesses about one of key roles of human physical fitness in limitation of ageing processors.

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THE FEASIBILITY OF USING CIRCULAR TRAINING METHOD FOR SKIERS-JUNIOR WITH REGARD TYPOLOGICAL PROPERTIES NERVOUS SYSTEM

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Annotation. *Purpose:* to determine the effect of a circular method of training on physical performance junior skiers depending on the strength of the nervous system. *Material:* the study involved 22 skiers (age 11 years). They were divided into 2 groups (11 people): experimental and control. In the experimental group 1 weekly circular training method used. The study was conducted in consultation with parents. Performance was determined using a bicycle ergometer first baseline and at 6 months after the study. At one stage (preparatory) conducted screening test and familiarize coaches with the goals and objectives of the study. Stage 2 (experimental): a) the subjects were divided into 2 groups; b) determined hypnotizability subjects; c) performance evaluation test was conducted at the beginning and end of the study. At stage 3 (final) analyzed the results of the study. *Results:* It was found that all subjects grade 3 hypnotic state. In the experimental group (using group training) after 6 months of regular exercise saw an increase in physical performance by an average of 56 kg m / min. In the control group (training was accepted by the program) there was an increase in physical performance average of 52 kg m / min. *Conclusions:* noted that all skiers same strength nervous system (weak). It is recommended to conduct training on the same program. Circuit Training should be carried out taking into account the anthropometric data and the initial physical fitness. Circular method of training does not contradict the basic principles of skiers: a gradual increase in the volume and intensity of physical activity.

Keywords: athletes, circuit training, hypnotizability, operability.

Introduction

In sports, growth of sportsmen's workability is achieved at the cost of gradual increasing of physical loads' scopes and intensity. For this purpose training methodic are improved, which include individual features of organism, such as: height, weight, lungs' capacity, status of cardio-vascular system, endured diseases and etc. [3, 4, 13, 22]. Disadvantage of this approach is the fact that individual features of sportsmen's nervous system are not considered.

The data of a number of scientific researches witness that reasons of serious fails in training of junior sportsmen are absence of required sequence in increasing of loads' scope and intensity (R.Ye. Mogylianskaya, L.I. Stogova, A.G. Dembo et al.). With it scope of loads shall be understood as total quantity of training work, fulfilled in one training session, week, month and year. It is expressed as time, spent for exercise, as quantity of kilometers of run distances, as weight of exercises' loads, as quantity of fulfilled exercises and so on. Intensity is understood as tension of training work and time of its fulfillment. It is measured by mass of applied weights, as speed of movements and etc.

It is known that human workability is connected with power of nervous system; that is why it is purposeful to regard concepts of features of sportsmen's nervous system. First, concept of "Nervous system's power" was offered by I.P. Pavlov in 1922. As per Pavlov individual, having strong nervous system, is able to fulfill work during more time in comparison with a person, having weak nervous system. I.P. Pavlov distinguished four types of nervous system and found their likeness with psychological types of temper:

1. Strong, balanced, mobile type – sanguine temper;
2. Strong, balanced, inert type – phlegmatic temper;
3. Strong, imbalanced, with dominating excitation – choleric temper;
4. Weak type – melancholic temper.

Strength of nervous system is one of main properties of nervous system, which reflects limit of cerebral cortex cells' workability, i.e. their abilities to endure excitation without coming to inhibition state [1, 2]. Its properties were studied by V.M. Zatsiorskiy, V.M. Filin (1962); B.M. Teplov (1963, 1965, 1967); V.G. Gorozhanin, M.A. Godik (1966); E.A. Golubieva (1972); T.F. Bazilevich (1974); Ye.P. Ilyin (1975); I.P. Blokhina, N.V. Zimkina (1977); M.V. Bodunov (1980); Ye.N. Surkov (1984); V.P. Ozerov (1989); V.L. Talanov (2007). Omelyanenko V.I. (2014) [17-20] and a number of foreign authors [14-16, 21].

By the present time there have been accumulated a lot of facts of data not compliance with determination of typological features of nervous system with the help of questionnaires and experiments. For example, using of questionnaires resulted in sportsmen's self-observations (I.K. Popesku, 1955; Z.I. Biriukova, 1961; B.I. Yakubchik, 1964 et al.). It is known that the weaker nervous system is the higher is the depth of hypnotic sleep, therefore determination of sportsmen's hypno-ability permits to determine strength of their nervous system. Therefore, when constructing training programs it is necessary to consider individual features of nervous system.

Owing to the fact that coaches do not consider nervous system's power it is urgent to use circular method of training, which can result in non compliance of nervous system's typological features and the state of over-training. Rather detail information about circular method of training is presented in work by V.I. Filimonov, A.R. Popova, Kh.M. Yusupov, 1986. The authors offer circular method as consequent fulfillment of certain complex of different exercises (every exercise with constant power fulfilled in turn).

In our work we observed development of physical strength of junior skiers, who are trained with application of circular method [6, 7, 12].
The work has been fulfilled in compliance with plan of SRW of School of higher sportsmanship in Nikolayev.

Purpose, tasks of the work, material and methods

The purpose of the work is to determine influence of circular method of training on physical workability of junior skiers, depending on nervous system's power.

The object of the research: junior skiers of 11 years old age. *The subject of the research:* the process of workability's changing under influence of circular method of training of junior skiers, depending on nervous system's power.

The tasks of the research:

1. Determination of junior skiers' hypno-ability;
2. Determination of dependence of junior-skiers' workability on their hypno-ability.

Hypothesis of the research: we assumed that junior skiers have weak nervous system, because the process of organism's formation has not been completed yet and circular method of training would be suitable for all tested equally under condition of uniformity of anthropometric indicators. If this hypothesis is wrong then there will be changes in sportsmen's workability, depending on typological features of nervous system: some sportsmen will demonstrate increasing of workability, other – will show reduction of physical workability, caused by non-compliance of load and functional potentials of an individual.

The methods of the research: theoretical analysis of scientific literature, pedagogic observation, testing, psychological influence.

Organization of the research: 22 skiers of 11 years old age participated in our research; they were divided in two groups (11 persons in each) – control and experimental. In experimental group we applied circular method of training 1 time a week. The research was conducted by parents' agreement. Workability was determined with the help of ergometric bicycle at the beginning of the research and 6 months after it.

At 1st stage preparatory- we carried out selection of the tested and familiarization of coaches with aims and tasks of the research.

At the 2nd stage – experimental, we fulfilled:

- a) the tested were divided in 2 groups;
- b) determination of hypno-ability of the tested;
- в) evaluation of workability of the tested at the beginning and at the end of the research.

At 3rd stage – final one- we carried out analysis of results of the research.

Results of the research

The fulfilled examinations showed 3rd degree of hypno ability of all the tested.

In experimental group, where we used group training, after 6 months of regular trainings we registered increase of physical workability in average by 56 kgm.p.min.

In control group training were conducted by traditional program and we registered increase of individuals' physical indicators in average by 52 kgm.p.min.

All skiers of experimental and control groups had weak nervous systems. It is explained by the fact that by 11 years age organism has not reached complete development.

It is known that indicators of different parts of brain do not always coincide between each other by strength of nervous processes. Besides, research of different zones of brain shall be conducted simultaneously, but this process is rather difficult and requires presence of not only appropriate instrumentation but also qualified operators of this instruments.

Advantage of “hypnotic” research of nervous system in comparison with other methods is that “hypnotic” methods do not require special expensive experimental equipment. For example Ye.P. Ilyin offered simple express-method of determination of nervous system power – tapping-test. But, as it became known further, result of this arbitrary motion method to large extent depends not only on nervous system's power and typological features of nervous system but also on how instructions and motivation of the tested was carried out. B.M. Teplov pointed that for diagnostic of typological features of nervous system it is necessary to use only “involuntary” responses and based on them “involuntary” methods [5, 8, 10].

The reason of discrepancy in researches of features of nervous system is imperfectness of methodic of sportsmen's examinations; that is why it is not reliable to base on results, received with the help of questionnaires and arbitrary motion methods.

It is known that inhibition of brain's neurons is in the base of hypnotic state. If this inhibition comes quickly – individual has weak nervous system, if it comes slowly – nervous system is strong. In hypnotic state spread inhibition of cerebral cortex takes place and as per classification of hypnosis we can determine hypnotic stages in short period of time [9, 11].

Basing on above said, all sportsmen shall be divided into 3 groups by their hypno ability. After determination of hypnotic stages it is necessary to work out new training methodic for every group of sportsmen, considering their hypno-ability. With working out of training methodic it is necessary to consider that sportsmen with strong nervous system feel tiredness later than sportsmen with moderate and weak nervous system.

Owing to the fact that nervous system organizes and coordinates functioning of all organism's parts and fulfills its connection with external world, then without consideration of individual features of personality's nervous system it is impossible to train sportsman of high level.

Conclusions:

In connection with the fact that all tested skiers of 11 years old age had equal (weak) nervous system then trainings shall be conducted by one program, including circular training, considering only anthropometric data and initial physical conditions. Circular method of training does not contradict main principles of junior skiers' initial training: gradual increasing of scope and intensity of physical loads.

Further researches are planned to be fulfilled with other age categories of sportsmen of different kinds of sports.

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INFLUENCE CHOREOGRAPHIC READINESS TO GYMNASTS FINAL ASSESSMENT OF PERFORMANCE SKILLS

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Annotation. *Purpose:* to provide a quantitative assessment and expert choreographic preparedness gymnasts. *Material:* the study involved eight gymnasts competition finalists in the floor exercise - female members of the Ukrainian national team in gymnastics. *Results:* the quantitative indicators of acrobatic and dance elements to determine the baseline assessment. Defined methods complications composition on the floor exercise by reducing the number of acrobatic lines and diagonals and increase the number of gymnastic elements. The theoretical performance of the composite sequence is improved structure and increases the difficulty of the exercise. *Conclusions:* in the process of composition complications need to pay more attention to the technique of performing gymnastic elements. In improving exercise choreography element replace (in some cases) acrobatic element. Based on the results is planned future direction of research in order to improve the training process in gymnastics.

Keywords: gymnastics, choreography, acrobatics, exercises, basic assessment, execution, difficulty.

Introduction

In modern sport gymnastic there exist high requirements to sportswomen. On the one hand they shall fulfill difficult elements with high technical skillfulness and on the other hand law of beauty requires that sportswomen should demonstrate lightness, grace, fineness, plasticity and etc. The most picturesque kind of gymnastic all round events was floor exercise [1, 7, 9, 12, 13, 15, 16, 18, 20].

Gymnastic choreographic training starts from mastering of classic dance. It permits to master body movement's culture, videlicet: purity, plasticity and expressiveness of movements [1,3, 8, 11, 14, 17, 19].

In choreographic training of female gymnasts aesthetic, physical and educational tasks are solved. **Aesthetic tasks** mean cultivation of musical sense and horizon, training of movement under music; **physical** – mean development of coordination, flexibility, plasticity, expressiveness and accuracy of movements; **educational tasks** mean psychological relaxation, cultivation of ability to feel, think, remember and estimate culture of movements [3, 4, 10].

Choreographic training in gymnastic is closely connected with technical training and is a component of training process. It is difficult to demarcate these two kinds of training because in training for example of jumps, turns, flies simultaneously technical level of floor exercises is improved. Expressiveness of arms' head's body's movements, expressiveness and completeness of posture permit to demonstrate individual style, performance mastering and artistry that give advantage with evaluation of exercise [2, 4].

Floor exercises are a synthesis of complex acrobatic jumps and choreographic elements, dance and gymnastic movements that, in their turn, condition complexity of the whole exercise [5, 6].

The main condition of floor exercises' composition depends on skillfull combination of all components, obeying of this wholeness to emotionality of music [5, 7].

Purpose, tasks of the work, material and methods

The purpose of the research is to give quantitative and expert evaluation of female gymnasts' choreographic fitness.

The tasks of the research:

1. Determination of quantitative indicators of acrobatic and choreographic elements in floor exercises composition with the help of records, made in symbols, accepted by International gymnastic federation (IGF).
2. Evaluation of technical level of female gymnasts' fitness with the help of experts' marks.
3. Determination of methods and means of complicating of floor exercises compositions.
4. Provision of theoretical proof of interconnection of female gymnasts' choreographic fitness with performance mastering.

The methods and material of the research: 1. Analysis and generalization of special scientific-research literature's data. 2. Analysis of video and recording of compositions in compliance with IGF requirements.. 3. Method of experts' evaluation. In the research 8 floor exercises' finalists for 2012-2013 period participated.

Results of the research

Floor exercises composition consists of complex of elements, which are fulfilled by female gymnast, and of these elements' choreography, i.e. distribution of gymnastic and acrobatic elements in time and space of mat in harmony with music. Choreography shall demonstrate smooth transition of a movement to movement with contrasts in speed and intensity.

Choreography and structure of composition include:

- Rich and various choice of elements from different groups of complexity in "Table of elements";
- Different levels (standing, sitting, lying, in movement or static);

- Changes of movements' directions (forward, backward, aside, arching, zigzag, by diagonal and so on);
- Creative and original movements, combinations and transitions [5, 7].

There exists the so called formula of "**Basic mark**", which consists of special requirements to composition (+ 2.5 p), complexity of elements («A» = 0.1; «B» = 0.2; «C» = 0.3; «D» = 0.4; and etc.) and combinations (+0.1 p and +0.2 p).

According to sport gymnastic competition rules **composition shall consist of** (complexity of elements):

- Maximum – **5 acrobatic** elements, using maximum 4 lines (or diagonals) – possible less but not more;
- Minimum – **3 "dancing"** elements (gymnastic, choreography, dance and etc.).

With fulfilling 5 **requirements to composition** (every one is evaluated as **0.5**) female gymnast receives + **2.50**

points:

- 1. Dance combination** of minimum 2 different jumps with one leg or hops (from Table of elements' complexity); one of them – with backward forward split by 180° + **0.5 p**
- 2. – Forward somersault back and aside, + 0.5 p**
- 3. – Somersault with turn around longitudinal axis** (min. 360°), + **0.5 p**
- 4. – Double somersault, + 0.5 p**
- 5. – Dismount – end of exercise.**
 - Without dismount or dismount «A» or «B», 0.00 p
 - Dismount «C», + **0.3 p**
 - Dismount «D» or more complex, + **0.5 p**.

In order to gain "Basic mark" female gymnasts fulfill maximum 4 acrobatic lines, which consist of standard **acrobatic** elements, and often they are: 2 groups of complexity «D» x 4 = **0.8 p** (at least one of them must be at the end of exercise, otherwise complexity of combination would not be achieved); 3 «C» x 3 = **0.9 p**, mean elements of **choreography**: – 2 gymnastic groups of complexity «C» x 3 = **0.6 p** and 1 gymnastic group of complexity «B» x 2 = **0.2 p**; it makes in total + **2.5** points for **complexity** and + **2.5** points are added for **requirements to composition**; so gross total "**basic mark**" is **5.0 points**. If to use combinations with additions then basic mark will increase accordingly.

