ISSN 2308-7269

PEDAGOGICS
PSYCHOLOGY

Medical-Biological Problems of Physical Training and Sports
№05/2015

PEDAGOGICS, PSYCHOLOGY, MEDICAL-BIOLOGICAL PROBLEMS OF PHYSICAL TRAINING AND SPORTS

2015
05

Key title: Pedagogika, psihologia ta mediko-biologicni problemi fizicnogo vihovanna i sportu
Abbreviated key title: Pedagog. psihol. med.-biol. probl. fiz. vihov. sportu
ISSN 1818-9172 (Russian ed. Print), ISSN 1818-9210 (Russian ed. online).

Key title: Pedagogics, psychology, medical-biological problems of physical training and sports
Abbreviated key title: Pedagog. psychol. med.-biol. probl. phys. train. sports
ISSN 2308-7269 (English ed. online)
Founders: Kharkov National Pedagogical University.

Journal is ratified: Ministry of Education and Science of Ukraine 6.11.2014, N1279 (pedagogical sciences); 06.03.2015, N261 (physical education and sport).

Journal is reflected in databases:

1) **DOAJ** (Directory of Open Access Journals) http://www.doaj.org
WorldCat - http://www.worldcat.org
SHERPA/RoMEO - http://www.sherpa.ac.uk
Open Science Directory (EBSCO information services) - http://www.opensciencedirectory.net
PBN (Polish Scholarly Bibliography) https://pbn.nauka.gov.pl/journals/40688
IndexCopernicus http://journals.indexcopernicus.com
Russian science citation index - http://elibrary.ru

2) **BASE** - http://www.base-search.net
Scilit - http://www.scilit.net
Academic Journals Database http://journaldatabase.org
CORE http://core.kmi.open.ac.uk
Elektronische Zeitschriftenbibliothek http://ezb.uni-regensburg.de
ROAD - http://road.issn.org
OAJI http://oaji.net/journal-detail.html?number=769

3) **V.I.Vernadskiy National Library of Ukraine** http://nbuv.gov.ua
Scientific Periodicals of Ukraine http://journals.uran.ua/olympicedu.org/pps

AcademicKeys http://socialsciences.academickeys.com/jour_main.php
academia.edu - https://www.academia.edu
Google Scholar - http://scholar.google.com.ua

Certificate to registration:
KB 20683-10483PR. 31.03.2014.
Frequency - 1 number in a month.
Address of editorial office:
Box 11135, Kharkov-68, 61068, Ukraine,
Tel. 38-057-755-73-58
http://www.sportpedagogy.org.ua
e-mail: sportart@gmail.com

Address of editorial office (Poland):
Sport str. 2, of.209, 85-064 Bydgoszcz, Poland
Editor-in-Chief: Sergii Iermakov, tel.: +48886680976
Deputy Editor: Mirosława Cieślicka, tel.: +48600945007
e-mail: cudaki@op.pl

CONTENTS

INFLUENCE OF DIFFERENT APPROACHES TO TRAINING OF MAIN MOVEMENTS ON PHYSICAL FITNESS OF 4 YEARS BOYS WITH VARIOUS MOTOR ASYMMETRY

Galamandjuk L. L.
Lesya Ukrainka Eastern European National University

Abstract. *Purpose:* determination of effectiveness of different training main movements' methods in physical fitness improvement of boys with different manual motor asymmetry. *Material:* 50 boys with ambidexterity (4 years old age) took part in the research. There was used the following: oral questioning, dynamometry and methodic by M.M. Bezrukikh. *Results:* usage of one of variants of "symmetric" approach determines specificities of motor qualities' development: among boys with ambidexterity in motor asymmetry variant "first with passive hand, then with active one" and variant "first with active and then with passive hand" ensure improvement of all tested qualities (except flexibility and quickness). Boys with right orientation of manual motor asymmetry demonstrated improvement of all qualities (except coordination in ballistic movements for accuracy, fulfilled by right arm) in the first variant. In the second variant all qualities (except already mentioned quickness) are improved. *Conclusions:* with any orientation of manual motor asymmetry the necessary condition of high activity and successful child's training is development of interaction between cerebral semi-spheres. Coordinated movements by left and right arms strengthen such interaction. That is why it is purposeful to consequently fulfill every movement by every arm and by two arms simultaneously.
Key words: motor, asymmetry, qualities, boys, pre-school age children.

Introduction

In the process of teaching and educating of pre-school age children it is necessary to consider orientation of functional asymmetry of their brains, in particular manual motor asymmetry (MMA) [2; 4; 9; 11–13; 15]. In aspect of the above mentioned it is important to know similar trends and specificities of functional potentials' changes, development of physical (motor) qualities of such children in pre-school period. At the same time these data are practically absent [1; 10], that conditions demand in appropriate researches.

The data of special literature on problems of brain's functional asymmetry witness about existence of the following: distribution and duplicating of functions in semi-spheres; specific character of information processing in semi-spheres; disordering of behavior reactions and their specificities in case of change of semi-spheres' functional state; dependence on emotions, memory, type of adaptation [12; 15]. The recent data [2; 6; 14; 16–19] witness about existence of serious discrepancies between psycho-physiological indicators of children with left (LMA) and right (RMA) orientation of MMA. For example they differ: by level of semi-spheres' autonomy; by interaction of interaction of cortex structures (in this connection by choice of variants of functioning's strategy); by creative abilities; by development of optical-space and visual functions, ability to concentrate attention at certain object; by quickness of distribution and re-switching of attention; by scope of short-term, long-term, instant and image memory.

Besides, development of will qualities is also asynchronous (it is more intensive among children with left LMA), psycho-motor qualities and space perception (they are better developed in children with RMA) [7; 19]. The carried out by us research [5] showed the following: statistically confident differences between indicators of cognitive function of 4-6 years boys with different MMA orientation; peculiarities of changing of physical fitness of girls when using different variants of main movements' training. At 3-5 yrs. age development of manual fitness of boys and girls with different MMA orientation is characterized by hetero-chronia [1].

At the same time we found that studies of such children's motor qualities are random and fragmentary [1; 10]. There are no data, received by longitudinal method. Effectiveness of offered [1; 8] variants of 3-6 yrs children's training to motor actions in comparison with traditional approach (considering only child's preferences) have not been studied. The above mentioned condition demand in such research.

Purpose, tasks of the work, material and methods

The purpose of the research is to determine effectiveness of different variants of main movements' training for improvement of physical fitness of 4 years age boys with different MMA orientation. The task of the research is to determine MMA orientation and output values concerning development of motor qualities; to conduct one-year forming experiment; to determine summarizing values concerning development of motor qualities; to fulfill comparative analysis of changes in the tested groups.

The following *methods of the research* were used: general scientific (analysis, generalization of information from literature sources); pedagogic (testing, experiment); oral questioning; dynamometry and methodic by M.M. Bezrukikh [3], for determination of MMA orientation, mathematical statistic. Experiment covered 50 boys with ambidexterity (12 in first, 13 in second experimental groups (EG1, EG2) and 25 – in control group – CG; 67 boys with RMA (accordingly 21, 21 and 25) and 61 – with LMA (18, 18 and 25). In all EG 1 we used first variant of "symmetric" approach to main movements' training. It implied training of movement first with passive arm (leg) up to established skill; after this – by active limb. In all EG2 we used second variant of approach, which implied reverse sequence of training. Boys of every CG were trained with traditional approach: movements were trained by chosen by them limb.

http://dx.doi.org/10.15561/18189172.2015.0501

With it there was no influence on the tested motor skills; organization of trainings and the used methodic did not differ. Pedagogic testing was conducted in September and in May.

Results of the research

All boys from EG1 and EG2 demonstrated significantly (at level from $p<0.05$ to <0.001) improvement of most of motor qualities. Exception was mobility in lumbar spine and quickness, condition of which remained unchanged. In CG the latter also remained unchanged. Additionally – coordination in ballistic movements for accuracy by left and right arms (see table 1). It was found that EG members showed better dynamic of motor qualities than CG. It pointed at higher effectiveness of "symmetric" approach to training of boys with ambidexterity in motor asymmetry, than traditional one. It was proved by other result – indicators at the end of experiment. For example in EG1 and EG2 absolute muscular strength, coordination in cyclic movement, ballistic movements for distance and accuracy, fulfilled by right and left arms, were substantially better than in CG; in the latter improvements were found in no indicators.

Table 1

Indicators of motor qualities in groups of boys with AMA during forming experiment

Indicator	Group	At the beginning		At the end		Change		Confidence of difference, *t*			
		$\bar{x}_1$	*m*	$\bar{x}_2$	*m*	*Absolute value*	*%*	*t*	EG1-CG	EG2-CG	EG1-EG2
Hand dynamometry of active hand, kg	EG1	3.9	0.1	5.7	0.11	1.8	46.2	12.1***	2.63 *	2.14 *	0.61
	EG2	4.1	0.14	5.6	0.12	1.5	36.6	8.13***			
	CG	4.1	0.1	5.1	0.2	1.0	24.4	4.47***			
Forward bending, sitting, cm	EG1	6.1	0.5	6.6	0.71	0.5	8.2	0.58	0	0.12	0.11
	EG2	6.0	0.14	6.7	0.58	0.7	11.7	1.17			
	CG	6.1	0.7	6.6	0.6	0.5	8.2	0.54			
20 meters' run from walking, sec.	EG1	7.6	0.18	7.3	0.19	–0.3	3.9	1.15	0.41	0	0.4
	EG2	7.6	0.21	7.4	0.16	–0.2	2.6	0.76			
	CG	7.6	0.2	7.4	0.15	–0.2	2.6	0.8			
Long jump from the spot, cm	EG1	70.3	1.42	83.1	1.45	12.8	18.2	6.31***	1.34	1.15	0.25
	EG2	71.1	1.75	82.6	1.32	11.5	16.2	5.25***			
	CG	70.6	1.7	80.3	1.5	9.7	13.7	4.28***			
Shuttle run 3x5 m, sec.	EG1	9.0	0.11	7.7	0.07	–1.3	14.4	9.97***	3.28 **	3.28 **	0
	EG2	8.9	0.13	7.7	0.07	–1.2	13.5	8.13***			
	CG	8.9	0.12	8.1	0.1	–0.8	9.0	5.12***			
Throw for distance by right arm, m.	EG1	3.7	0.14	6.6	0.16	2.9	78.4	13.6***	1.95	1.29	1.0
	EG2	3.7	0.17	6.4	0.12	2.7	73.0	13.0***			
	CG	3.8	0.15	6.1	0.2	2.3	60.5	9.2***			
Throw for distance by left arm, m.	EG1	3.7	0.18	5.1	0.11	1.4	37.8	6.64***	4.49 ***	3.37 **	1.29
	EG2	3.6	0.15	4.9	0.11	1.3	36.1	6.99***			
	CG	3.6	0.17	4.3	0.14	0.7	19.4	3.18**			
Error in throw for accuracy by right arm, cm	EG1	36.2	1.9	27.2	1.7	–9.0	24.9	3.53**	3.25 **	3.03 **	0.34
	EG2	36.0	2.2	28.0	1.6	–8.0	22.2	2.94*			
	CG	35.4	2.1	36.5	2.3	1.1	–3.1	0.35			
Error in throw for accuracy by right arm, cm	EG1	34.7	1.9	23.0	1.3	-11.7	33.7	5.08***	3.13 **	2.93 *	0.05
	EG2	35.1	2.1	23.1	1.5	-12.0	34.2	4.65***			
	CG	34.1	2.4	30.2	1.9	-3.9	11.4	1.27			

Data of boys with RMA witnessed that in EG1 all motor qualities (except coordination of ballistic movements for accuracy by right and left arms) significantly improved. The mentioned coordination remained unchanged (see table 2). In Eg2 such unchanged indicator was the same. Besides, quickness also unchanged; other qualities improved within 14.1–53.5 % ($p<0.01\div0.001$). In CG quickness remained unchanged. Coordination of ballistic movements for accuracy by right and left arms worsened accordingly by 22.3 and 23.9 % ($p<0.05$).

Besides, at the end of experiment in EG1 and EG2 all indicators (except flexibility, quickness and speed power) were much better than in CG. At the same time, at the end of academic year in EG1 and EG2 absolute muscular strength, coordination of cyclic movements, ballistic movements for distance and accuracy were developed much better than in CG. It witnessed about higher effectiveness of variants of "symmetric" approach to training than traditional in development of motor skills of boys with RMA.

Concerning boys with LMA we received the following results: in EG1 all motor skills substantially improved (except coordination of throws for accuracy by right arm); in EG2 – except the same quality and mobility in lumbar

spine, quickness – they showed only positive trend (see table 3). In CG such trend was noticed in quickness and coordination in ballistic movements for accuracy by left arm. At the same time, coordination of ballistic movements for accuracy by right arm worsened by 30.4% ($p<0.01$).