As a rule, female gymnasts desire to increase "basic mark" at the cost of complicating of **acrobatic elements** and their increasing, but it does not always give required result. With fulfillment only one acrobatic line or diagonal, female gymnast can "loose" (fall downs and rough mistakes are not considered) from 0.3 points. As per competition rules it is necessary to take specific deductions on apparatus:

- More than 1 pause, without motion on 2 legs – 0.1 p;
- Pause more than 2 seconds before acrobatic line – 0.1 p;
- More than 1 lunge (acrobatic elements) – 0.1 p;
- "Entering" diagonal before acrobatic line, without dance or choreographic elements ("empty steps") – 0.1 p;
- Device for running to acrobatic line – 0.1 p;

After world championship 2013 there were made some changes and additions to acting competition rules, which meant that it was prohibited to come to diagonal with simple steps, with face or back turned forward, i.e. without choreographic movements [2]. It results in minus – **0.1** points. Thus, preparing to certain acrobatic line, having no proper choreography, female gymnast loses – 0.3 points (she even did not start to fulfill acrobatic elements, she only prepared for it); if landing after diagonal was added by lunge, - one more deduction – 0.1 points. They can be added by technical deductions for performance. In total, female gymnast hopes to receive bonus but have deductions. We can conclude that it is necessary to replace acrobatic element by gymnastic one. If female gymnast does not fulfil technical requirements to element's performance, then :

- She is given next element from Table of Elements' Complexity;
- Or she is given complexity less by one group. With it, if fulfillment of element is satisfactory, no deduction happens.

In this case there will be less deductions for performance and basic mark will be higher.

We offer reducing of quantity of acrobatic lines and increasing of quantity of **gymnastic elements** with their further complicating. Thus, we exclude deductions for preparation before acrobatic line.

We took as the base results of finalists of competitions 2012-2013 (CU – Cup of Ukraine, ChU – championship of Ukraine, ChU CJSS – championship of Ukraine for children junior sport schools) (see table 1).

Having analyzed results, presented in table 1, we can judge about technical fitness of female gymnasts and their performance mastering. For example, in the simplest formula the first mark is "basic mark" or complexity of fulfilled exercise; second mark – is mark received for performance and final result is sum of first two marks.

Table 1

Results of competitions of Ukrainian sport gymnastic combined team (women), n=8

№	Initials	CU- 20212	ChU- 20212	ChU CJSS 12
		CU - 20213	ChU- 20213	ChU CJSS -13
1	L.M.	$5.4 + 7.1 = 12.5$	$4.4 + 8.075 = 12.475$	$5.4 + 8.75 = 14.15$
		$5.5 + 8.933 = 14.433$	–	–
2	V. A.	$5.1 + 7.633 = 12.733$	$5.2 + 8.0 = 13.2$	$5.1 + 7.866 = 12.966$
		$5.4 + 7.85 = 13.15$	$5.4 + 8.025 = 13.425$	$5.4 + 8.275 = 13.675$
3	M. D.	$5.0 + 7.366 = 12.366$	$5.0 + 6.525 = 11.525$	$5.0 + 7.733 = 12.733$
		$5.1 + 8.525 = 13.625$	–	$5.1 + 8.6 = 13.7$
4	S. K.	$5.1 + 8.05 = 13.05$	$4.5 + 8.15 = 12.65$	$5.1 + 8.3 = 13.4$
		$5.2 + 8.15 = 13.35$	$5.5 + 8.25 = 13.75$	$5.6 + 8.333 = 13.933$
5	K. A.	$5.1 + 8.0 = 13.1$	$5.1 + 8.075 = 13.175$	$5.1 + 8.1 = 13.2$
		$5.2 + 8.35 = 13.55$	$5.4 + 8.45 = 13.85$	$5.4 + 8.433 = 13.833$
6	S. L.	$5.4 + 8.133 = 13.533$	$5.3 + 8.1 = 13.4$	$5.1 + 7.925 = 13.025$
		$5.0 + 7.75 = 12.75$	$5.1 + 7.8 = 12.9$	$5.4 + 8.266 = 13.666$
7	I. A.	$4.8 + 8.0 = 12.8$	$5.0 + 8.233 = 13.233$	$5.0 + 8.55 = 13.55$
		$5.1 + 8.433 = 13.533$	$5.2 + 8.166 = 13.366$	$5.5 + 8.633 = 14.133$
8	K. D.	$5.0 + 8.475 = 13.475$	$5.0 + 8.4 = 13.4$	$5.0 + 8.2 = 13.2$
		$5.2 + 8.3 = 13.5$	$5.2 + 7.95 = 13.15$	$5.2 + 8.5 = 13.7$

As we have already mentioned above, with fulfillment of all special requirements and with optimal complexity mean mark is 5.0 points. If initial mark is less, that means that some special requirement is not fulfilled or there is deficit of complexity.

In table 1 and fig.1 it is seen that 4 marks are low, 26 marks have middle indicator and 11 – are high. Even these marks are not criteria for final competitions of international level. Indicators of “basic mark” shall be higher – 5.8-6.0 points.

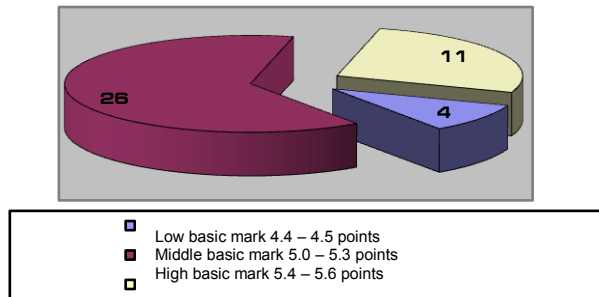


Fig.1. Determination of technical fitness of female gymnasts, considering points for complexity

From table 1 and fig 2 it is seen that performance mastering was evaluated with 36 low marks and only 11 – with high marks.

If mark is lower than 8.0 points it witnesses about rough mistakes; deduction of **0.5 points** or, in case of fall down – deduction is **1.0 points**. Also, here mistakes in technique of performance (both gymnastic and acrobatic elements) can be considered. Fulfillment of gymnastic or choreographic element in falling is practically impossible.

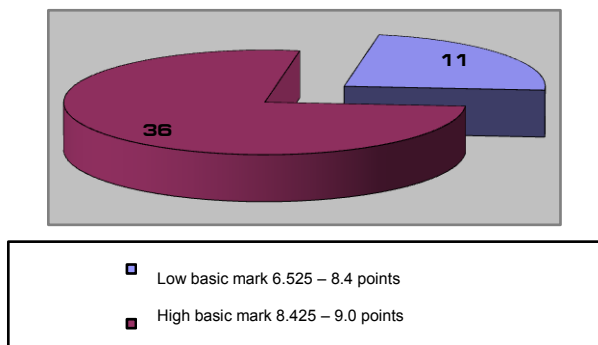


Fig.2. Determination of performance mastering of female gymnasts (mark for performance)

Having analyzed all results and marks and basing on existing rules of competitions in sport gymnastic we came to conclusion that it is important to pay more attention to technique of fulfillment of gymnastic elements. In this connection it is necessary to replace acrobatic element with element of choreography. We should orient on individual potentials of female gymnasts, no matter if elements will be of “turn” or “jump” character. In any case it is necessary to use basic dance elements with further their complicating.

In the course of our research 2 sportswomen began to change their free compositions in floor exercises. We offered to them to build their programs so as to add choreographic elements and to fulfill three diagonals (each of them), excluding extra losses and deductions.

Having discussed changes in competition rules with coach and sportswoman D.K., we made record of exercises, which were fulfilled in 2012 and offered new composition (for 2014 with perspective development of it) with reducing of acrobatic lines and elements and replacing of them with gymnastic elements.

As it is shown in table 2 (composition 1) sportswoman used 5 acrobatic elements in 4 lines and 4 gymnastic elements. In 2012 her “basic mark” was - **5.0 points**.

Table 2

Compositional sequence of sportswoman D.K.

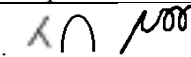
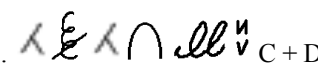
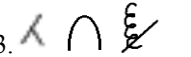
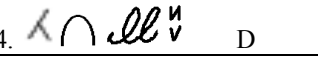
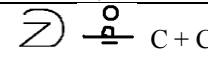
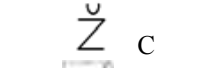


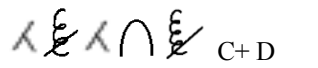






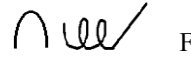
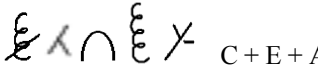






1 composition of 2012		
Acrobatic: 4 lines, 5 complex elements 2 D, 3 C	Gymnastic: 4 complex elements 2 B, 2 C	Basic mark 5.0 points:
1. D 2. C+C 3. C 4. D	C+B C B	2 D = 0.8 p 5 C = 1.5 p 1 B = 0.2 p complexity 2.5 p complexity 2.5 p
2 composition for 2014		
Acrobatic: 3lines, 4 complex elements 3 D, 1 C	Gymnastic: 6 complex elements 1 D, 4 C, 1 B	Basic mark 5.4 points:
1. C+D 2. D 3. D Element of composition	C+C C D B C	4 D = 1.6 p 4 C = 1.2 p complexity 2.8 p composition 2.5 p plus for combining 0.1 p
3 perspective composition		
Acrobatic: 3lines, 4 complex elements 1 E, 2 D, 1 C	Gymnastic: 6 complex elements 3 D, 2 C, 1 B	Basic mark 6.0 points:
1. C+E+A 2. D 3. D Element of composition	C+D C D+B D	1 E = 0.5 p 5 D = 2.0 p 2 C = 0.6 p complexity 3.1 p composition 2.5 p plus for combining 0.4 p

Having determined optimal elements for improvement in compliance with existing competitions' rules we chose the following composition (2nd composition for 2014). It is: 4 acrobatic elements in 3 lines and 6 gymnastic elements; “basic mark” is **5.4 points**. For female gymnast, who is not able to fulfill complex acrobatic elements it is a good mark. Thus,, by replacement of one acrobatic series with element (equal by complexity) we excluded minimum 0.4 points of deduction for performance and received bonus in “basic mark”.

In third composition we regard complicating of both acrobatic and choreographic elements. However, we may leave all acrobatic lines unchanged and accentuate only gymnastic elements. And even in this case “basic mark” of a female gymnast will be **5.8 points**.

Table 3

Compositional sequence of sportswoman K.S.

1 composition of 2012		
Acrobatic: 4 lines, 5 complex elements 1 E, 3 D, 1 C	Gymnastic: 4 complex elements 3 C, 1 B	Basic mark 5.5 points
1.  E 2.  C+D 3.  D 4.  D	 C+C  C  B	1 E = 0.5 p 3 D = 1.2 p 4 C = 1.2 p complexity 2.9 p composition 2.5 p composition 0.1 p
2 composition for 2014		
Acrobatic: 3 lines, 4 complex elements 1 F, 2 D, 1 C	Gymnastic: 5 complex elements 4 D, 1 C	Basic mark 5.9 points:
1.  F 2.  C+D 3.  D Element of composition 	 C+D  D  D  D	1 F = 0.6 p 6 D = .4 p 1 C = 0.3 p complexity 3.3 p composition 2.5 p plus for combining 0.1 p
3 perspective composition		
Acrobatic: 3 lines, 4 complex elements 1F, 1 E, 1 D, 1 C	Gymnastic: 5 complex elements 4 D, 1 C	Basic mark 6.2 points:
1.  F 2.  C+E+A 3.  D Element of composition 	 C+D  D  D  D	1 F = 0.6 p 1 E = 0.5 p 5 D = 2.0 p 1 C = 0.3 p complexity 3.3 p composition 2.5 p plus for combining 0.3 p

The above presented example of composition's change refers to female gymnast, who is skillful in acrobatic and choreography. Her initial "basic mark" is higher than of previous sportswoman; she is a candidate to final in floor exercises.

As it is shown in table 3 (composition 1), female gymnast used 5 acrobatic elements in 4 lines and 4 gymnastic elements as well as combining + 0.1 points. In 2012 her "basic mark" was – **5.5 points**.

We discussed with coach variant "three diagonals", replacing completely acrobatic lines and complicating choreographic elements. Also we excluded deductions of minimum 0.4 points. We received the following exercise: 4 acrobatic elements in 3 lines and 5 gymnastic elements with "basic mark" – **5.9 points**. It is already "international" level of finals.

In third composition we accentuated thy second acrobatic line with its further complicating. This composition includes elements of acrobatic and choreographic elements that, gives plus 0.3 points. Thus, complicating of composition occurs at the cost of addition and improvement of gymnastic and choreographic elements.

Conclusions:

1. With the help of vide analysis and records, fulfilled by symbols, adopted in International gymnasts' federation, we could evaluate quantitative indicators of acrobatic and choreographic elements in floor exercises' compositions.

2. Method of experts' marks permitted for us to evaluate female gymnasts' technical fitness in free exercises. Basing on received data we determined that complicating of program occurs at the cost of increasing of acrobatic elements and combinations, however it can result in deductions for performance.

3. When planning improvement of composition, we offer to pay more attention to gymnastic elements and choreography in order to vary and improve exercise.

4. We have shown and proved theoretically that female gymnasts' choreographic fitness directly influence on performance mastering.

Further researches will be oriented on improvement of female gymnasts' choreographic fitness in compositions and on implementation of such compositions in training and competition processes.

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STRUCTURE AND PHYSICAL TECHNICAL AND TACTICAL TRAINING HANDBALL PLAYERS AGED 10-11 YEARS

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Annotation. *Purpose:* to study the structural and functional relationships, physical, technical and tactical training handball aged 10-11 years. *Material:* the study involved 20 handball players aged 10-11 years. *Results:* isolated and subjected to review 55 correlations between speed, speed-strength, coordination skills and basic technical and tactical methods of the game. Consider the correlation matrix structure level of physical, technical and tactical training to handball pedagogical experiment. Found that 55 of the 15 correlations calculated (27.3%) positive and 12 (21.81 %) of negative relationships were statistically significant. It is 49.08 % of the linkages ($r = 0.54$ to 0.85). Correlations allow to evaluate the effectiveness of the training process under the influence of specific funds targeted at individual components of motor abilities and techniques of the game. *Conclusions:* methodological recommendations, technology and program start-up phase of preparation of young handball players. The program aims at the development of the dual physical and technical and tactical training.

Keywords: handball, physical, technical, tactical, training, correlation structure, techniques, game.

Introduction

Modern handball significantly differs from handball of 80-90-s, which was characterized, mainly, as slow and power kinds of sports; on modern stage of it development, with evolution and changing of game's character scope and intensity of motion activity increased significantly and it is realized in probabilistic game situations of competition character. That is why potential players shall meet higher requirements to physical, technical-tactic and in general integral fitness, videlicet: they shall be able to demonstrate conditional and coordination skills in space-time accuracy of technical tactic actions and their bio-mechanic rationality. In this connection we have to admit that system of handball players' training is not able to satisfy completely increased demands of domestic handball in young skillful sportsmen, because in modern conditions it is not sufficient both in respect to scope and quality of training [1, 2, 14, 15-19, 21 et al.].

This circumstance witnesses about demand in searching of scientifically grounded approach to building, planning and managing of system of junior handball players' training, which would consider tasks, conditions of training, continuation, new achievements and innovative prospects.

One of promising direction in improvement of system of handball players' training is combined influence on physical and technical-tactic fitness of players that, in its turn, will permit to ensure coordination, quickness and variety of technical-tactic potential, facilitating to effectively and rationally fulfill competition's movements under influence of different disturbing factors [5, 6, 7 et al.].

The problem of interconnection of physical and technical-tactic indicators is theoretically and methodically important for psychological-pedagogic direction of sport training [2, 3, 5 et al.]. For theory of sport it is very important to have answer about interconnection of these indicators, characterizing different levels of sportsman's biological individuality.