Table 2

Indicators of motor qualities in tested groups of boys with RMA during forming experiment

Indicator	Group	At the beginning		At the end		Change		Confidence of difference, *t*			
		$\bar{x}_1$	*m*	$\bar{x}_2$	*m*	*absolute*	*%*	*t*	EG1-CG	EG2-CG	EG1-EG2
Hand dynamometry of active hand, kg	EG1	5.5	0.16	7.7	0.12	2.2	40.0	11.0***	3.09 **	2.82 *	0.61
	EG2	5.3	0.15	7.6	0.11	2.3	43.4	12.4***			
	CG	5.4	0.2	6.7	0.3	1.3	24.1	3.61**			
Forward bending, sitting, cm	EG1	6.6	0.51	9.3	0.39	2.7	40.9	4.21***	0.16	0.16	0.36
	EG2	6.7	0.48	9.1	0.4	2.4	35.8	3.84**			
	CG	6.9	0.6	9.2	0.5	2.3	33.3	2.94*			
20 meters' run from walking, sec.	EG1	7.3	0.15	6.7	0.18	–0.6	8.2	2.56*	0.43	0	0.4
	EG2	7.2	0.13	6.8	0.17	–0.4	5.6	1.87			
	CG	7.2	0.18	6.8	0.15	–0.4	5.6	1.71			
Long jump from the spot, cm	EG1	71.1	1.4	89.2	1.6	18.1	25.5	8.51***	0.24	0.34	0.52
	EG2	72.4	1.6	87.9	1.9	15.5	21.4	6.24***			
	CG	71.5	1.5	88.7	1.4	17.2	24.1	8.4***			
Shuttle run 3x5 m, sec.	EG1	8.5	0.1	7.3	0.07	–1.2	14.1	9.83***	3.28 **	3.12 **	0
	EG2	8.5	0.09	7.3	0.08	–1.2	14.1	9.97***			
	CG	8.5	0.11	7.7	0.1	–0.8	9.4	5.38***			
Throw for distance by right arm, m.	EG1	4.3	0.18	6.8	0.19	2.5	58.1	9.55***	3.06 **	2.17 *	0.71
	EG2	4.3	0.15	6.6	0.21	2.3	53.5	8.91***			
	CG	4.1	0.12	6.0	0.18	1.9	46.3	8.8***			
Throw for distance by left arm, m.	EG1	3.2	0.13	4.8	0.14	1.6	50.0	8.37***	4.88 ***	4.3 ***	1.12
	EG2	3.1	0.12	4.6	0.11	1.5	48.4	9.21***			
	CG	3.0	0.11	3.9	0.12	0.9	30.0	5.5***			
Error in throw for accuracy by right arm, cm	EG1	32.0	1.9	28.1	2.1	–3.9	12.2	1.38	3.11 **	3.83 **	0.24
	EG2	31.5	1.7	27.5	1.4	–4.0	12.7	1.82			
	CG	30.9	1.8	37.8	2.3	6.9	-22.3	2.36*			
Error in throw for accuracy by right arm, cm	EG1	33.9	1.9	29.6	2.1	–4.3	12.7	1.52	3.86 **	3.59 **	0.16
	EG2	34.4	1.6	30.1	2.3	–4.3	12.5	1.53			
	CG	34.8	1.9	43.1	2.8	8.3	-23.9	2.45*			

Besides, at the end in Eg1 and EG2 development of most of motor skills was better than in CG. Exception was mobility in lumbar spine, quickness and speed-power. Their level was practically equal in all boys. The mentioned above permitted to make the same conclusion, like in case with boys with AMA and RMA.

Discussion

Results of all EG boys with different MMA were connected with involvement of both brain semi spheres in main movements training (movements were fulfilled both by active and passive arms or legs in any direction). With traditional approach one semi-sphere activated to larger extent, videlicet depending on boy's preference in fulfillment of movement by certain arm or leg, in certain direction. It is proved by conclusions of other researchers [6; 9; 11; 12]: with any MMA orientation the necessary condition of high activity and success of training is development of child's interaction between semi-spheres; coordinated movements by left and right arms increase such interaction, that is why it is purposeful to fulfill movements by each arm in sequence as well as by two arms simultaneously.

Table 3

Indicators of motor qualities in tested groups of boys with LMA during forming experiment

Indicator	Group	At the beginning		At the end		Change		Confidence of difference, *t*			
		$\bar{x}_1$	*m*	$\bar{x}_2$	*m*	*Absolute value*	*%*	*t*	EG1-CG	EG2-CG	EG1-EG2
Hand dynamometry of active hand, kg	EG1	5.0	0.18	6.9	0.12	1.9	38.0	8.78***	4.69 ***	3.53 **	1.13
	EG2	5.3	0.15	6.7	0.13	1.4	26.4	7.05***			
	CG	5.2	0.2	6.0	0.15	0.8	15.4	3.2**			
Forward bending, sitting, cm	EG1	6.4	0.71	8.9	0.41	2.5	39.1	3.05**	0.2	0.09	0.39
	EG2	6.3	0.95	8.6	0.65	2.3	36.5	2.0			
	CG	6.1	0.8	8.7	0.9	2.6	42.6	2.16*			
20 meters' run from walking, sec.	EG1	7.0	0.16	6.5	0.08	–0.5	7.1	2.8*	0.62	0	0.69
	EG2	7.0	0.19	6,6	0.12	–0.4	5.7	1.78			
	CG	7.0	0.2	6.6	0.14	–0.4	5.7	1.64			
Long jump from the spot, cm	EG1	78.8	2.1	94.8	2.3	16.0	20.3	5.14***	0.19	0.21	0.4
	EG2	77.9	1.9	93.6	1.9	15.7	20.2	5.84***			
	CG	80.8	1.8	94.2	2.2	13.4	16.6	4.7***			
Shuttle run 3x5 m, sec.	EG1	8.0	0.13	7.1	0.06	–0.9	11.3	6.29***	2.77 *	2.77 *	0
	EG2	7.9	0.11	7.1	0.06	–0.8	10.1	6.38***			
	CG	7.9	0.14	7.4	0.09	–0.5	6.3	3.0**			
Throw for distance by right arm, m.	EG1	3.6	0.16	5.4	0.12	1.8	50.0	9.0***	3.24 **	2.91 *	0.64
	EG2	3.5	0.19	5.3	0.1	1.8	51.4	8.38***			
	CG	3.6	0.2	4.7	0.18	1.1	30.6	4.1***			
Throw for distance by left arm, m.	EG1	4.0	0.11	6.1	0.12	2.1	52.5	12.9***	5.3 ***	4.48 ***	1.28
	EG2	3.9	0,.3	5.9	0.1	2.0	51.3	12.2***			
	CG	4.0	0.1	5.2	0.12	1.2	30.0	7.7***			
Error in throw for accuracy by right arm, cm	EG1	42.1	2.1	38.9	1.2	–3.2	7.6	1.32	5.96 ***	5.15 ***	1.29
	EG2	41.6	2.3	41.0	1.1	–0.6	1.4	0.24			
	CG	40,1	2.5	52.3	1.9	12.2	-30.4	3.89**			
Error in throw for accuracy by right arm, cm	EG1	25.8	1.4	16.9	1	–8.9	34.5	5.17***	3.64 **	2.99 **	0.81
	EG2	26.8	1.6	18.1	1.1	–8.7	32.5	4.48***			
	CG	26.2	1.5	24.4	1.8	–1.8	6.9	0.77			

On the other hand the received data are not in agreement with results of some researchers [4]. In particular, they are the data about advantage of "symmetric" approach, used in EG2 in comparison with approach used in EG1. We think that one of reasons of this is different age of the tested and the fact that this author studied only changes in coordination.