Interconnection of physical fitness and technical-tactic actions is based on functional complex of movements' coordination, on accumulation and realization of life experience, elements of programming and mechanisms of correction as well as on general, executive (physical) components of coordination process [9].

In works by V.G. Manolaky, V.I. Liakh there is information that interconnection of some components in sportsmen's organism in structure of physical and technical-tactic fitness is, in general, not important. Little quantity of interconnections in structure of fitness is explained by both authors by existing of high individual distinctions [11, 12 et al.] For example, depending on the fact if there exists interconnection between certain components of holistic physical and technical-tactic fitness or not, selection of means, applied for their development and improvement depends on. Presence of strong connections implies using of exercises of integrated influence and on the contrary: their absence implies searching of new means of targeted influence.

A number of authors [7, 8, 9, 20 et al.] think that with age authenticity of correlation links reduces; high positive correlation dependence is present at age of 10-12 years old.

However, in spite of evident character of usefulness of such researches, the problem of physical and technical-tactic fitness of potential sportsmen, namely, 10-11 years old junior handball players at initial stage of training, still remains to be insufficiently studied.

As far as works of our predecessors showed that correlation interconnections in different age periods were far from being synonymous by level of fitness then problem of the research of interconnection of physical and technical fitness of 10-11 years old handball players is an urgent task.

The present work has been fulfilled in compliance with SRW work of physical education and sports department of Byelorussia state university.

Purpose, tasks of the work, material and methods

The purpose of the work was to study structural-functional interconnections between physical and technical-tactic fitness of 10-11 years old handball players before and after pedagogic experiment.

The methods and organization of the research: analysis and generalization of literature sources; for determination of physical and technical-tactic fitness's level we applied control tests, which, as per requirements of sport metrology, were reliable and valid. The battery of tasks included: **technical tactic fitness** "snake run with dribbling" and "complex exercise"; **conditional fitness** - "side motion (40 meters)" and "jumps on one and two legs"; **coordination fitness** - "throwing of tennis ball for distance from initial position - sitting, legs apart" and shuttle run (3x10 m)".

The received results were statistically processed in standard way: we used calculation of mean arithmetic (\bar{x}); error of mean arithmetic (m); mean square deviation (σ); coefficient of multiple correlation. Mathematical processing was carried out with the help of computer program STATISTIKA 6.0.

The researches were conducted in center of Olympic reserve "Viktoria", Brest, at trainings, in period from September to December 2011. In the researches junior handball players of 10-11 years old age ($n=20$) participated.

Results of the research

Correlation analysis of current state of inter-correlation links between technical-tactic and physical fitness of 10-11 years old handball players permits to mark out their important and background components.

In the course of pedagogic experiment before and after research we analyzed interconnections between 11 indicators of 6 tests for quickness, speed-power, coordination abilities and main technical-tactic methods of game. In total we regarded 55 correlations between mentioned above indicators before and after experiment.

Correlation matrix of physical and technical-tactic fitness of 10-11 years old handball players **before pedagogic experiment** permits to say that from 55 calculated correlations 15 (27.3%) positive and 12 (21.81%) of negative links were statistically confident that made up only 49.08% of all links (r = from 0.54 to 0.85).

In correlation structure of physical and technical-tactic fitness of junior handball players we registered **confident positive links** (r = from 0.54 to 0.85) between:

- Quickness and ability to adapt and reconstruct movements of test task "shuttle run 3x10 m" ($r=0.77$; $P<0.01$);
- Absolute (ability to adapt and reconstruct movements of test task) and relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m) coordination abilities ($r=0.82$; $P<0.001$);
- Right and left arms with fulfillment of ballistic movements accentuated for distance ($r=0.63$; $P<0.05$);
- Special condition skills (side movement) and absolute (quickness ($r=0.55$; $P<0.05$) and ability to adapt and reconstruct movements ($r=0.74$; $P<0.01$)) and relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m ($r=0.61$; $P<0.05$)) of coordination abilities;
- Indicators, which characterize special condition skills - jumps on two legs and jumps on right leg ($r=0.77$; $P<0.01$) and left leg ($r=0.76$; $P<0.01$);
- Indicators of special condition skills - jumps on left and right legs ($r=0.84$; $P<0.001$), side movements with sidestep ($r=0.68$; $P<0.01$), and left hand's ballistic movements, accentuated on distance ($r=0.65$; $P<0.05$);
- Techniques of game (snake run with dribbling) and absolute (quickness ($r=0.75$; $P<0.01$) and ability for adaptation and reconstruction of movements ($r=0.85$; $P<0.001$)) and relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m) ($r=0.59$; $P<0.05$)) of coordination skills;
- Techniques of game (snake run with dribbling) and special condition abilities (side movement with sidesteps) ($r=0.73$; $P<0.01$).

Negative confident links (r = from -0.54 to -0.86) were found between the following:

- Techniques of game (snake run with dribbling) and special condition abilities jumps on right ($r=-0.67$; $P<0.01$), left ($r=-0.76$; $P<0.01$) on two legs ($r=-0.76$; $P<0.01$);

– Special condition abilities jumps on right leg and absolute (quickness ($r=-0.56$; $P<0.05$) and ability to adapt and reconstruct movements ($r=-0.72$; $P<0.01$)) and relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m) ($r=-0.57$; $P<0.05$)) coordination abilities;

– Special condition abilities – jumps on left leg and absolute (quickness ($r=-0.59$; $P<0.05$) and ability to adapt and reconstruct movements ($r=-0.86$; $P<0.001$)) and relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m) ($r=-0.75$; $P<0.01$)) coordination abilities;

– Special condition abilities – jumps on two legs and absolute (quickness ($r=-0.67$; $P<0.05$) and ability to adapt and reconstruct movements ($r=-0.77$; $P<0.01$)) and relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m) ($r=-0.56$; $P<0.05$)) coordination abilities.

After pedagogic experiment matrix of correlation structure of physical and technical tactic fitness of 10-11 years' handball players had a number of changes in quantity of links that witness that from 55 of calculated correlations 17 (30.90%) positive and 10 (18.18%) negative were statistically significant that made up only 49.08% of all links ($R =$ from 0.54 to 0.85).

In correlation structure of physical and technical tactic fitness of handball players we determined confident positive links ($r =$ from 0.54 to 0.85) between the following:

– Quickness and ability to adapt and reconstruct movements of test “shuttle run 3[10 m” ($r=0.74$; $P<0.01$);

– Absolute ability to adapt and reconstruct movements and relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m) coordination abilities ($r=0.84$; $P<0.001$);

– Right and left arms in ballistic movements accentuated on distance ($r=0.61$; $P<0.05$);

– Left arm in ballistic movements accentuated on distance and indicators of special condition abilities – jumps on right ($r=0.54$; $P<0.05$) and ($r=0.63$; $P<0.05$) left hand and relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m) coordination abilities ($r=0.65$; $P<0.05$);

– Special condition abilities (side movements with sidesteps) and absolute (quickness) ($r=0.56$; $P<0.05$) and ability to adapt and reconstruct movements ($r=0.74$; $P<0.01$)) relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m) ($r=0.62$; $P<0.05$)) coordination abilities;

– Indicators of special condition abilities – jumps on left and right legs ($r=0.84$; $P<0.001$), side movement with sidestep ($r=0.65$; $P<0.01$);

– Indicators, characterizing special condition abilities- jumps on two legs and jumps on right ($r=0,73$; $P<0,01$) и левой ($r=0,71$; $P<0,01$);

– Techniques of game (snake run with dribbling) and absolute (quickness ($r=0.72$; $P<0.01$) and ability to adapt and reconstruct movements ($r=0.65$; $P<0.001$)) and relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m) ($r=0.59$; $P<0.05$)) coordination abilities;

– Techniques of game (snake run with dribbling) and special condition abilities (side movement with sidesteps) ($r=0.74$; $P<0.01$).

Negative confident links ($r =$ from -0.54 to -0.84) we registered between the following:

– Special condition abilities – jumps on right leg and absolute (quickness ($r=-0.54$; $P<0.05$) and ability to adapt and reconstruct movements ($r=-0.66$; $P<0.05$)) and relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m) ($r=-0.52$; $P<0.05$)) coordination abilities;

– Special condition abilities – jumps on left leg and absolute (quickness ($r=-0.58$; $P<0.05$) and ability to adapt and reconstruct movements ($r=-0.84$; $P<0.001$)) and relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m) ($r=-0.74$; $P<0.01$)) coordination abilities;

– Special condition abilities – jumps on two legs and absolute (quickness ($r=-0.66$; $P<0.05$) and ability to adapt and reconstruct movements ($r=-0.75$; $P<0.01$)) and relative (latent) indicators (difference between 30 meters' run and shuttle run 3x10 m) ($r=-0.54$; $P<0.05$)) coordination abilities;

– Techniques of game (snake run with dribbling) and special condition abilities – jumps on two legs ($r=-0.76$; $P<0.01$).

Comparative analysis of changes of control tests' results permitted for us to determine that after pedagogic experiment:

– junior, 10-11 years old handball players showed statistically significant improvement ($P< 0.05$) in tests “shuttle run 3x10 m” and “throw of tennis ball for distance – only with right hand”, which characterize coordination abilities as well as in control tests for technical fitness “run with dribbling” and “complex test”.

– increments of indicators, which characterize condition abilities in tests “side 40 meters’ movement” and “jumps on one and two legs”, for coordination abilities in “throw of tennis ball for distance – only with left hand” were statistically insignificant ($P>0.05$).

Thus, comparative analysis of results after pedagogic experiment, which were received in control tests, permits for us to say about significant reserves in improvement of motion abilities and technical fitness of 10-11 years old handball players. This matter witnesses that it is necessary to implement means of combined influence, oriented on development of coordination abilities and on forming of game’s techniques, in training process of junior handball players; it would permit to raise physical and technical tactic fitness of 10-11 years old handball players.

Conclusions:

1. Analysis of 55 correlations between 11 indicators of condition, coordination abilities and technical tactic fitness permitted to determine that junior 10-11 years old handball players showed before experiment 15 (27.3%) of positive and 12 (21.81%) of negative links and after pedagogic experiment – 17 (30.90%) of positive and 10 (18.18%) of negative links, which were statistically significant.

2. The found positive and negative correlation links in structure of physical and technical tactic fitness of 10-11 years old handball players permit to evaluate effectiveness of training process before experiment and after targeted pedagogic influence on separate components of interacting abilities.

3. Results of correlation analysis prove recommendations on using of means of combined and integrated influence, oriented on development of special condition, coordination abilities and forming of technical-tactic methods of playing game in training process of junior, 10-11 years old, handball players.

4. The fulfilled researches should be regarded as modern principles with working out of program-methodic maintenance of initial stage of junior handball players’ training in children-junior sport schools and centers of Olympic reserve, oriented on increasing of their physical and technical-tactic fitness in process of intensive and integral training.

Further researches imply searching of new modern approaches of sport trainings, which would be oriented on discovering of reserves of physical and technical-tactic components of handball players on different stages of sport training.

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THE PROFESSIONAL VALEOLOGICAL PORTRAIT OF INSTRUCTOR OF PHYSICAL CULTURE

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Annotation. *Purpose:* identify components of the readiness of the future physical education specialist to valeological activity in preschool education. *Material:* a review and theoretical analysis of the scientific literature. *Results:* defines the general and special competence, the individual components. The degree of their relationship in the process of preparing an instructor of physical education in preschool education. Theoretically proved that the readiness of the future specialist organization based on skill valeological activities (including major tasks specific functions and values valeological culture). Such an organization implies unity of general and special components health-preserving technologies. *Conclusions:* the process of forming a professional portrait valeological instructor in physical education in pre-school educational institution should provide its willingness to valeological activities. This is based on the awareness of its organization and unity of general and special health- technology components.

Keywords: valeology, instructor, physical education, pre-school, educational, education.

Introduction

Children of pre-school age are a special category of population and constantly require concentrated attention from governmental educational administrations [8, 12]. Training of their ability for social functioning, independent way of life shall be ensured by systemic multi-profile valueologic preparation of a specialists in physical education for pre-school educational establishments (PSEE) [7, 10, 16].

Effectiveness of health related function of valueologic culture is a scientifically proved fact [5]. At present stage of society's development new trends in education of pre-school age children create significant influence on choosing of forms, means and methods of forming of valueologic knowledge and appropriate behavior.

In opinion of advanced scientists, pedagogues and specialists in branch of health related technologies [2, 8, 9, 12, 17-24], valueologic education is an important form of education – one of levers, influencing on personal and social children's behavior. It, in its turn, is a reflection of demand in more substantial and fruitful using of time for maintaining of pre-school children's psycho-physical state and increasing of their valueologic culture.

Purpose, tasks of the work, material and methods

The purpose of the work is to determine components of future physical culture specialist's fitness for valueologic functioning at pre-school educational establishments.

Results of the research

Organization of valueologic functioning in pre-school educational establishments is regarded as a mean for ensuring of future children's integration in social environment, which is provided by three interconnected processes:

- 1) encouragement – creation of conditions, ensuring group or individual possibility of better cognition activity in respect to oneself and surrounding people;
- 2) familiarization of group's children with health related technologies under influence of valueologic structure;
- 3) creative self expression – independent initiative and sense of responsibility on the base of ensuring of interaction of a personality and children's group with environment.

Considering the above said we formulated own interpretation of conception “valueologic functioning” of physical culture instructor (PhE) in pre-school educational establishment (PSEE). It means expanded knowledge and combination of practical skills in health related technologies, oriented on creation and re-creation of physical and spiritual forces of child's organism.

Main tasks of PhE instructor in PSEE shall be organization of valueologic socially significant education of children, oriented on the following:

- maintaining of harmonious physical and functional development;
- development of motion skills;
- development of physical abilities and facilitating organism's growth and differentiation of functional systems;
- acquiring of skills in healthy life style (HLS).

Basing on opinion of scientists and specialists in valueologic education [3, 4, 15], we can mark out a number of important specific functions, which reflect its content:

- socially significant, facilitating joining to other kinds of physical culture, to personal and social self-determination;
- health related-recreational function, which envisages prophylaxis of morbidity, recreation of psycho-physical potential, health strengthening at the cost of increasing of organism's resistivity to environmental factors, creation of ground for HLS;
- value-orientation function, which stipulates mastering of valueologic values by children, which reflect their internal settings and desires.

Ye.R. Chernyshova [15] says that only in case, when children have formed value orientations on HLS as the most important component of human life, health will be regarded as the most important component of human life, required for realization of life targets.

As on present time there are marked out three main value orientation in aspect of valueologic functioning of physical culture instructor at PSEE:

a) ability to independently define the purpose of valueologic functioning, specify its rules, select desired means, determine duration of trainings, content of program and group of trainees;

б) ability for self-realization – PhE instructor shall choose programs, valueologic measures, which would envisage variable motion functioning with the help of different forms of personally-important motion functioning in compliance with demands, interests and potentials of children.

в) valueologic communicability.

In connection with above presented especially important is the problem of training of PhE specialists for valueologic functioning at PSEE, creation of appropriate scientific and educational training base. Training of such specialists is logical, like other pedagogic processes. It has its own cause-effect dependences between pedagogic influence on children and achieved results. In professional training of future PhE specialists for valueologic functioning at PSEE theoretical and practical aspects are of great importance. Such training uses glossary of valueologic technologies, health related, sport, tourism, excursions and animations and gives certain idea about valueologic resources and health related systems for both of children and their valueologic culture.

The purpose of physical education specialists' training for valueologic functioning at pre-school educational establishments is forming of 3-5 years students' holistic idea about role of valueologic culture in human life functioning (meaning people of different age and sex) as well as kind of labor functioning [7, 9, 11].

As experience of other researchers [5, 6, 9, 16] and our generalizations show personality's fitness of PhE specialist for valueologic functioning shall include general and special competences.

General professional competence of PhE instructor of PSEE includes:

– methodic skills to carry out training with using of PhE means for formation of children's physical culture;

– application of physical exercises, outdoor games for development of organism's functional systems;

– application of experience of methodic and practical activity in cultivation of valueology in pre-school education;

– ability to continue valueologic education (self-perfection).

Special valueologic professional competence includes:

a) special professional knowledge:

– of main sectors of valueologic functioning, in which health related technologies are used;

– methodic of health related technologies in personality's valueologic culture;

– main motivations for achievement of valueologic culture;

– forms, means and methods of organization of valueologic functioning and programs on HLS technologies' realization;

– experience of cultivation of valueology in pre-school education.

b) special valueologic skills in the following:

– using of technical and legal documentation;

– evaluation of valueologic resources and health related potentials of valueologic functioning;

– organization of valueologic functioning at PSEE and application of health related technologies and supporting of HLS;

– constructing of programs of valueologic education and application of their realization's methodic.

It is necessary to note that as far as future of rising generation is a prospect of human development from position of HLS then valueologic culture and education are expectations of guarantees, stimuli for HLS practicing on the base of health related technologies, without which further development and education of pre-school children is impossible.

Conclusions:

The process of forming of professional-valueologic portrait of physical instructor at pre-school educational establishment shall stipulate his readiness for valueologic functioning on the base of knowledge about its organization and combination of general and special components of health related technologies.

The prospects of further researches imply planning and working out of scientific- methodic complexes for effective training of future physical culture instructors for pre-school educational establishments.

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COMPARATIVE CHARACTERISTICS OF THE PHYSICAL AND TECHNICAL PREPAREDNESS OF THE WOMEN'S NATIONAL TEAM OF UKRAINE AND LITHUANIA BASKETBALL (HEARING IMPAIRED) BEFORE AND AFTER TRAINING TO DEAFLYMPIC GAMES

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Annotation. *Purpose:* to compare the physical and technical readiness women basketball teams of Ukraine and Lithuania. *Material:* participated in the study of female athletes team of Ukraine and Lithuania (n = 24). Athletes age - 25-30 years. Teacher testing was conducted physical and technical readiness. Ukrainian team trained by the author's method with the use of innovative technologies. Included the use of technology in the training process of copyright video tutorials with animated illustrations and LED linear luminaire. *Results:* the results indicated significant improvement of athletes Ukrainian team in the tests: a standing jump, cross 2000 meters, throwing a medicine ball with a running start, lifting the trunk in 30 seconds from a prone position, speed equipment, three points shots, special endurance. The proposed new management training process helped increase mobility, intensity and complexity of team training in Ukraine. *Conclusions:* It is recommended to use a program of technical and tactical training with the use of innovative technologies in the training process basketball players are hearing impaired.

Keywords: basketball, athletes, hearing impairment, physical, technical, preparedness.

Introduction

Among numerous kinds of sports, which exist in physical education system of Ukraine women basketball takes one of leading places [1, 3, 4, 5]. Competition and training functioning of every team have own specificities [6, 7, 10, 12, 13, 15], that require special researches and pedagogic observations [17, 18, 19, 20, 21, 22]. To day the problem of working out of women sport for disabled is especially acute [2, 9, 11, 19, 20], that requires creative cooperation of coaches, scientists, medical workers in order to form and permanently perfect scientifically grounded system of sport training of female basketball players with hearing problems.

The research has been carried out in compliance with "Combined plan of scientific-research works in field of physical culture and sports for 2011-2015" as per topic 2.4 "Theoretical-methodic principles of individualization in physical education and sports"(state registration № 0112U002001) and in compliance with scientific-research work, which is financed by Ministry of education and science of Ukraine for 2013-2014 "Theoretical-methodic principles of information, pedagogic and medical-biological technologies for formation of healthy life style" (state registration № 0113U002003).

Purpose, tasks of the work, materials and methods

The purpose of the research is to compare physical and technical fitness of women (with hearing problems) basketball combined teams of Ukraine and Lithuania before and after Deaflympic games.

In our research 12 sportswomen of women with hearing problems basketball combined team of Ukraine; from them – 10 international masters of sports; 2 – masters of sports; female basketball players with hearing problems, members of Lithuanian combined team – 12 persons. Before research age of sportswomen was within 25-30 years old. Ukrainian basketball players made up experimental group; they were trained by the author's methodic with application of innovative technology. The worked out technology included application of author's video-aid with animation illustration [7, 8, 14] and LED linear lighter in training process. Control group consisted of Lithuanian female basketball players (12 persons), who trained the same scope of time as per training program of Lithuanian female basketball player and coach Rasa Kreyvite [1]. She is a doctor of sciences and multiple participant of international competition as a member of basketball combined Lithuanian team, also she is champion of Europe of 1997.

Both teams passed primary testing in September 2012, secondary – at the end of June, 2013; one month before Deaflympic games. Pedagogic testing of physical and technical fitness was carried out with tests, applied in combined teams of Ukraine. In every test 3 attempts were permitted; the best result was registered. The tests were carried out during 3 trainings.

Results of the research

Results of comparative analysis of control and experimental groups' basketball players showed that before experiment combined team of Ukraine confidently was behind combined team of Lithuania by some indicators (see table 1). In tests "Jumps with skipping rope during 1 minute, q-ty of times" (by 7.58 times, p<0.05), "Shuttle run 2x28 m, sec." (by 0.67 sec., p<0.01), "Speed springiness for 20 sec., q-ty of times" (by 4.49 times, p<0.01), "20 meters' run, sec" (by 0.34 sec., p<0.01).

Table 1

Physical fitness indicators of control (n=12) and experimental (n=12) groups' female basketball players before experiment

Registered indicators	Group	Statistic data				
		\bar{x}	S	m	t	p
Skipping for 1 min., q-ty of times	Ukraine	136.08	11.77	3.40	-2.00	<0.05
	Lithuania	143.66	5.78	1.67		
Jump from the spot, cm	Ukraine	191.08	14.49	4.18	-0.29	>0.05
	Lithuania	192.42	7.23	2.09		
Jump from the spot, cm	Ukraine	30.83	6.26	1.81	-0.96	>0.05
	Lithuania	32.92	4.19	1.21		
Shuttle run 2x28 m, sec.	Ukraine	10.07	0.77	0.22	2.97	<0.01
	Lithuania	9.4	0.07	0.02		
6 meters' run, sec.	Ukraine	1.19	0.06	0.02	0.55	>0.05
	Lithuania	1.17	0.06	0.02		
Cross-country 2000 meters, min.	Ukraine	9.59	0.89	0.26	-1.21	>0.05
	Lithuania	9.96	0.55	0.16		
Throwing of filled ball from the spot, cm.	Ukraine	6.09	0.75	0.22	-0.11	>0.05
	Lithuania	6.12	0.63	0.18		
Throwing of filled ball from run, cm.	Ukraine	8.23	1.01	0.29	-0.08	>0.05
	Lithuania	8.26	0.86	0.25		
Flexibility, cm.	Ukraine	13.25	1.19	3.52	-0.04	>0.05
	Lithuania	13.42	7.65	2.21		
Pressing ups for 30 sec., q-ty of times	Ukraine	28.17	5.89	1.70	-1.70	>0.05
	Lithuania	31.58	3.70	1.07		
Torso rising from sitting position for 30 sec., q-ty of times	Ukraine	26.17	5.94	1.71	-0.99	>0.05
	Lithuania	28.17	3.76	1.09		
Speed springiness for 20 sec., q-ty of times	Ukraine	27.92	5.02	1.45	-2.82	<0.01
	Lithuania	32.41	2.31	0.66		
20 meters' run	Ukraine	3.17	0.31	0.09	2.52	<0.01
	Lithuania	2.83	0.33	0.10		

Comparative analysis of technical fitness of control and experimental groups' basketball players before experiment (see table 2) permitted to find out negative indicators of our combined team in tests "2 scores' throws, q-ty of hits from 21 throws (by 2.42 times, $p<0.05$), "Speed of defensive travelling, sec." (by 1.11 sec., $p<0.01$), "Middle distance throws, q0ty of hits for 40 sec." (by 1.25 times, $p<0.01$) in comparison with Lithuanian combined team.

Table 2

Technical fitness indicators of control (n=12) and experimental (n=12) groups' female basketball players before experiment

Registered indicators	Group	Statistic data				
		\bar{x}	S	m	t	p
Speed technique, sec.,	Ukraine	35.00	2.04	0.59	2,00	>0,05
	Lithuania	33.61	1.27	0.37		
2 scores' throes, q-ty of hits from 21 throws	Ukraine	11.41	2.94	0.85	-2,4	<0,05
	Lithuania	13.83	1.85	0.53		
Speed of defensive travelling, sec.	Ukraine	24.59	0.73	0.21	2,74	<0,01
	Lithuania	23.48	0.51	0.15		
Penalty throws, q-ty of hits, from 21 throws	Ukraine	12.08	2.43	0.70	-1,29	>0,05
	Lithuania	13.33	2.31	0.67		
3 scores' throes, q-ty of hits from 21 throws	Ukraine	5.58	2.81	0,81	-0,70	>0,05
	Lithuania	6.25	1,71	0,49		
Middle distance throws, q-ty of throws for 40 sec.	Ukraine	7.33	0.78	0,22	-0,84	>0,05
	Lithuania	7.58	0.67	0,19		
Middle distance throws, q-ty of hits for 40 sec.	Ukraine	2.67	1.37	0,40	-2,73	<0,01
	Lithuania	3.92	0.79	0,23		
Special endurance, q-ty of throws for 5 min.	Ukraine	81.50	5.02	1,45	-0,85	>0,05
	Lithuania	83.17	4.61	1,33		
Special endurance, q-ty of hits for 5 min.	Ukraine	32.42	6.86	1,98	-1,08	>0,05
	Lithuania	35.08	5.11	1,47		
Middle distance throws, q-ty of hits for 40 sec.	Ukraine	18.92	4.03	1,16	-0,18	>0,05
	Lithuania	19.17	2.69	0,78		

After application of the worked out system for increasing of technical-tactic training's effectiveness with the help of innovative technologies in training process of women with hearing problems combined basketball team of Ukraine, indicators of physical fitness significantly improved (see table 3) in tests "Jump from the spot, cm (by 8.67 cm, $p<0.05$), "Cross country 2000 meters, min." (by 0.44 sec., $p<0.01$), «Throwing of filled ball from run, cm" (by 45 cm, $p<0.05$), "Rising of torso from lying position, q-ty of times) (by 2.5 times, $p<0.05$).

Table 3

Physical fitness indicators of control (n=12) and experimental (n=12) groups' female basketball players after experiment

Registered indicators	Group	Statistic data				
		\bar{x}	S	m	t	p
Skipping for 1 min., q-ty of times	Ukraine	149.83	10.44	3.01	0.79	>0.05
	Lithuania	146.75	8.61	2.49		
Jump from the spot, cm	Ukraine	198.75	12.99	3.75	2.1	<0.05
	Lithuania	190.08	5.83	1.68		
Jump from the spot, cm	Ukraine	35,75	4.09	1.18	0.96	>0.05
	Lithuania	34.17	4.00	1.15		

Registered indicators	Group	Statistic data				
		\bar{x}	S	m	t	p
Shuttle run 2x28 m, sec.	Ukraine	9.54	0.40	0.12	1.82	>0.05
	Lithuania	9.43	0.08	0.02		
6 meters' run, sec.	Ukraine	1.14	0.07	0.02	-0.94	>0.05
	Lithuania	1.20	0.20	0.06		
Cross-country 2000 meters, min.	Ukraine	9.11	0.55	0.16	-2.5	<0.01
	Lithuania	9.55	0.46	0.13		
Throwing of filled ball from the spot, cm.	Ukraine	639	0.62	0.18	0.32	>0.05
	Lithuania	631	0.64	0,9		
Throwing of filled ball from run, cm.	Ukraine	879	0.52	0.15	2.03	<0.05
	Lithuania	834	0.54	0.15		
Flexibility, cm.	Ukraine	14.08	12.69	3.66	0.06	>0.05
	Lithuania	13.83	7.23	2.09		
Pressing ups for 30 sec., q-ty of times	Ukraine	33.67	3.20	0.92	1.15	>0.05
	Lithuania	32.25	2.83	0.82		
Torso rising from sitting position for 30 sec., q-ty of times	Ukraine	34.17	3.19	0.92	1.96	<0.05
	Lithuania	31.67	3.06	0.88		
Speed springiness for 20 sec., q-ty of times	Ukraine	32.00	4.61	1.33	-1.16	>0.05
	Lithuania	33.83	2.94	0.85		
20 meters' run	Ukraine	2.55	0.27	0.08	0.71	>0.05
	Lithuania	2.48	0.21	0.06		

The offered by us new methods of management of training process helped to increase mobility, intensity and load of trainings of Ukrainian combined team. Comparative analysis of technical fitness of control and experimental groups' basketball players after experiment points at great changes in favor of our team (see table 4) in tests "Speed technique, sec." (by 2.09 sec., $p < 0.01$), "3 scores' throes, q-ty of hits from 21 throws" (by 1.25 times, $p < 0.05$), "Special endurance, q-ty of throws for 5 min.", (by 4.92 times, $p < 0.01$), "Middle distance throws, q-ty of hits for 40 sec." (by 2.33 times, $p < 0.05$).

Table 4

Technical fitness indicators of control (n=12) and experimental (n=12) groups' female basketball players after experiment

Registered indicators	Group	Statistic data				
		\bar{x}	S	m	t	p
Speed technique, sec.,	Ukraine	32.42	1.16	0.33	-3.48	<0.01
	Lithuania	34.51	1.22	0.35		
2 scores' throes, q-ty of hits from 21 throws	Ukraine	14.17	2.37	0.68	0.17	>0.05
	Lithuania	14.00	2.41	0.70		
Speed of defensive travelling, sec.	Ukraine	24.37	0.62	0.18	2.43	<0.05
	Lithuania	23.53	0.49	0.14		
Penalty throws, q-ty of hits, from	Ukraine	15.92	2.11	0.61	1.69	>0.05

Registered indicators	Group	Statistic data				
		\bar{x}	S	m	t	p
21 throws	Lithuania	14.42	2.23	0.65		
3 scores' throes, q-ty of hits from 21 throws	Ukraine	8.33	1.50	0.43	2.00	<0.05
	Lithuania	7.08	1.56	0.45		
Middle distance throws, q-ty of throws for 40 sec.	Ukraine	8.42	0.67	0.19	0.81	>0.05
	Lithuania	8.17	0.83	0.24		
Middle distance throws, q-ty of hits for 40 sec.	Ukraine	4.92	0.79	0.23	1.03	>0.05
	Lithuania	4.58	0,79	0.23		
Special endurance, q-ty of throws for 5 min.	Ukraine	88.50	3.21	0.93	3.05	<0.01
	Lithuania	83.58	4.56	1.31		
Special endurance, q-ty of hits for 5 min.	Ukraine	44.17	6.48	1.87	1.87	>0.05
	Lithuania	39.83	4.73	1.36		
Middle distance throws, q-ty of hits for 40 sec.	Ukraine	23.00	2.73	0.79	2.42	<0.05
	Lithuania	20.67	1.92	0.56		

Conclusions:

Thus, with the help of offered technical-tactic training system with using of innovative technologies in training of female basketball players, who have hearing problems, - members of Ukrainian combined team we managed to significantly increase indicators of sportswomen's physical and technical fitness.