Concerning specificities of development of motor qualities of boys with different MMA during 4th year of life we note concordance with information of other researchers [4; 8]. It witnesses about significant conditioning of manifestation and age dynamic by individual morphological functional development. Such development forms individual motor profile of a person, in which one of advanced places is engaged by motor asymmetry. Ignoring of this fact is inadmissible, as far as the latter is a determining one for body and limbs' sizes, internal organs, sectors of central nervous system (CNS), asymmetry of functional activity of all systems of organism.

The latter is proved by data, received by Ye.D. Khomska (1997): existing specific neuro-dynamic psychological profile is in interconnection with type of functional profile of brain's lateral organization. Such type is a factor, which ensures individual specificity of motor function. It reflects distribution of domination of brain's functioning in its functioning and in sensor function. The type of lateralizing of semi-spheres is a neuro-physiological basis of psycho-physiological individuality. But they are combined in typological groups by complex of such characteristics [7]. In connection with the latter it is noted [4]: representatives of LMA and RMA samples differ by manifestation of quickness, speed-power, coordination features of upper and lower limbs; value and orientation of motor parameters are different and depend on age, coordination complexity of task, requirements to accuracy and direction, lever of urgency of choice.

Conclusions

1. Independent on approach to main movements' training of 4 years boys with different MMA they demonstrate substantial improvement of absolute muscular strength, speed-power quality, coordination in cyclic movements, in ballistic movements for distance and accuracy by each arm. Besides, increment of most of them (except

speed-power, coordination in ballistic movements for distance by right arm) was significantly higher in case of one of "symmetric" approach, effectiveness of which is practically equal.

2. Usage of one of variants of "symmetric" approach determines peculiarities of development of motor qualities: concerning boys with ambidexterity in motor asymmetry AMA, variant "first by passive then by active arm" and variant "first by active then by passive arm" ensure improvement of all tested parameters, except flexibility and quickness. Concerning RMA boys with first variant all parameters improve except coordination in ballistic movements for accuracy by right arm, with other – all parameters except the a.m. one and quickness. LMA boys demonstrated the same results, except flexibility and quickness.

Further researches imply working out of methodic system of influence of indicators of pre-school age children at physical culture classes, considering the obtained data.

Acknowledgement

The work has been fulfilled in compliance with combined plan of scientific research works for 2010-2014 by topics: "Pedagogic diagnostic in system of physical education of pupils of comprehensive educational establishments" (state registration number 0112U002160); "Theoretical-methodic principles of application of information, pedagogic and medical-biological technologies for healthy life style formation" (state registration number 0113U002003).

Conflict of interests

The author declares absence of any conflict of interests.

References:

1. Balac'ka L., Galamanzhuk L., Iedinak G. Osoblivosti rozvitku motorki ditej z riznoiu rukhovoiu asimetriieiu mizh 3 i 6 rokami [Features of motorboat children with varying motor asymmetry between 3 and 6 years old]. *Visnik Prikarpats'kogo nacional'nogo universitetu*, 2012, no.16, pp. 112-118. (in Ukrainian)
2. Bezrukikh M. M. [The functional hemispheric asymmetry and the lateralization of motor function]. *Aktual'nye voprosy funkcional'noj mezhpolusharnoj asimmetrii* [Actual questions of functional hemispheric asymmetry], 2003, pp. 27-28. (in Russian)
3. Bezrukikh M. M. *Levorukij rebenok v shkole i doma* [Left-handed child at school and at home], Ekaterinburg, Factors, 2004, 300 p. (in Russian)
4. Berdichevskaia E. M. *Rol' funkcional'noj asimmetrii mozga v vozrastnoj dinamike dvigatel'noj deiatel'nosti cheloveka Dokt. Diss.* [The role of functional brain asymmetry in the age dynamics of human motor activity Dokt. Diss.], Krasnodar, 1999, 50 p. (in Russian)
5. Galamanzhuk L. L. [Features of mental functions related to cognitive processes, in boys with different orientation manual motor asymmetry between 4 and 6 years]. *Materials IX the International scientific and practical conference «The strategic questions of world science-2013»* [Materialy IX Miedzynarodowej naukowi-praktycznej konferencji «Strategiczne pytania swiatowej nauki-2013»], Przemysl, Science and Studies, 2013, no.31, pp. 15—20. (in Polish)
6. Zhavoronkova L. A. *Pravshi–levshi. Mezhpolusharnaia asimmetriia biopotencialov mozga cheloveka* [Right-handed – left-handed. Hemispheric asymmetry of brain potentials man], Moscow, Ekoinvest, 2009, 240 p. (in Russian)
7. Leutin V. P., Nikolaeva E.I. *Funkcional'naia asimmetriia mozga* [Functional brain asymmetry], Sankt Petersburg, Speech, 2005, 276 p. (in Russian)
8. Liakh V. I. *Dvigatel'nye sposobnosti shkol'nikov* [Motor abilities of schoolchildren], Moscow, Terra-Sport, 2000, 241 p. (in Russian)
9. Moskvin V. A. *Mezhpolusharnye otnosheniia i problema individual'nykh razlichij* [Hemispheric relations and the problem of individual differences], Orenburg, IPK OSU, 2002, 288 p. (in Russian)
10. Panfilova N. V. *Razvitie koordinacionnykh sposobnostej i obuchenie dvigatel'nym dejstviiam detej 4–6 let v sviazi s osobennostiami dvigatel'noj asimmetrii. Cand. Diss.* [The development of coordination abilities and learning motor actions in children 4-6 years due to the nature of motor asymmetry. Cand. Diss.], Moscow, 1992, 19 p. (in Russian)
11. Silina E. A., Evtukh T. V. *Mezhpolusharnaia asimmetriia i individual'nye razlichiia* [Hemispheric asymmetry and individual differences], Perm, PGPU, 2004, 136 p. (in Russian)
12. Sirotiuk A. L. *Nejropsikhologicheskoe i psikhofiziologicheskoe soprovozhdenie obucheniia* [Neuropsychological and psychophysiological support learning], Moscow, Sphere, 2003, 220 p. (in Russian)
13. DeVries, J. I. P., Wimmers R. H., Ververs I. A. P. Fetal Handedness and Head Position Preference: a Developmental Study. *Developmental Psychology*. 2001, no.39, pp. 171—178.
14. Jordy C. F. Lateral dominance in 182 children: the antimeres, the praxis, the structure-performance relation. *Arg. Neuropsiquiatr.* 1995, vol.53, no.3B, pp. 631—638.
15. Kuhl J., Kazen M. *Hemispheric asymmetry: Does power beat wisdom?* Seattle, Hogrefe and Huber Publishers, 2005, 467 p.
16. Lenneman, F. Raising a left-handed child. *Brain and Cognition,* 2009, no.59, pp. 384—388.
17. Mattay, V. S., Fera F., Tessitore A., Hariri A. R. Neurophysiological correlates of age-related changes in human motor function. *Neurology,* 2002, no.58, pp. 630—635.
18. Shabbott, B. A., Sainburg R. L. Differentiating between two models of motor lateralization. *Journal of Neurophysiology*, 2008, no.100, pp. 565—575.