In the future we are going to perfect system of innovative technologies for application in training process of female basketball players with hearing problems.

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**STATE OF DEVELOPMENT OF SPORT AND TECHNICAL AND APPLIED SPORTS
IN THE SPORTS ORGANIZATIONS OF UKRAINE**Tikhonova N.V., Gradusov V.A.
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Annotation. *Purpose:* the study of the development of sport and technical and applied sports in the sports organizations of Ukraine. *Material:* the results of analysis of scientific and methodical literature, statistical reports of the Ministry of Youth and Sports, controls for Physical Culture and Sport, the governing bodies of education and science, society websites promoting Defence of Ukraine, the Sports Committee of Ukraine. *Results:* technical sports solve complex health and educational problems, promote patriotic education of children. In Ukraine today gaining popularity of sports-technical and applied sports. According to statistics the number of students enrolled in 2013 increased by 6% (1720 people) in relation to 2012. Total 30484 person. The most popular among children and adolescents are: military-sport all-around (amount involved is 23.9% of the total number of pupils), fire-applied sports (8.8%), parachute (8.7%), automotive (8.1 %), model aircraft (7.8%), underwater (5.8%), radio sport (7.1%). The most abundant component in the number of sports clubs have engaged in occupations which covered 18264 children and adolescents. *Conclusions:* Implementation of measures for further development of sports engineering, aviation and military applied sports will foster a versatile development, hardened physically, technically trained people. As the formation of the younger generation of sustained interest and needs in the classroom technical creativity, provide training for young people for military service and active labor.

Keywords: children, teenagers, sports, technical, military applied, sports.

Introduction

At present one of trends of sports' development is increasing of kinds of sports and separate sport disciplines, that conditioned formation of new direction – non Olympic sports. It was conditioned by demand in new, having show character, sport competitions or in improvement of existing complex kinds of sports. Bu quantity of participants and show character most of non Olympic kinds of sports do not yield Olympic ones and can be quite popular, while sportsmen, who honor their country by their achievements at international arena, deserve the same recognition and support as Olympic sportsmen. Besides, hundred of thousands of people practice non Olympic sports as amateurs, that is why their popularizing and development undoubtedly will facilitate formation of healthy life style among different age groups, first of all – youth [1, 2, 4, 5]. One of components of non Olympic sports in Ukraine are sport-technical and applied kinds of sports. In all world they belong to prestige and most vivid ones and our country is not an exclusion. As per authors [1, 3, 4] sport-technical and applied kinds of sports include kinds of sport, which combine general physical and technical fitness of a sportsman and have certain applied meaning.

For modern Ukraine the question of development of technical and applied kinds of sports is rather urgent. Sportsmen's training in some technical kinds of sports is regarded in works by Ye.V. Basenko (2010), S.Ye. Bebinov (2001), I.V. Volobuyeva (2006), V.A. Gradusova (2009), A.Yu. Rybak (2007), Ye.G. Singurindy (1982), Ye.S. Tsygankova (2008, 2009), Tikhonova N.V. (2014) [13] and other authors, in which peculiarities and specificity of training of qualified sportsmen are described. Among foreign authors we can list researches by Meistelman C., Savourey G., Besnard Y. [11]; Schneiders A.G. et al. [12]; Tranter P., Lowes M. [14]; Walker S.M., Ackland T.R., Dawson B. [15]. However, status of development of technical and applied kinds of sports has been still insufficiently studied.

The research has been fulfilled in compliance with Topical plan of scientific & research works of Kharkov state academy of physical culture for 2013-2015, topic "Perfection of sport training of sportsmen on technical and applied kinds of sports".

Purpose, tasks of the work, material and methods

The purpose of the research is studying of technical and applied kinds of sports' status in physical culture organizations of Ukraine.

The methods and organization of the research: in the course of our researches we used complex of general scientific methods, including analysis of literature sources and documents, methods of systemic analysis, methods of mathematical processing of data. In this work we presented results of analysis of scientific-methodic literature, statistical reports of Ministry of youth and sports of Ukraine, of physical culture administration boards, administrations of education and science, internet sites of association of assistance to defense of Ukraine, Sport Committee of Ukraine.

Results and discussions

Technical-applied kinds of sports, which include: aviation kinds of sports (helicopter, parachute, sail-plane, aircraft), automobile sport, carting, bike sport, radio-sport, shooting, water-motor, diving, all kinds of sport modeling (aero-model, rocket model, ship-model) are of great importance in process of children's training for labor activity, intellectual development; they are one of powerful means of formation of harmonious, socially active personality. Technical kinds of sports solve not only a complex of health related and educational tasks, but the also facilitate

patriotic education of children because popularization of such kinds of sports is carried out by association of assistance to defense of Ukraine (AADU), which was re-organized after declaration of independence of Ukraine in 1991 from Voluntary association of assistance to army, aviation and fleet (VAAAF) and by federations and sport clubs. AADU was formed for ensuring of proper conditions for military-patriotic education of youth, development of technical and applied kinds of sports, training of future warriors in military, military-technical, aviation and marine specialties. AADU cultivates and develop more than 20 technical and applied kinds of sports – automobile sports, radio, sports on water, all round events, service dogs’ training and other. For years of Ukrainian independence, sportsmen of AADU won at world and European championships 1 120 gold medals, 1 076 – silver and 847 bronze medals (Sport Committee of Ukraine: <http://www.scu.org.ua/>; Association of assistance to defense of Ukraine: <http://www.scu.org.ua/>).

AADU fruitfully cooperates with local administrations and social organizations in carrying out of measures of All-Ukraine relay-race “In honor of liberators of Ukraine” and All-Ukraine military-patriotic game “Zarnitsa”, which are conducted in order to form patriotism of rising generation, acquiring of skills, required by defender of Motherland, by schoolchildren and cultivation of proper qualities in disciples of secondary education system.

As it was noted in work by M.A. Lukash (2012), since 60-s, in USSR, with support of VAAAF technical and military-applied kinds of sports had actively developed and had been very popular among children and youth; there had been created necessary conditions for trainings and formed a system of sport competitions of different levels. As on today, AADU created sport-technical complexes, centers and clubs, in which sport training of children and youth is realized. For example, in Ukraine 13 026 of primary organizations are functioning and they involve nearly 2 million of citizens. In Kharkov and Kharkovska region there are 19 technical training centers, 8 technical sport clubs, 5 training centers, among them aero-club, named after V.O. Gryzodubova, Kharkov combined technical school, carting club “Pioner”, disciples of which take part in competitions of different levels, including international. Besides, in Kharkov, by public and private initiative there were created carting clubs “Leader”, “Dafi”, “Metallist” (Sport Committee of Ukraine: <http://www.scu.org.ua/>; Association of assistance to defense of Ukraine: <http://www.scu.org.ua/>). It should be noted that on base of Kharkov state academy of physical culture International seminars on optimization of training process in technical kinds of sports are conducted.

In modern Ukraine technical and applied kinds of sports has become very popular. As per statistical data [Report of Ministry of youth and sports of Ukraine for 2013: <http://www.kmu.gov.ua/sport/control/>] quantity of disciples increased by 6% (1720 persons) in 2013 from total quantity of trainees in technical-applied kinds of sports in respect to 2012 and is now 30 484 persons (see table 1).

Table 1

Development of technical and applied kinds of sports in physical culture organizations of Ukraine in 2013

Вид спорта	Quantity of trainees in technical and applied kinds of sports				
	Total	Including			
		HTT	CJSS, SCJSSOR	SC	Circles
Aero-model	2377	298	24	1118	937
Automobile sports	2465	28	111	2238	88
Car-model sports	657	0	69	433	155
All round events of body guards	21	0	0	21	0
Helicopter sport	6	0	0	6	0
Military sport all round events	7274	703	120	3300	3151
Water- motor sport	780	0	22	758	0
Pigeon training sport	302	60	0	212	30
Delta gliding sport	128	0	0	109	19
Carting	1151	0	59	651	441
Aircraft sport	52	0	0	52	0
Marine all round events	236	0	122	8	106

Вид спорта	Quantity of trainees in technical and applied kinds of sports				
	Total	Including			
		HTT	CJSS, SCJSSOR	SC	Circles
Motor-ball	407	0	0	407	0
Biking sport	1325	123	92	831	279
Para-sail plane sport	1019	0	0	1019	0
Parachute sport	2665	34	0	2511	120
Diving	1762	35	805	843	79
Sail plane sport	104	0	0	58	46
Aeronaut sp[ort]	170	20	0	150	0
Applied fire-fighting sport	2688	272	0	561	1855
Radio sport	2174	0	216	1621	337
Rocket-model sport	854	4	11	337	502
Dogs' training sport	898	250	0	610	38
Sport of super light flyers	15	0	0	15	0
Ship model sport	954	0	26	395	533
Total	30484	1827	1677	18264	8716

It should be noted that the highest increment of quantity of disciples was registered in sport military all round events. In 2013, quantity of trainees increased by 2663 in comparison with 2012. Also quantity of trainees in para sail plane sport increased by 942 persons, in aero-model – by 382 persons, in motor ball – by 299 persons, in rocket model sport – by 194 persons and in diving – by 191. From the above presented we can see that military-sport all round events are the most popular among children and teenagers of Ukraine – quantity of trainees in 2013 was 23.9% from total quantity of disciples. Besides, 8.8% of youth train applied fire fighting sport, 8.7% - parachute sport, 8.1% - automobile sport, 7.8% - aero-model sport, 7.1% - radio sport, 5.8% - diving [Report of Ministry of youth and sports of Ukraine for 2013: <http://www.kmu.gov.ua/sport/control>].

Analysis of statistical reports of Ministry of youth and sports of Ukraine showed that the most mass indicator of trainees' quantity belongs to sport clubs, which cover 18 264 children and teenagers (see table 1).

Conclusions:

Conducting of measures on further development of technical, aviation and applied kinds of sports will facilitate education of comprehensively developed, physically strong people, formation of population's, first of all, rising generation's steady interest and demand in technical creativity, preparation of youth for military service and active labor functioning.

In Ukraine, in 2013 quantity of trainees in technical, aviation and applied kinds of sports increased by 6%, including youth of pre-mobilization and mobilization age. The most popular kinds of sports among children and teenagers are military all round events, applied fire-fighting, parachute sport, automobile sport, aero-model, radio sport and diving.

Active attraction of different population's strata to trainings of technical, aviation and military applied kinds of sports, increasing of quantity of having show character measures, will facilitate propaganda of healthy life style, overcoming of drug-taking, alcoholism, smoking and other harmful habits, increasing of workability and human life's quality.

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IMPROVED GENERAL PHYSICAL FITNESS OF YOUNG SWIMMERS BY APPLYING IN THE TRAINING PROCESS OF ENDOGENOUS HYPOXIC BREATHING TECHNIQUES

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Annotation. *Purpose:* to examine the effect of general physical preparedness of young swimmers in the body artificially created state hypercapnic normobaric hypoxia. *Material:* the study involved 21 swimmer aged 13-14 years with sports qualifications at third and second sports categories. *Results:* the original method of working with young swimmers. Studies were conducted for 16 weeks a year preparatory period macrocycle. The average value of the index on the results of general endurance races 800m improved by 2.80 %. 8.24 % increased speed- strength endurance and 18.77 % increased dynamic strength endurance. During the period of formative experiment performance speed, agility, static endurance, flexibility and explosive strength athletes first experimental group was not significantly changed. *Conclusions:* it was found that the use of the proposed technique provides statistically significant increase in overall endurance, speed strength endurance and dynamic strength endurance.

Keywords: *swimming, hypoxia, hypercapnic, physical, preparedness.*

Introduction

Physical preparation of swimmers is a major part of the sports training that is sent to the improvement of physical abilities [5]. Forcing of process of physical preparation of teen age's swimmers on the previous base stage preparation due to the increase of volume and intensity of the training load can disrupt the balanced activity of those organism's functional systems, which are determinative for the process of the physical improvement of sportsman on the next stages of long-term training, and at the same time can negatively influence on the dynamics of sports achievements [3,5,6,7]. Therefore in our opinion it is necessity to search additional ways which would strengthen the effect of physical activities without the increase of volume and intensity of training work.

The sportsman's ability to demonstrate sports mastery in swimming is predefined by ability effectively perform physical work in the state of the so-called hypermetabolic hypoxia(hypoxia of physical activity) [4,5]. Therefore in sport practice there is a necessity of search and application of methods and techniques that held to improve the adaptation of sportsmen to the hypermetabolic hypoxia. One of such methods is training in mountains in height over 1500 m above a sea level. However with the increase of height the partial pressure of gases in the inhaled air is directly proportional reduced and that lead to the decline of efficiency of muscular activity in the conditions of highland as a result decrease of the gradient pressure is negatively influencing on the transport of oxygen to tissue. Using of such model of the hipoxic training by sportsmen-teenagers are especially dangerous, because the improving of sports mastery of young sportsmen takes place on a background intensive alteration of organism [1,2]. According to some authors [2, 9, 10] the methodologies of creation in the organism the state of hypoxia in normobaric terms are considered safer and no less effective for the increase of physical level preparation. One of such methodologies is methodology of the "endogenous hypoxic breathing" with using the vehicle «Endohenik -01", that allows to create the state of moderate hypoxia and hypercapnia in an organism.

So, we hoped, that complex application of physical exercises and methodology of the endogenous hypoxic breathing with using the vehicle "Endohenik -01" in complex preparation of young swimmers would assist the increase their level of general physical preparation.

The results of this scientific article are the fragment of a planned research subjects of the Department of Biomedical foundations of physical education and physical rehabilitation of the Vinnitsa State Pedagogical University named after Mikhail Kotsubyns'kyi under the consolidated plan of research work of the Department of Education and Science of Ukraine in the sphere of physical culture and sports in 2011-2014 on the topic 9027 "The optimization of the process of improving the physical and functional preparation of students and pupils by physical activities of different aspiration" (registration number – 0113U007491).

Purpose, tasks of the work, material and methods

To set the efficiency of influence of artificially body condition of normobaric hiperkapnic hypoxia on general physical preparation of young swimmers.

Task:

1. To determine the influence of physical activities according the program for CYSS (Children and Youth Sports School) without and with the application of methodology of the endogenous hypoxic breathing on general physical preparation of teenagers in a preparatory period of annual macrocycle.

The methods and organization of the research.

For the decision of put tasks such methods were used: review of literature, pedagogical observation, pedagogical experiment, pedagogical testing of the special physical preparation and methods of mathematical statistics.

Before the beginning of forming experiment sportsmen had passed a typology selection and by the method of random sampling were divided into two groups - control (CG, n=10) and basic (BG, n=11). All swimmers were training 6 times a week according to the typical program of sports preparation for CYSS. Sporting experience of investigated was 4-5

years, and qualification at the level of the second and third sports class. The difference between the classes for sportsmen of basic group is consisted of application during every training on the land the methodology of the endogenous hypoxic breathing (EHB) with using the vehicle " Endohenik -01" according to the so-called "route maps", that caused in an organism the state of moderate hypoxia and hypercapnia at the constant parameters of the oxygen content (of 18%) and carbon dioxide (3%) [8].

The inspection for swimmers was conducted during preparatory period of annual macrocycle in three stages: before the experiment and after 8 and 16 weeks from the beginning. During 16 weeks of forming experiment we were studying a complex influence of trainings and methodology of the endogenous hypoxic breathing on general physical preparation of swimmers 13-14 years old. For the estimation of general physical preparation we used next test exercises: running on a 60 m and 800 m, long jump from a place, raising in sitting from the position of lying after 1 min, "trick" by direct hands, shuttle run 4 x 9 m, bending and unbending of hands during lying, hang on bent arms.

For determination the efficiency of influence the complex application on physical activity and methodology of the endogenous hypoxic breathing on physical preparation of young swimmers we compared the mean arithmetic values of the constrained selections, and reliable differences between them were determined by Student's test.

Results of the researches

The results of the state experiment of general physical preparation of the control and experimental groups were not significantly different ($p > 0.05$) (Table 1, Table 2). The results of the research indicate that after 8 weeks from the beginning of the experiment in control (CG) and basic (BG1) groups probable developments of general physical preparation have not been identified. However, after 16 weeks from the beginning of the experiment in the control group speed-strength endurance is increased on 8,21 % by the number of times raising in the sitting from the laying position for 1 min ($p < 0.05$), and dynamic strength endurance of the shoulder zone muscles is also increased on 8,21 % by the maximum possible number of times bending and unbending hand during lying (at 22.86 %, $p < 0.05$).

Table 1

Swimming training influence according to the program of CYSS on general physical preparation of group's swimmers CG (n=10)

Tests	Average quantity, $\bar{x} \pm S$			T	
	before the beginning of the training	after 8 weeks from the beginning of the training	after 16 weeks from the beginning of the training	after 8 weeks	after 16 weeks
"Trick" by direct hands ,cm	55,0±2,2	54,2±2,49	53,0±2,17	0,24	0,65
Running 60 m, sec	9,7±0,25	9,64±0,24	9,5±0,24	0,35	0,59
Running 800 m, min.	3,433±0,03	3,417±0,02	3,404±0,02	0,44	0,81
Long jump from a place, cm	179,3±4,87	181,0±4,33	182,7±4,11	0,26	0,53
Raising in sitting from the position of lying after 1 min, sec	46,3±1,19	47,1±1,62	50,1±1,08*	0,4	2,36
Bending and unbending of hands during lying, times	17,5±1,3	19,0±1,08	21,5±0,97*	0,88	2,47
Shuttle run 4x9 m, sec	10,9±0,2	10,86±2,38	10,83±0,24	0,02	0,3
Body's bend forward from the sitting position, cm	7,5±0,97	8,1±0,87	8,3±0,76	0,46	0,65
Hang on bent arms, sec	21,0±2,49	22,1±2,6	22,3±2,6	0,31	0,36

Remarks. Probable difference of the relative quantities recorded prior to forming experiment: * - $p < 0.05$

Trainings according to the program of sports training for youth swimming schools during the experimental period for the sportsmen in control group did not assist the increase the indexes of general endurance after the result of running on 800 m, static endurance by test with hanging on bent arms, speed results on running at 60 m, flexibility as a result of "trick" by direct hands, explosive power as a result of the long jump from a place and agility after the result of «shuttle run» 4x9. Unlike the sportsmen in the control group, the first basic group swimmers who used the "EHB" methodology during the training and after 16 weeks from the beginning of the experiment significantly increased formative indicators of general endurance, speed-strength endurance and dynamic strength endurance (Table 2).

Table 2

Swimming training influence according to the program of CYSS with using methodology of EHB on the testing results of general physical preparation of group's swimmers BG (n=11)

Tests	Average quantity, $\bar{x} \pm S$			t	
	before the beginning of the training	after 8 weeks from the beginning of the training	after 16 weeks from the beginning of the training	after 8 weeks	after 16 weeks
"Trick" by direct hands ,cm	53,18±2,49	52,73±1,97	52,09±1,97	0,14	0,34
Running 60 m, sec	9,2±0,2	9,18±0,17	9,16±0,15	0,08	0,16
Running 800 m, min.	3,431±0,03	3,375±0,02	3,335±0,02*	1,4	2,4
Long jump from a place, cm	188,18±4,83	190,27±4,93	191,91±4,63	0,3	0,56
Raising in sitting from the position of lying after 1 min, sec	42,0±0,986	43,27±1,38	45,46±0,89*	0,75	2,6
Bending and unbending of hands during lying, times	18,91±0,986	20,55±0,79	22,46±0,79*	1,30	2,82
Shuttle run 4x9 m, sec	10,66±0,25	10,58±0,22	10,55±0,21	0,05	0,33
Body's bend forward from the sitting position, cm	10,18±1,18	10,64±1,08	10,7±0,99	0,29	0,34
Hang on bent arms, sec	19,46±2,07	20,36±2,07	20,73±2,07	0,31	0,43

Remarks. Probable difference of the relative quantities recorded prior to forming experiment: * - $p < 0.05$

The average quantity of the index for general endurance race results at 800 m improved to 2.80%, the 8.24% increase in speed-strength endurance and increased to 18.77% dynamic power endurance. However, during the period of forming experiment speed, agility, static endurance, flexibility and explosive power indexes in first experimental group sportsmen did not change significantly ($p < 0,05$).

Conclusions:

Trainings according the program of sports training for youth swimming schools improve speed-strength and dynamic strength endurance. Complex application of physical exercises and artificially created state of moderate hypoxia and hypercapnia in the swimmers body of 13-14 years in the preparatory period of annual macrocycle on the stage of previous basic training allows you to increase not only the speed-strength and dynamic strength endurance, but overall endurance.

It is planned to conduct the research of the efficiency of the artificial creation the hiperkapnich hypoxia state in an organism on specific functional physical preparation of 13-14 years old swimmers.

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THE RELATIONSHIP BETWEEN ATHLETIC IDENTITY AND SPORTS PERFORMANCE AMONG NATIONAL ROWERS DURING DIFFERENT SEASONS OF COMPETITION

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Annotation. *Aim:* Psychologists believe that mental skill like any other skill, can be taught and practiced, and without making use of this factor, it is impossible to achieve peak performance; therefore, elite athletes in different levels and their coaches, shall know about practical concepts and methods of developing mental skills. So, the purpose of this study is to investigate the relationship between athletic identity and sports performance among national rowers during different seasons of competition. *Methods:* Forty athletes (20 females and 20 males) who were members of the national team with the age mean 23/67 ($\pm 3/71$) participated in this correlation research. The statistic sample of this investigation was chosen with a special purpose. Athletic identity was measured by Brewer Athletic Identity Questionnaire (AIMS) (1999), and sports performance was measured by 4 physical fitness tests and 4 Proficiency tests in 6 respective stages. The data was analyzed by descriptive statistics, Pearson correlation and Multivariate regression analysis coefficient with $P < 0.05$. *Results:* The results indicated that there was positive correlation between sports performance and athletic identity during different seasons of competition ($P < 0.05$), but this amount of correlation was different in different seasons of competition. There was significant correlation between athletic identity and sports performance only during the seasons. The results indicated that athletic identity at the end of the training season is a good predictor for athletics success in competition season ($P < 0.05$; $f: 7/12$). So that 48% of athletic performance in competition season can be predicted from athletic identity scales at the end of the training season. *Conclusion:* Athletic identity increased as sports performance was enhanced; indicating that there was a significant correlation in this season because of its importance for the athletes. Athletes know that if they have good performance, their role of being an athlete or their athletic identity is stabilized.

Keywords: performance, athletes, identity, rowing.

Introduction

Psychologists believe that mental skills like any other skills, can be taught and practiced, and without making use of this factor, it is impossible to achieve peak performance; therefore, elite athletes in different levels and their coaches, shall know about practical concepts and methods of developing mental skills. As a result, today's coaches and athletes try to make use of scientific achievements and psychological techniques in order to improve their performance and achieve greater success. For this end, sport psychology always considers the two matters of mental health and improving athletic performance (Nili et al. 2011). Nowadays, an important discussion in the science of psychology is "identity". Today the subject is so important that it has become a main chapter in social studies and has gained a specific status in the theories and researches of social psychologists. Identity has multiple definitions and among these synonymous meanings such terms as "subjective I", "objective I", "we", "cognitive self", "self-image", "self-representation", "self awareness", "self-identity", "self (I)", "superior I" and "personality" could be mentioned (Weinberg et al. 2011). There have been different types of identity and athletic identity is one of them, so that by 1980, athletic identity has been associated with a variety of attitudes and behaviors. Coaches have through the years tried to gain a real knowledge of their athletes' identity in order to help them achieve greater success. In this field, athletic identity has gained an important status (Baysden et al. 1997).

Athletic identity as part of a great self-concept is able to accurately define roles, attitudes, beliefs and behaviors of the athlete and could be considered the base of self-esteem and value that the athlete regards for the role of "self" (Engels et al., 2006). Brewer et al., (1999), states that athletic identity is the degree by which individuals regard themselves as playing the role of an athlete and he believes that high levels of involvement in athletic performance can create high degrees of commitment in them and consequently the athletes consider themselves as perfect athletes. People with high levels of athletic identity, set the value of "self" based on athletic performance and tend to boost their self-esteem through strong athletic identity that later in case of achieving the elite level (such as professional, national, and Olympic level) it develops further. Consequently, most athletes strengthen and adjust their identity based on their achievements in sports (Craft et al., 2008). Research shows that having a strong athletic identity is essential for success in advanced levels of sport. Studies indicate that strong athletic identity leads to more commitment and practice, positive effects on the performance of the athlete, development of social relations and concentration on the goals related to sport (Craft et al., 2008; Danish et al. 1983). Just as strong athletic identity would create much commitment in the role of an athlete, in some occasions it causes risks and too much practice. Practicing more than limit is a behavioral model and an emotional condition that more often leads to anxiety, non-workout (in injury and rest) and can lead to using drugs for reinforced function (Grove et al., 2004). Lally., (2007), studied the athletic identity of fifty university swimmers in different seasons (before the season, in preparation season, during competition season and after the season). The results of his study show that swimmers have higher athletic identity during the competition season and after the season compared to the preparation season and before the competition season. On this basis, Lally., (2007),

suggested that competition season be controlled by researchers as an influential variable. Heerden et al., (2007), found no association between athletic identity and performance.

Brewer et al., (2010), studied the changes of athletic identity on injured athletes for 6 months and he stated that the structure of athletic identity was variable and changed as a result of changes in the environment and the conditions of the athlete. Based on what was said, attention to athletic identity is among the factors that influence professional success; since national team athletes face various situations and conditions during the preparation camp and competition season and after it, and athletic identity is a variable factor (Nili et al., 2011), the assessment of its relationship with performance in different seasons seems essential. Despite the importance of this factor in the success of the champions (Nili et al., 2011) this area has been examined less. Given the little research and uncertainties among interested coaches and researchers, this study was designed to answer some questions. The main objectives of this research are:

- 1) to determine if there is any relationship between athletic identity and athletic performance of the canoe squad before the competition, during the competition and after the competition?
- 2) To discover if athletic identity predict the success of athletes in different seasons?

Material and Methods

This research is fundamental by general subject and purpose and in terms of method, and is semi-experimental because of investigating the effect of the independent variable of competition seasons that have 6 levels, and is of correlation type due to the investigation of the relationship between the variables. The statistical population included all athletes of national canoe squad in different fields from among whom 40 female and 65 male athletes all members of the national team were purposefully selected as sample based on their specified number in the national team. After explaining the purpose of the research and methodology, their informed consent was obtained, then an athletic identity questionnaire and sport tests of exercise performance during the following six stages were taken: 1) initially entering the camp (3 months), 2) half-season training (3 months), 3) end of the exercise season (3 months), 4) the season (one week), 5) one week after the season, and 6) a month after the season. The study lasted for 1 year.

Measures

Brewer et al., (1999), Athletic Identity Measurement Scale (AIMS) was used to collect information on athletic identity. The questionnaire was first designed in 1993 by Brewer and its validity was tested by Nili and Hadian in Iran. There were 10 questions and the maximum points that could be acquired by athletes were 70. Questionnaire validity was 0.81 and its time reliability were obtained 0.89 through test-retest during two weeks. To collect data about athletic performance, four physical fitness tests (push-up test, sit-up test, running endurance test, chest press test) and 4 skill tests for the discipline (rowing speed test, dribbling test, test of shooting skill from different points, and combined test) were used. For greater certainty, 12 face validity experts confirmed the tests.

Analysis

To summarize and classify the data, descriptive statistic methods (mean, standard deviation) were used. For data analysis, Pearson correlation and regression analyzes were used to predict the performance. Because the scores of athletes' performance test had different measurement units, first, the standard score (Z) for each of them was calculated, then standard scores (Z) of physical fitness and skill were added, and the mean score was considered as a sport performance score. The data was coded, edited and analyzed using SPSS software.

Results

As shown in table 2, there is positive correlation between sports performance and athletic identity during different seasons of competition ($P < 0.05$), but this amount of correlation is different in different seasons of competition and rest. There is significant correlation between athletic identity and sports performance only during the seasons (R ; 0.539 & P ; 0.4).

Table 1

Mean and standard deviation for athletic identity and sport performance

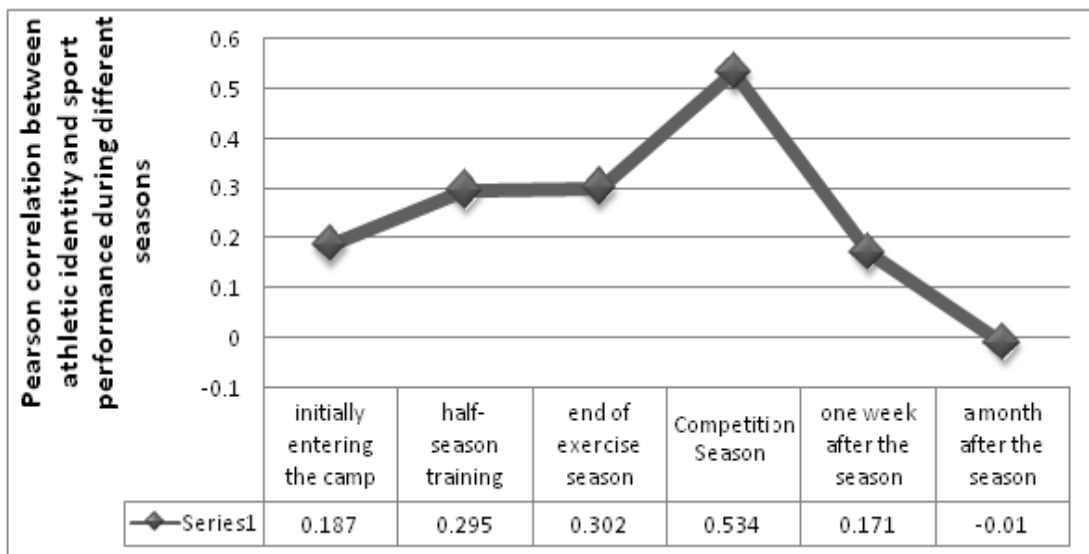
Six stages	Athletic identity		Sport performance	
	mean	S.D	mean	S.D
initially entering the camp	49/32	10/27	0/00	2/29
half-season training	53/90	5/56	0/00	2/40
end of exercise season	58/55	23/45	0/00	2/20
Competitions season	50/58	7/89	0/00	2/18
one week after the season	58/35	2/72	0/00	1/75
a month after the season	51/35	60/01	0/00	2/49

Table 2

Pearson correlation between athletic identity and sport performance among national rowers during different seasons of competition

six stages	Correlation coefficient	sig
initially entering the camp	0/187	0/429
half-season training	0/295	0/206
end of exercise season	0/302	0/248
Competitions Season	*0/534	*0/040
one week after the season	0/171	0/415
a month after the season	-0/01	0/601

As shown in graph 1, athletic identity increases, as sport performance enhanced and when athletic identity decreased, sport performance decreased in the rest season. This represents that there is positive correlation between sports performance and the athletic identity during different seasons of competitions.