19. Ramaley F. Inheritance of left-handedness. *Chicago Journal,* 2012, vol.47, no.564, pp. 730—738.
20. Vincent W. J. *Statistic in kinesiology*. Champaign, Human kinetics, 2005, 312 p.

Information about the author:

Galamandjuk L. L.: http://orcid.org/0000-0001-9359-7261; yedinak.g.a@gmail.com; Lesya Ukrainka Eastern European National University; Volya Avenue 13, Lutsk, 43025, Ukraine.

Cite this article as: Galamandjuk L. L. Influence of different approaches to training of main movements on physical fitness of 4 years boys with various motor asymmetry. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 3-8. http://dx.doi.org/10.15561/18189172.2015.0501

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

Received: 02.04.2015
Accepted: 27.04.2015; Published: 30.04.2015

PRINCIPLES OF DEVELOPING A WELL-ROUNDED PROGRAM OF PHYSICAL REHABILITATION FOR FEMALE STUDENTS IN THE SPECIAL MEDICAL GROUP WITH CONSIDERATION OF PHYSICAL ACTIVITY IMPAIRMENT

Golod N. R.
Vasyl Stefanyk Precarpathian National University

Abstract. *Purpose*: to highlight the main provisions of a comprehensive physical rehabilitation program for students of special medical group based on violations of the motor capacity. *Material*: testing 24 students of special medical group and the same number of their healthy peers on standardized tests of physical qualities. To reflect the movement disorders applied functional movement screen. *Results*: a program of rehabilitation of the students included: lifestyle modification; morning hygienic gymnastics; kinesitherapy (using yoga fitness, functional training); aerobic exercise (swimming, Nordic Walking, jogging, aerobics wellness); massage. First presented a unified approach to working with students of special medical groups - selection based on load capacity motor disorders according to the results of tests of functional movement screen. The complexity of the impact of the program involves the impact on the physical, social and mental health components. *Conclusions*: the author's program of physical rehabilitation of students of special medical group is complex.
Keywords: students, special medical groups, physical rehabilitation, movement capacity.

Introduction

It has been commonly accepted that epidemic of chronic not catching diseases (CNCD) is to certain extent connected with way of life and caused by it risk factors. This fact is directly connected with social, economical and ecological determinants of health [8, 16, 21]. They include education, availability of healthy eating, psycho-social stress, accessibility of health protection services and infrastructures, supporting healthy life style. Besides, there are other risk factors of CNCD, connected with way of person's life: tobacco smoking, wrong eating, insufficient physical activity and alcohol. Correction of the mentioned above factors will facilitate individual risk owing to influence on such biological factors as excessive body mass, arterial hyper-tension, disordering of fat and carbohydrate metabolism [10, 12, 16, 20].

Youth is the most vulnerable and strategically important for state strata of population. That is why main priority of modern medicine and rehabilitation shall be prophylaxis, oriented on increasing of youth's information about after effects of wrong life style, on early detection of these after effects and quick, full fledged correction of the detected defects with non-medical methods [8].

Objective indicator of students' unhealthy condition is the fact that with every year quantity of special health groups' members increases.

Modern physical education system for higher educational establishments' students in Ukraine is not able to ensure sufficiently normal life functioning, health protection and recreation of workability. The reasons are: too old methodic system of students' physical education, absence of governmentally approved programs of innovation means and technologies of physical education. Besides, recent years, rehabilitation direction of physical culture classes as mean for health and workability recreation has been being propagated. For example, in National doctrine of physical culture and sports development №1148/2004, dt. 28.09.2004 it is stressed that it is necessary to develop health related measures with the help of physical rehabilitation methods. One more problem of practical work with special health groups' students is absence of unified multifunctional criterion of students' differentiation inside every group. That is why working out of new programs of physical rehabilitation, considering, on the one hand, detected pathologies and, on the other hand, students' interests in modern kinds of physical functioning, has been still remaining urgent and demanded.

Purpose, tasks of the work, material and methods

The purpose of the research: is to render main principles of author's program for girls students of special health groups, considering defects of motor functioning.

Material and methods of the research: theoretical analysis and generalization of scientific-methodic literature and author's experience as the basis of creation of author's program for special health groups' girl students, considering defects of motor functioning.

We tested 24 girl students of special health groups (SHG) of Ivano-Frankivsk national medical university and the same quantity of their healthy peers who composed control group. Girl students of special health group were divided into SHG1 and SHG2 (12 girls in every group). In further tests SHG 1 was a group of comparison as far as girl students of this group were taught as per "Typical program of academic discipline for higher II-IV accreditation levels' medical higher educational establishments' students" [13]. For SHG 2 girl students, author's physical rehabilitation program was worked out.

http://dx.doi.org/10.15561/18189172.2015.0502

Main unified criteria for of substantiation of girl students' functional state assessment we took determination of motor ability. This parameter was assessed in complex way by two methods. The first was testing with the help of standard tests for determination of physical skills, envisaged for main and special health groups. The second method of motor defects' detection was functional movement screen (FMS). FMS is an innovative system, which is used for assessment of quality of fulfilled exercises' and stabilizing movements' fulfillment. These movements create unusual situation for organism, in which its weakness and unbalanced condition become evident in case of absence of appropriate balance and mobility. Advantage of FMS is that coach-rehabilitator works for improvement of certain person's physical fitness and applies this system, having simple quantitative method of basic motor functioning's assessment [4].

Results of the research

In the course of working out of rehabilitation program for SHG girl students, considering defects of motor functioning we based on results of previously conducted tests. The received data (SHG girl students' lagging behind their healthy peers by indicators of strength, flexibility, dexterity, test results by all FMS exercises) substantiate conclusion that the tested girl students require serious improvement of their health.

With creation of physical rehabilitation program we considered methodic principle of "Typical program of academic disciplines for II-IV accreditation medical higher educational establishments' SHG students". This program regulates content of in-class and out-of-class learning of main and special health groups students and determine sequence of physical skills' mastering.

The worked out program of complex rehabilitation of SHG girl students, considering defects of motor functioning included: modifying of life style; morning hygienic exercises, kinesiotherapy (including fitness-yoga exercises, functional training, aerobic loads – swimming, health related walking, jogging, health related aerobics) massage. With working out of the program we followed requirements of adequacy, strict dozing of physical loads, their systemic character, gradual expansion of means for ensuring of complex influence on internal organs and muscular skeletal apparatus.

Complex program of physical rehabilitation was being implemented during all academic year in three stages: preparatory, main and supporting (see fig.1).