Graph 1: Proceeding changes of correlation between athletic identity and sport performance among national rowers during different seasons of competition

The multiple regression was conducted using the enter method. As shown in Table 3, the adjusted R2 represents that the contribution of the athletic identity in the end of exercise season explains 39.2% of the variances in task orientation. The Beta weights show that, of the one variable in the model, athletic identity in end of exercise season had the strongest influence on task orientation with a value of 0.47 (p=0.001). The Beta weights for athletic identity when initially entering the camp, athletic identity in half-season training and athletic identity in competitions season suggested that they had no influence on task orientation.

Table 3

Linear regression for predicting the performance in the competition season due to athletic identity

Model	P	F	R2adj	Beta
Athletic identity in end of exercise season	0.016*	7.12	0.392	0.478*
Athletic identity when initially entering the camp				

	0.270			-0.209b
Athletic identity in half-season training	0.952			0.012b
Athletic identity in competitions season	0.249			-0.221b

Discussion

One goal of this study was to investigate the relationship between athletic identity and athletic performance in the national squad rowers in different competition seasons. Based on the research findings, athletic identity and athletic performance are directly related, but this relationship was only significant and strong in the competition season ($r=0/534$, $P=0/040$). It seems that significant relationship in this season is due to the importance of the time of this season, because the athlete knows that in case of good performance and achieving proper result, their athletic role will become strong and stabilized. The findings of this research are in agreement with researches conducted by Chezlak., (2004), Danish et al., (1998) and Grove et al., (2004). Chezlak., (2004), reported that individuals with high athletic identity set the value of "self" based on athletic performance and tend to boost self-esteem and self-image through their strong athletic identity which later in case of achieving the elite level (professional, national and Olympic levels) it develops further. Finally, most athletes strengthen their identity based on their success. Danish et al., (1998), stated that having a strong athletic identity is essential for success in high athletic levels. Investigations show that high athletic identity leads to more commitment and practice, positive effects on athletic performance, progress of social relationships and focus on athletic related goals.

Another purpose of this study was to investigate the effect of athletic identity in predicting the performance of athletes in national rowing squad in competition season. The results show that the performance of athletes in the competition season could be predicted by athletic identity at the end of the exercises season (0.487). Just as the beta coefficient of regression model shows, athletic identity at the end of exercises season (before the competition) is a better predictor of changes in athletic performance of national squad in the competition season. This finding can be justified with the presupposition that at the end of the exercise season, the individual cares most about their athletic role based on the spent time and the conditions of the camp and at this time, the athletes benefit from both internal factors (personal identity, monopolization) and external factors (social identity) of athletic identity. Maintaining an optimal level of athletic identity in this season could be a predictor factor for athletic performance in the competition season. The general conclusion is that athletic identity and athletic performance of the athletes in the competition season are significantly and positively related. In other words, in this season, because of higher athletic identity, the athletic performance improves. On the other hand, athletic identity at the end of the exercise season can somewhat predict athletic success. It is therefore suggested that sport psychologists pay special attention to this factor in the competition season and further emphasize on the athletic role of the athletes especially the external dimension, i. e. the social identity or being identified by the society as athlete in order to improve athletic performance. This suggestion is consistent with the results of Brewer et al., (1999), indicating that exercise requires commitment and competing with other athletes and usually needs limiting other activities. The predictive power of this factor can be used by coaches to achieve success and it can also be used at the time of selecting athletes. Consequently, high athletic identity can help an athlete achieve optimal athletic performance.

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ASSESSMENT OF EFFECTIVENESS OF SPORTS MASSAGE IN SUPPORTING OF WARM-UP

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Annotation. *Purpose:* Warm-up is necessary part of sports training, because prepare the body for exercises and minimize the risk of injury. The aim of this study was assess the effectiveness of two types of warm-up: aerobic exercises and exercises with sports massage (before). *Material and Methods:* The research covered 59 women. All of them did fitness tests two times. Each test was preceded by a different form of warm-up (aerobic exercises, exercises with massage). For examined the differences t-Student test was used. *Results:* Warm-up with massage had positive effect for fitness level. More effective was exercises preceded by massage – differences in results (after the standard warm-up and warm-up with massage) in every tests were significant ($p < 0.001$). *Conclusion:* Alternative form of warm-up can be effective way to preparing the body for exercises and make the training more attractive.

Key words: warm-up, sports massage, fitness, women.

Introduction

Properly conducted training consists of three main elements: warm-up, actual exercises and cool-down [1]. Warm-up is considered to be an indispensable element of preparation to each physical activity, however, according to some authors, such as Bishop or Fradkin, there is little scientific evidence proving its effectiveness [2, 3, 4].

Warm-up techniques may be divided into two categories: passive and active warm-up. Passive warm-up is based on the application of external factors, such as hot shower, sauna, bath, diathermy, or warm compress. Passive warm-up does not cause the body to lose its energy substrates. On the other hand, there is active warm-up, which assumes properly selected physical exercises, which may include jogging, gymnastics, cycling, or swimming. Stretching is also an important element of a successful warm-up, since it prevents muscles from being damaged. However, this type of warm-up is usually applied when preparing for sports trainings and their effects [5, 6].

The main purpose of a warm-up is to increase the inflow of blood to the muscles, providing working muscles with an additional supply of oxygen and nutrients and raising their temperature to the optimal value of approximately 37°C [1, 2, 7]. Of course we should remember, that core temperature is generally close to about 37°C, while the temperature of the surface of the body can be much more diversified and lowered as a result of exercises. It's an effect of the perspiration and returning heat by working muscles [8]. Moreover, warm-up reduces muscle stiffness and increases the number of stimuli in motoneurons. Moreover, warming up exercises applied prior to physical activity also aim at increasing the effectiveness of thermoregulation through the activation of sweat glands. Thanks to such mechanisms, a warm-up alone does not result in raising internal body temperature [1, 5, 7].

Properly conducted warm-up should take from 5 to 20 minutes, depending on the type of exercises to be performed. Short warm-up is usually applied when preparing for endurance training. Long warm-up, on the other hand, is applied when preparing for intensive power and speed exercises. It should be emphasized, however, that, in order not to waste the effects of preliminary exercises, the interval between the end of warm-up and the beginning of training should not exceed 15 minutes [1, 7].

The primary purpose of the research was to evaluate the effectiveness of two forms of warm-up exercises (standard warm-up – based on general developmental exercises and sports massage of the lower limbs preceding proper warm-up) in preparing for physical exercises.

Material and Methods

The research covered 59 women attending fitness classes on a regular basis (at least three times a week). The age of women participating in the research was 29.3 (± 11), in average. Their average height was 166.9 cm (± 4.8) and their average body weight was 61.7 kg (± 6.3). For comparative purposes, the research group was divided into sub-groups, in which the criterion for division was:

- age – women after the age of 30 ($n=25$) and before the age of 30 ($n=34$),
- training experience – women with less than a year's experience in exercising ($n=35$) and women with more than a year's experience in exercising ($n=24$),
- exercising in the past – women who exercised in the past ($n=29$) and women who did not exercise in the past ($n=30$).

All women participating in the research received two various forms of preparation to physical exercise: standard warm-up and warm-up preceded by sports massage of lower limbs. After having received all types of warm-up, the women underwent fitness tests and filled in survey questionnaires.

Standard warm-up was the first type of preparation to physical exercise. Here, the warm-up was based on copying steps from aerobics to the rhythm of music. The recommended tempo of music was 130-135 BPM. The exercise consisted of the following steps: march in place, toe step, step touch, twice, hill back, knee up, grapevine, which additionally engaged the upper limbs. The steps were arranged in a simple choreographic block, suitable for any exercising person. Then, additional stretching exercises for neck, shoulder, trunk and lower limb muscles were introduced. To close the session, several breathing exercises were performed. This warm-up took approximately 10 minutes [9].

The second form of preparation to physical exercise was sports massage of the lower limbs followed by standard warm-up (described above). The massage was performed manually. The duration of the procedure was approximately eight minutes (four minutes for each leg), and the position, in which the massage was performed was sitting with legs bent. The massage was a power massage applying the following techniques: sliding, compression, kneading, percussion [10, 11, 12, 13].

After having performed all forms of warm-up, the women were asked to undergo specific fitness tests, the results of which were entered to special data sheets. The intervals between particular evaluations were seven days [14].

Four fitness tests were carried out as part of the research: a power test – long jump from standing (the length of the jump was measured), a test of suppleness – a bend to the front performed on a bench (the distance of the tip of the longest finger to the ground was measured), a speed test – a 10-second run in one spot, clapping hands below the knees (the number of claps decided on the result) and an physical efficiency test – the Ruffier Test (the Ruffier coefficient was used to evaluate the results of the test). The Ruffier Test was based on performing 30 squats in 30 seconds and monitoring pulse during the rest immediately following the exercise and after one minute of the rest. The Ruffier coefficient is calculated basing on the following formula [14]:

$$IR = [(P + P1 + P2) - 200]/10$$

IR – Ruffier Index

P – resting pulse

P1 – pulse measured immediately after the test

P2 – pulse measured after 1 minute of the rest

Standard statistical analysis methods were applied in evaluating empirical data. The results of particular fitness tests were presented with the use of arithmetic means (\bar{x}), taking into account the standard deviation (SD) factor. The significance of disparities between couples of variables were evaluated using the t-Student test for dependent groups, assuming $p < 0.05$ as the minimal significance level.

Results

Standard warm-up basing on aerobic exercises (without massage) proved to be the least effective method of preparing to physical exercises, compared to applying massage. Women applying sports massage acquired considerably better results ($p=0.000$) in all tests (tab. 1). The biggest disparities were recorded in the results of the speed test, and the smallest ones – in the physical efficiency test. The most beneficial results in all fitness tests were achieved with warm-up preceded by sports massage.

Analyzing the results of particular sub-groups, it may be claimed that non-standard form of preparation to physical exercise (warm-up preceded by massage) had greater impact on women under the age of 30. The biggest differences in all sub-groups were recorded with respect to power, flexibility and speed tests. Massage had the slightest impact there – particularly among younger women with smaller experience in training (tab. 2).

Table 1.

Average results (with SD) of fitness tests preceded by two kind of warm-up

	Aerobic exercises		Exercises with massage		Difference [p]
	mean value	SD	mean value	SD	
POWER long jump [cm]	132.47	19.9	146.45	19.1	0.000
FLEXIBILITY deep bend [cm]	1.67	10.1	7.93	9.5	0.000
SPEED run with tapping [n of tapping]	28.12	4.7	34.55	4.7	0.000
PHYSICAL EFFICIENCY Ruffier Test [IR]	9.27	3.7	6.74	3.5	0.000

Table 2

Results of fitness tests preceded by two kind of warm-up in subgroups

subgroups	kind of warm-up	POWER long jump [cm]	FLEXI-BILITY deep bend [cm]	SPEED run with tapping [n of tapping]	PHYSICAL EFFICIENCY Ruffier Test [IR]
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persons over 30 years old	only exercises	117.5	0.3	24.6	7.72
	massage	133.78 **	5.89 ***	31.89 ***	5.74 *
persons under 30 years old	only exercises	137.13	1.37	29.38	9.42
	massage	150.09 ***	8.41 ***	35.32 ***	6.78 ***
subgroups	kind of warm-up	POWER long jump [cm]	FLEXI-BILITY deep bend [cm]	SPEED run with taping [n of tapping]	PHYSICAL EFFICIENCY Ruffier Test [IR]
persons practicing under 1 years old	only exercises	135.25	-0.1	28.7	9.86
	massage	149.56 ***	5.78***	35.72 ***	6.8 ***
persons practicing over 1 years old	only exercises	128.5	4.21	27.28	8.43
	massage	142.15 ***	10.92 ***	32.92 ***	6.67 **
subgroups	kind of warm-up	POWER long jump [cm]	FLEXI-BILITY deep bend [cm]	SPEED run with taping [n of tapping]	PHYSICAL EFFICIENCY Ruffier Test [IR]
persons practicing sport in the past	only exercises	141.55	5.25	29.1	9.36
	massage	154.06 ***	11.72 ***	34.83 ***	7.22 ***
persons not practicing sport in the past	only exercises	116.79	-4.92	26.35	8.29
	massage	133.31 ***	2.08 ***	33.61 ***	5.45 ***

* p<0.05; ** p<0.01; *** p<0.001: differences between measurement after standard warm-up and warm-up with massage

Discussion

Increased physical activeness has beneficial effect on the health of every human being. This is because particular systems and organs are activated and exercised as a result of changes occurring in the course of and after physical training. However, in order to prepare for physical exercise in the correct way, one needs to warm up properly.

Research proves that properly chosen warm-up has beneficial effect on the results of fitness tests. Proper preparation to physical exercise is also commonly applied in rehabilitation. Brzęk and Nowotny-Czupryna [15] examined how warm-up influences the results of fitness tests in patients who suffered from heart attack. Their research proved that warm-up performed prior to physical exercise has effect on the results of the submaximal strain test both in men and women. Additionally, patients suffering from cardiologic conditions who applied proper warm-up displayed increased endurance of larger strains. The next precious piece of information was the fact that warm-up preceding a strain test had considerable effect on lowering the value of maximum and final pulse [15].

The next, very important aspect of warming up before proceeding to training is injury prevention [16, 17]. Research conducted by Malliou in Greece on 404 aerobics instructors proves that proper warm-up combined with stretching and cool-down after training lowers the risk of the occurrence of personal injuries [18]. Similar conclusions were raised by Obałkowska [5], who claimed that proper warm-up has great impact on the properties of muscles, and, in result, contributes to minimizing the possibility of injuries. Research conducted by Subasi et al. [19] confirms the positive impact of warm-ups in injury prevention as well.

The results of research on the impact of massage as a preparatory element to physical exercise do not always lead to identical conclusions [20, 21, 22, 23, 24]. What is actually proven is the positive effect on the mental sphere, which is the key factor in some sport disciplines (e.g. combat sports) [22, 25, 26]. In the case of fitness tests, positive impact of massage was recorded in short-term exercises [21, 27]. In the case of the research referred to herein, the impact of massage was the smallest in the Ruffier Test measuring physical efficiency. It should be emphasized, however, that massage has undeniable impact on injury prevention.

Sports massage produce mechanic stimuli which, as such, cause numerous local and general changes in human body. Applying proper techniques, one may stimulate particular tissues: muscular and skin tissue as well as particular systems: nervous, circulatory, excretory, breathing and alimentary system. In response to massage, the body raises its temperature in the area being massaged for approx. 1.5-1.8°C. A specific direction of massage, for instance in the direction of the heart causes the blood to circulate faster from the veins and capillary vessels, thanks to which the tissues of the body part being massaged expel the products of metabolism and absorb nutrients more actively [10, 12].

The application of alternative forms of preparation to physical exercise may not only increase the effectiveness of training itself but also make the training more attractive. The primary purpose of sports or recreational training is increasing the strength and physical efficiency of the entire organism. In order to make this process more efficient, exercise must be performed on a regular basis, which could lead to monotony and boredom. Therefore, it is essential that we prepare our bodies for training on a proper way.

It seems justified that further research in this matter focused on a larger, more diversified group of people with respect to age, sex, health condition, height-weight parameters, experience in physical training, or even lifestyle. In addition, warm-up may be followed by other physiotherapeutic procedures or various forms of stretching, the results of which may also be evaluated [28, 29].

Conclusions

1. Warm-up preceded by sports massage was the most effective method of preparing to physical exercise. Active engagement of physiotherapists in preparing sportsmen to physical exercise and the introduction of massage as an element of warming up before contests could improve the psychomotor abilities of contestants.
2. Sports massage may serve as interesting supplements to traditional warm-up procedures, both for professional sportsmen, and amateurs.
3. The present results may be the basis for a prospective randomized study involving a more diverse group of people.

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**DIFFERENTIATION OF BODY COMPOSITION OF PLAYERS
OF THE POLISH NATIONAL BASEBALL TEAM**
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Annotation. The purpose of the study is to identify the differentiation of body composition among players of Polish national baseball team in comparison to persons of the same population not professionally engaged in sport. The study involved Polish baseball representatives (n=20). Competitors' age was 18-28 years, body mass from 67.7 kg to 114 kg (85±10.3 kg), and body height 173-196 cm (185.1±4.8). The training experience was 7-14 years and it was highly differentiated. The stoutness factor is the dominant factor among "infielders" and "pitchers", and among "outfielders" – the length one. The proportions of the features within the factors show that players are characterized by a strongly muscled forearm and a shank and by a clear predominance of the elbow width with a disproportionately – to the overall size of the factor – small knee and shoulder width. In the length factor an even contribution of the upper and lower extremity length with lower sitting body height can be noted. Depending on the position on the field there is a differentiation of the internal proportions of the body.

Key words: body composition, baseball, national, team.

Introduction

The problem of differentiation of body composition among top class athletes is one of the most topical problems in the theory of sports training [1, 2, 11].

As a result of years of research, a thesis has been formulated that with the increase in sports championship and hence also training experience, there is a reduction in the variability of somatic indices. In this respect, athletes within a given discipline or event become more homogenous.

In the light of the above, the main aim of the study was an attempt to identify morphological differentiation among baseball players with reference to the position on the field and to answer the following research questions:

1. What somatic factors determine the athletes' specific body composition?
2. What internal proportions of body composition are characteristic of them?

Material and methods

The study involved competitors from the Polish national team in men's baseball (n=20). Competitors' age was 18-28 years, body mass 67.7 kg to 114 kg (85±10.3 kg), body height 173-196 cm (185.1±4.8). The training experience was 7-14 years and it was highly differentiated.

Table 1.

Features of the body build of Polish men's baseball representatives (n=20) and a comparative group [10].

Features	Comparative group, n=153		Infielders, n=8		Outfielders, n=6		Pitchers, n=6	
	X	SD	X	SD	X	SD	X	SD
Body mass [kg]	72.11	8.96	88.68	14.8	83.67	5.76	81.50	5.10
Body height [cm]	179.36	6.19	186.1	7.47	184.67	1.51	184.33	2.07
Sitting body height [cm]	93.86	3.06	94.50	4.11	92.17	1.57	92.25	1.78
Length of upper extremity [cm]	78.30	3.51	81.35	3.21	79.30	0.80	79.68	1.59
Length of lower extremity [cm]	85.50	4.10	89.65	3.13	86.57	1.05	87.25	1.23
Shoulder width [cm]	40.67	1.59	40.59	2.13	39.97	2.20	39.58	2.06
Pelvic width [cm]	28.44	1.41	30.01	2.81	27.92	0.95	27.80	0.77

Elbow width [cm]	6.98	0.34	7.58	0.50	7.52	0.52	7.53	0.51
Knee width [cm]	9.82	0.45	9.96	0.72	9.18	0.72	9.15	0.69
Forearm perimeter [cm]	26.02	1.80	29.96	2.09	29.50	0.86	29.12	1.00
Shank perimeter [cm]	36.86	2.30	40.58	2.58	39.12	1.56	39.60	1.22
Sum of three fat skinfolds [mm]	33.4	14.3	8.83	1.38	24.52	2.82	24.90	2.33

Methods

The assessment of internal proportions of the body build was achieved by means of Perkal's [9] natural indicators with Milicerowa's modifications [7]. For this purpose the following were determined:

- Composition factors m – through adding values standardized within each factor and dividing the sum by the number of features identifying the given factor. The adiposity factor, which is a standardized value of fat and skin folds was an exception: $Z = m$;
- The indicator of the overall body size (M) of the group: $M = m_1 + m_2 + m_3 / 3$;
- The assessment of internal proportions of the body composition as achieved by calculating Perkal's natural indicators for each factor of the composition: $m_1 - M$; $m_2 - M$; $m_3 - M$;
- The evenness of the composition was determined by means of the intrapersonal variability indicator – the difference between the natural indicator of the highest numerical value and the natural indicator of the lowest numerical value;
- The code of internal group proportions on the basis of the point scale of Perkal's natural indicators (Table 2);
- The assessment of internal proportions of the composition features within each of the factors was made by deducting the value of the m factor from the standardized features.

The reference group was made up of students of Warsaw University of Technology [10]. Numerous scientific publications [8, 10, 12] emphasize specific comparative values of this social group in studies on the body build of Polish sportsmen. Students of the University of Technology are characterized by the greatest biological development (height and body mass) among Polish academic youth. Thus, it is the part of the population which constitutionally is the closest to sportsmen (who, as it is known, come from the most physically perfect youth).

Table 2.

<i>Point scales of Perkal's natural indicators</i>		
Points	Values of Perkal's natural indicators	
1	X do -1.07	
2	-1.06 do -0.57	values less than average
3	-0.56 do -0.18	
4	-0.19 do 0.18	average value
5	0.19 do 0.57	
6	0.58 do 1.06	values greater than average
7	1.07 do X	

Results

As a result of the study, values of body composition have been specified, which confirm in a more generalized way the observations made on the values of the standardized individual features [4] – Tab. 3.

Stoutness is the dominant factor in the body composition among "infielders" and "pitchers" (respectively: 1.16 and 0.32). "Outfielders" are characterized by a slight predominance of the length factor ($m_1 = 0.21$). Low adiposity and, in the case of "infielders", greater overall body size ($M = 0.76$) is a distinguishing factor in baseballers' body composition.

Table 3.

Factor	<i>Standardized features of the body composition of Polish men's baseball representatives (n=20)</i>		
	Positions on the field		
	infielders	outfielders	pitchers
Length m_1	0.79	0.21	0.27

Stoutness m_2	1.16	0.18	0.32
Adiposity m_3	0.32	-0.63	-0.60
Overall size index M	0.76	-0.08	0

While analyzing mutual proportions between factors of body composition in Polish baseball representatives, differences in individual groups of composition features become clear (Figure 1). "Infielders" are the most proportionately built, and the value of the intra-group variability index amounts to 0.84 with the code of internal proportions – 4-5-3. "Outfielders" also have the intra-group variability index value of 0.84, but the code of internal proportions is 5-5-3. "Pitchers " are the least proportionally built – the intra-group variability index is 0.92 and is determined by the disproportionately low contribution of the adiposity factor to the overall size of the body. The code of internal proportions is 5-5-2.

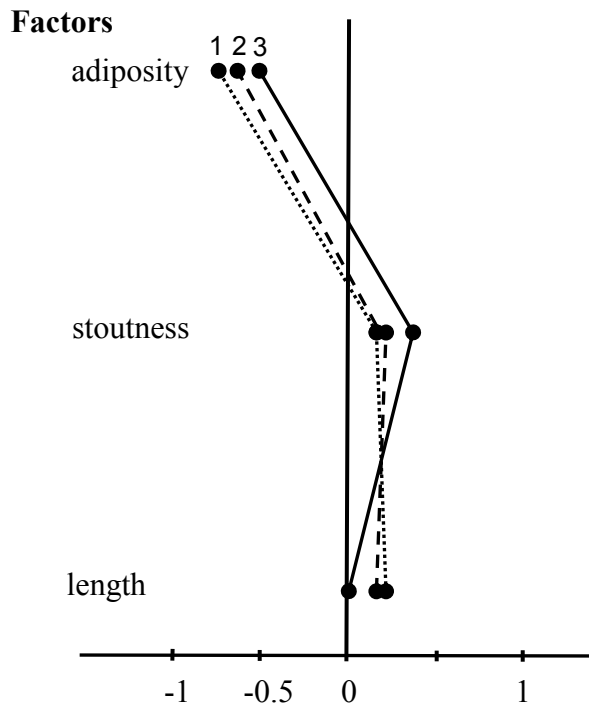


Fig. 1. Natural indicators of body composition factors among baseball players, $n = 20$. Denotation: 1-pitchers, 2-outfielders, 3- infielders

Calculations of internal proportions of composition features within each of the factors provide very important information on baseballers' body composition (Figure 2). All representatives (regardless of their position on the field) are characterized by a strongly muscular forearm and shank. In the features expressing skeletal stoutness there is a clear predominance of the elbow width and disproportionately to the overall size of the factor small width of knees and shoulders.

In the length factor, an even contribution of the upper and the lower extremity length with a lower sitting body height can be noted. The body height has a dominant contribution to this factor among "infielders" and "pitchers". Among "outfielders" the body height has a small contribution to the overall size of this factor.

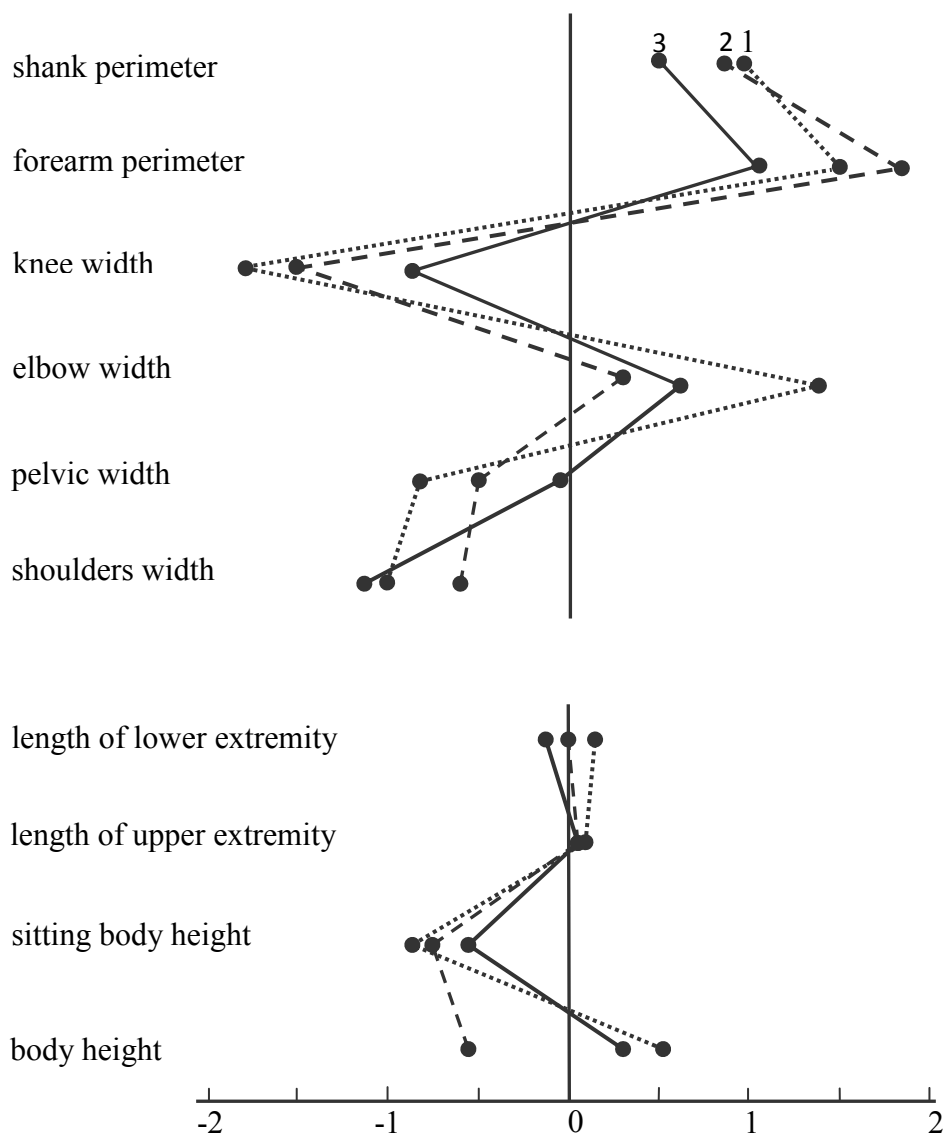


Figure 2. Natural indicators of somatic features within factors of the body composition among baseball players, $n = 20$. Denotation as in Figure 1.

Discussion

Baseball players' morphological differentiation revealed in the study is a resultant of two processes: on the one hand – the selection process, on the other hand – the effect of adaptation of the organism to the external factors affecting it. Baseballers are characterized by the correct weight and are considered long-legged [4].

In terms of the overall body size ($M=0.76$), only "infielders" significantly outweigh the comparative group (students of Warsaw University of Technology). In studies using Perkal's natural indicators method only judokas of heavy-weight categories [3] and wrestlers [6] outweigh "infielders" with the overall body size ($M=3.4$ and $M=1.8$, respectively). However, in terms of the specificity of the composition these are "pitchers" who are a group of the most specific composition among baseballers. The difference between the highest and the lowest natural indicator is 0.92. Taking into account other studies of this type, only Polish modern pentathlon representatives [5] and wrestlers of light-weight categories [6] have a more proportional composition (the indicator value: 0.33 and 0.65, respectively).

Natural indicators of somatic features within the factors provide important information on the specifics of baseballers' body composition. In the stoutness factor, the circumference of the forearm and the predominance of the elbow width over the knee are clearly marked. In the length factor, the contribution of somatic features is more harmonious. However, the small contribution of the sitting body height draws attention.

Conclusions

1. Functions which baseballers players perform during the game are an important factor in determining their morphological differentiation. Stoutness is the dominant factor in body composition of "infielders" and "pitchers". On the other hand, "outfielders" are characterized by a slight predominance of the length factor. Low adiposity and, in the case of "infielders", greater overall body size are a factor distinguishing baseballers' body composition.

2. "Infielders" are the most proportionately built –the code internal proportions amounts to 4-5-3, and "outfielders" – 5-5-3. "Pitchers" are less proportionately built – 5-5-2. The large value of the intra-group variability index is determined by the disproportionately low contribution of the adiposity factor to the overall body size.

3. All baseball players are characterized by the strongly muscled forearm and shank and a clear predominance of the elbow width and disproportionately – to the overall size of the stoutness factor – small width of the knees and shoulders.

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