Modifying of life style

Girl students were given recommendations concerning modifying their life style, which were worked out in compliance with Countrywide Noncommunicable Diseases Intervention Programe – CINDI. This program was officially implemented in practice of prophylaxis-medical institutions of Ukraine [11, 12]. The purpose was reduction of not catching diseases' progressing by elimination of risk factors. The worked out recommendations included:

- Modifying of eating:
  - Eating of mainly vegetable food, shortening of meat food;
  - Eating minimum 400 g of different vegetables and fruits, preferably fresh;
  - Eating of bread, grain products, pasta, rice or potato several times a day;
  - Reduce consuming of fats;
  - Replace fats by vegetable oils or soft margarines;
  - Cook on steam or stew, bake (it reduces quantity of used fat);
  - Replace meat products with beans, fish, chicken;
  - Use milk and milk products with low content of fat and salt;
  - Use food with low content of sugar, restrict usage of sweets, sweet drinks, refined sugar; prefer product with low content of salt (maximum 5 g per day);
- Modifying of harmful habits:
  - Restrict taking alcohol up to 20 ml of ethanol per day or don't take it at all;
  - Stop tobacco smoking; avoid passive smoking.
- Modifying of everyday physical loads: apply moderate everyday physical loads (for example don't use lift, reduce usage of municipal transport).

Considering determined with questioning low interest in health related trainings and rare attending of sport circles, we conducted additionally talks-consultations with girl students about influence of physical exercises on human organism and role of physical functioning in rehabilitation and preservation of health.

Program of kinesiotherapy

The purpose of kinesiotherapy was correction of motor functioning's defects, improvement of organism's general condition through improvement of internal organs' functioning, which was disordered as a result of main disease; increasing of functional reserve of muscular skeletal apparatus, elimination of physical inactivity, improvement of girl-students' psycho-emotional state.

When working out of rehabilitation program we considered students' unsatisfactory knowledge of modern approaches to health improvement, low level of their interest to health related trainings and high in-class academic loads of medical university students. That is why, in our trainings we tried to arise girl-students' interest to modern systems of fitness during in-class trainings. For this purpose we chose fitness yoga, functional training and health related aerobic. Choice of health related functioning's kinds was justified by their different orientation and possibility to choose exercises according to results of FMS tests as well as to physical qualities to be corrected.

<table>
<tr><th>stage</th><th>month</th><th>Mode of training</th><th>task</th><th colspan="5">methods</th></tr>
<tr><td rowspan="5">preparatory</td><td>9</td><td rowspan="5">moderate</td><td>Initial control</td><td rowspan="13">Program of kinetic therapy</td><td>RGG</td><td>Every day (independent trainings)</td><td rowspan="13">Modifying of life style</td><td rowspan="13">Correction of eating, giving up harmful habits, increase of general physical activity</td><td rowspan="13">massage</td></tr>
<tr><td rowspan="4">Adaptation of all organism’s systems to increasing physical loads; mastering of the offered corrections of motor functioning’s defects; development of physical qualities; general hardening; correction of psycho-emotional state; Motivation for healthy life style</td><td>Fitness-yoga</td><td>Twice a week (in-class trainings)
Once per 2 weeks (independent trainings)</td></tr>
<tr><td>10</td><td>Functional training</td><td>Once a week – in-class training
Twice per 2 weeks (independent trainings)</td></tr>
<tr><td></td><td>Health related walking, jogging</td><td>Every day (independent trainings)</td></tr>
<tr><td></td><td></td></tr>
<tr><td rowspan="5">main</td><td>11</td><td rowspan="5">moderate-training</td><td>Intermediate control</td><td>RGG</td><td>Every day (independent trainings)</td></tr>
<tr><td>12</td><td rowspan="4">Improvement of cardio-vascular, respiratory, vegetative-nervous systems’ functions; correction of motor functioning’s defects; further progressing of physical qualities; improvement of posture; hardening</td><td rowspan="2">Functional training</td><td rowspan="2">Once per 2 weeks (in-class trainings)
Twice per 2 weeks (independent trainings)</td></tr>
<tr><td>1</td></tr>
<tr><td>2</td><td>swimming</td><td>Twice a week (in-class trainings)</td></tr>
<tr><td>3</td><td>Health related walking</td><td>Every day (independent trainings)</td></tr>
<tr><td rowspan="5">supporting</td><td>4</td><td rowspan="5">training</td><td>Intermediate control</td><td>RGG</td><td>Every day (independent trainings)</td></tr>
<tr><td rowspan="3">Fixing of achieved results, further improvement and stabilizing of internal organs functioning; further widening of physical functioning; maintenance of achieved physical workability; Increase of general endurance; further improvement of physical qualities</td><td>Health related aerobics</td><td>3 times per 2 weeks (in-class trainings)</td></tr>
<tr><td>5</td><td>Functional training</td><td>3 times per 2 weeks (independent trainings)</td></tr>
<tr><td></td><td>Health related walking, jogging</td><td>Every day (independent trainings)</td></tr>
<tr><td></td><td>Final control</td></tr>
</table>

Fig.1. Block diagram of complex rehabilitation program for girl students of special health groups, considering defects of motor functioning

Fitness yoga is fulfillment of yoga asana as specific physical exercises without consideration of yoga philosophy [2, 15]. Considering high therapeutic effectiveness of yoga [17, 19] and low level of girl-students physical fitness (except correcting effect of asana) these trainings had one more purposes – girl-students' adaptation to regular controlled physical loads, development of physical qualities (mainly flexibility and endurance), adaptation of organism to increasing physical loads.

Functional training (FT) is trainings with the help of own body mass with the help of power equipment and is aimed to development of cardio-vascular system's endurance, coordination, general endurance, muscular strength, flexibility and etc. [1, 18]. FT forms skills in integration of separate physical qualities in something whole on the base of creation of stereotypes of rational, anti-traumatic, correct fulfillment of domestic and professional movements [1, 24]. In the process of mastering of correct movements' models for everyday, recreational and professional functioning risk of muscular-skeletal apparatus's traumas, backbone diseases of girl students reduced. In our rehabilitation program we used FT with application of band expanders. Advantages of them were: universal character (trainings of all muscular groups); individual dozing for girl students with different levels of physical fitness due to regulation of expander's stretching. Elasticity of this equipment excludes sharp movements and does not allow making exercises easier. Besides, such exercises are anti-traumatic.

Aerobic is a number of physical activity kinds, which are combined by some common features and musical accompaniment [9, 15, 23]. Our physical rehabilitation program includes health related aerobic, which is characterized by simplicity of applied means, possibility of control and self control of health condition, positive emotional background of trainings, dancing character of exercises.

For obtaining of maximal health related effect, in the process of trainings there must appear expressed energy losses, simultaneously with smooth durable loading of cardio-vascular and respiratory systems that must have aerobic character [3, 5, 9, 14, 15, 22]. That is why, besides health related aerobics, girl students received aerobic loads from health related walking, jogging, swimming. With gradual adaptation of organism to increasing physical load intensity of exercises increased at the account of increasing of distance and time of fulfillment.

Program of kinesiotherapy was implemented in in-class and independent trainings. At in-class trainings we gave theoretical basis of different health related systems, trained technique of different exercises, corrected mistakes. Every training consisted of main, preparatory and final parts. Choice of exercises for kinesiotherapy was individual, considering disease of each girl students.

In preparatory part girl students fulfilled general exercises (different at different stages of rehabilitation -0 fitness yoga, functional training, health related aerobic). Exercises were fulfilled for main muscular groups of legs, arms, torso firs slowly and then with moderate temp. Special attention was paid to deep and smooth breathing. Exercises, which require great efforts, were not recommended.

During main part we trained technique of movements and training itself. Exercises were selected individually, considering defects of motor functioning, according to specificity of kinesiotherapy exercises (fitness yoga, functional training, health related aerobic) and counter indications. We followed principle of scattering of load. If it was impossible without distortion of exercise's mastering process, we used "re-switching of movements" in the form of short-term movements by fresh muscles.

Final part consisted of exercises for relaxation and breathing exercises. Its purpose was recreation of functional state of girl students' organisms, which were caused by physical loads of main part.

Massage

For further hardening of organism, improvement of health, elimination of stress, improvement of adaptation to increasing of physical loads and recreation after trainings girl students passed course of general health related self-massage.

Implementation of the program resulted in confident improvement of tested physical fitness indicators and efficiency of fulfilled FMS exercises in SHG2 in comparison with SHF1 СМГ1 [6, 7].

Discussion

The received in the process of our researches data prove acute character of students' health (in SHG groups) problem (E.G. Bulych, 1986; O.D. Dubogay, A.V. Tsios, M.V. Yevtushok, 2012; O.I. Mozgoviy, 2012), demand in seeking of new basic criteria for training of such groups with so non-uniform rehabilitation contingent (O.Yu. Ivanochko, 2009; O.P. Kanyscheva, 2011; A.A. Yerokhina, 2014) They also prove urgency of health correction for such groups of youth (O.V. Kuznetsova, 2005; V.G. Babenko, L.G. Yevdokimova, Yu.I. Tupitsa, G.L. Khapsalis, 2011).

In our program for the first time we present new unified approach to work with students of special health groups – selection of physical loads, considering current main disease and defects of motor functioning by FMS tests' results. It permits to individualize kinesiotherapy programs with selection of exercises, which offer modern, interesting for students, health related trainings: fitness yoga, functional training, health related aerobic. Besides, the work of coach on creation of uniform by certain features groups during training becomes easier.

Complex character of this program's influence stipulates influence on not only physical component of health at the account of physical exercise. Social and psychological components are also positively change at the account of better self feeling, rising of level of everyday activity, creation of up-to-date self image.

Conclusions

The presented author's program of physical rehabilitation for special health group girl students, considering defects of motor functioning was worked out on the base of fulfillment of functional movements' screen exercises and assessment of physical fitness. The program is of complex character and includes the following elements: modifying of life style, methodic of kinesiotherapy (morning exercises, fitness aerobic), functional trainings, aerobic trainings (health related walking, jogging, swimming, aerobic), massage. All these permit to influence on main health components – physical, social and psychic.

The prospects of further work in this direction imply detail analysis of influence of the worked out program on functioning of special health group girl students' organisms.

Acknowledgement

The work has been fulfilled in compliance with plan of scientific-research works of Vasyl Stefanyk Precarpathian National University and is a fragment of research by topic "Application of non medical means and natural factors for improvement of physical condition, functional and physical fitness of organism" (state registration No. 0110U001671).

Conflict of interests

The author declares absence of any conflict of interests of any kind.

References:

1. Beliak Iu.I., Oprishko N.M. Funkcional'ne trenuvannia zasib pidvishchennia rukhovoi pidgotovlenosti liudini [Functional training means of improving human motor readiness]. *Slobozhans'kij naukovo-sportivnij visnik*. 2009, vol.3, pp. 58–61. (in Ukrainian)
2. Beliak Iu., Majstruk A., Zinchenko N. Kharakteristika suchasnikh program ozdorovchogo fitnesu [Characteristics of modern health fitness programs]. *Pedagogics, psychology, medical-biological problems of physical training and sports,* 2006, vol.4, pp. 14–16. (in Ukrainian)
3. Blavt O., C'ovkh L. Plavannia iak zasib reabilitacii studentiv, iaki zajmaiut'sia u special'nikh medichnikh grupakh (v umovakh vuzu) [Swimming as a means of rehabilitation students engaged in special medical groups (in terms of university)]. *Sportivna nauka Ukraini*, 2009, vol.2, pp. pp. 42-53. (in Ukrainian)
4. Bojchuk T.V., Golod N.R., Levandovs'kij O.S. Rezul'tati vstanovlennia rukhovoi diiezdatnosti studentok special'noi medichnoi grupi za testovimi vpravami ekranu funkcional'nogo rukhu [Results propulsion installation capacity of students of special medical group for testing functional movement screen exercises]. *Visnik Chernigivs'kogo nacional'nogo pedagogichnogo universitetu imeni T. G. Shevchenka*, 2012, vol.102(1), pp. S. 86-90. (in Ukrainian)
5. Vilmor Dzh.Kh., Kostill D.L. *Fiziologiia sportu* [Physiology of sport]. Kiev, Olympic Literature, 2003, 655 p. (in Ukrainian)
6. Golod N. Dinamika parametriv fizichnogo rozvitku i fizichnoi pidgotovlenosti studentok special'noi medichnoi grupi pid vplivom reabilitacijnoi programi [Dynamics of parameters of physical development and physical fitness of students of special medical group under the influence of rehabilitation program]. *Moloda sportivna nauka Ukraini,* 2015, vol.19(3), pp. 45 - 52. (in Ukrainian)
7. Golod N.R. Rezul'tativnist' testovikh vprav ekranu funkcional'nogo rukhu iak pokaznik efektivnosti reabilitacijnoi programi dlia studentok special'noi medichnoi grupi [The performance test exercises functional movement screen as an indicator of the effectiveness of rehabilitation programs for students of special medical group]. *Naukovo-pedagogichni problemi fizichnoi kul'turi,* 2015, vol.4(29), pp. 17-23. (in Ukrainian)
8. Gorbas' I. M. Profilaktika khronichnikh neinfekcijnikh zakhvoriuvan' – real'nij shliakh polipshennia demografichnoi situacii v Ukraini [Prevention of chronic non-communicable diseases - the real way to improve the demographic situation in Ukraine]. *Ukrains'kij kardiologichnij zhurnal*, 2009, vil.3, pp. 6–11. (in Ukrainian)
9. Lisickaia T. S. Principy ozdorovitel'noj trenirovki [Principles of recreational exercise]. *Teoriia i praktika fizicheskoj kul'tury,* 2002, vol.8, pp. 6–14. (in Russian)
10. Paffenbarger R., Ol'sen E. *Zdorovyj obraz zhizni* [Healthy lifestyle], Kiev, Olympic Literature, 2003, 320 p. (in Russian)
11. Smirnova I.P. *Principi zdorovogo kharchuvannia* [The principles of healthy eating], Kiev, Institute of Cardiology AMS Ukraine, 2001, 30 p. (in Ukrainian)
12. Smirnova I.P., Kvasha O.O. Modifikaciia sposobu zhittia – golovnij princip profilaktiki khronichnikh neinfekcijnikh zakhvoriuvan' [Modification of lifestyle - the main principle of prevention of chronic non-communicable diseases]. *Likuvannia ta diagnostika* [Treatment and Diagnosis], 2001, vol.4, pp. 20-23. (in Ukrainian)
13. Magl'ovanij A.V. *Fizichne vikhovannia* [Physical Education], Kiev, 2009, 30 p. (in Ukrainian)
14. Shul'ga L.M. *Ozdorovche plavannia* [The wellness swimming], Kiev, Olympic Literature, 2008, 232 p. (in Ukrainian)
15. Edvard T., Khouli B., Frenks Don. *Ozdorovitel'nyj fitness* [The wellness fitness]. Kiev, Olympic Literature, 2000, pp. 132–134. (in Russian)
16. *A strategy to prevent chronic disease in Europe*. A focus on public health action. The CINDI vision. WHO, 2004. 41 p.
17. Dietrich E. *Physiological aspects of yoga*.Leipzig: Georg Thime, 1986, 156 p.

18. Di Stefano L.J., Clark M.A., Padua D.A. Evidence supporting balance training in healthy individuals: a systemic review. *Journal of Strength Conditioning Research,* 2009, 23(9), pp. 2718-2731.
19. Emerson D. Hopper E. *Overcoming Trauma through Yoga: Reclaiming Your Body Paperback*. North Atlantic Books, 2011, 184 p.
20. Farrington J.L., Stachenko S. *Country capacity for noncommunicable disease prevention and control in the WHO European Region*. Preliminary report Copenhagen: WHO Regional Office for Europe, 2010, 100 p.
21. Levington S. The importance of cholesterol, blood pressure and smoking for coronary heart disease. *European Heart Journal,* 2003, vol.24, pp. 1703-1704.
22. Shechtman N. *Group Indoor Cecling. American Council on Exercise*. New-York, (ACE), 2000, 66 p.
23. Wagner P., Riedel I. *Aerobic*. Ausdauertraining. Karin Krallmann Verlag, 2000, 103 p.
24. Weiss T. Effect of functional training resistance training on muscular fitness outcomes in young adults. *Journal of Exercise Science & Fitness,* 2010, vol.2, pp. 113-122.

Information about the author:

Golod N. R.: http://orcid.org/0000-0003-0996-6920; natasha777@mail.ua; Vasyl Stefanyk Precarpathian National University; 57 Shevchenko str., 76018, Ivano-Frankivsk, Ukraine.

Cite this article as: Golod N. R. Principles of developing a well-rounded program of physical rehabilitation for female students in the special medical group with consideration of physical activity impairment. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 9-15. http://dx.doi.org/10.15561/18189172.2015.0502

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

Received: 03.04.2015
Accepted: 25.04.2015; Published: 30.04.2015

WORKABILITY'S RECREATION METHODIC WITH APPLICATION OF CUPPING MASSAGE AND AUTOGENIC TRAINING OF WOMEN STUDENT TEAMS' BASKETBALL PLAYERS

Kozina Zh.L. [1], Kozhuhar L.V. [1], Sobko I. N. [2], Vaksler M.A. [1], Tihonova A.A. [1]
[1] H.S. Skovoroda Kharkiv National Pedagogical University
[2]Kharkov National Economic University

Abstract. *Purpose:* to experimentally subsituate effectiveness of non traditional complex methodic of recreation in female basketball players‟ training process. *Material:* 22 basketball players of women student‟s team participated in the research. Pedagogic testing was conducted by 12 tests in special physical and technical fitness. Psycho-physiological testing was conducted by program PSYCHO-DIAGNOSTIC. Groups were trained by identical programs during 9 weeks. *Results:* we authors observed increased physical and technical fitness of basketball players. Besides, quantity of mistakes in response to visual irritator reduced. It indirectly witnesses about strengthening of nervous processes. There was registered influence of mind on quality of organism‟s recreation after physical loads. *Conclusions:* the authors recommend methodic of cupping massage, combined with autogenic training. Autogenic training implies repeated pronouncing by instructor (or independently by sportswomen) of text, describing coming turn by turn natural images. Peculiarities of massage were influence of massage passes on muscles and ligaments. Cupping massage was used after warming up classic massage techniques.
Key words: recreation, basketball, massage, psycho-regulation, girl students. of coming turn by turn natural images

Introduction

Recreational processes take an important place in training of sportsmen and require effective and practical methods, which would not cause adverse effects [1, 3, 7, 9, 10, 13, 17]. Massage is rather effective mean of rworkability‟s recreation [2, 4, 18, 19, 20]. Its positive effect is undoubted [1, 2, 6, 20]. But problem of recreation of workability in basketball has still remained unsolved [11, 12, 14, 15, 22]. It is connected with the fact that loads in basketball require high physical fitness [23, 25, 26, 28, 31, 33]. That is why classic massage can not satisfy demands of modern basketball.

As P.B. Yefimenko (2009) [6], Yu.S. Slyzniuk (2009) [21] note at medern stage ancient method of cupping massage is becoming more and more widely spread; main action of it is ensured by creation of vacuum and activation of blood circulation. Besides, in works [5, 14, 22] autogenic training as mean of psycho-physical condition‟s normalizing, vegetative balance optimizing and adaptation processes‟ improvement, is discribed. It is logical to assume that cupping massage can be effective in basketball. Also we can assume that effectiveness of cupping massage can be increased with application of autogenic training. The latter also develops so important for basketball psychological and mental abilities.

However, at present methodic of cupping massage in combination with autogenic training has not been being worked out and used in training practice of women-basketball players.

Purpose, tasks of the work, material and methods

The purpose of the work is to experimentally substituate effectiveness of non traditional complex recreation methodic in basketball training process, which combines cupping massage and autogenic training.

In the research basketball players of women student‟s team of KNPU, named after G.S. Skovoroda, participated (11 sportswomen – experimental group and 11 – control group). Before experiment the groups were tested by pedagogic and psycho-physiological tests (in November 2014 – before pedagogic experiment and in January 2015 – after pedagogic experiment). The groups were practically identical before experiment; calculated values of Sjudent‟s t-criterion were less than critical. The groups were trained by identical programs during 9 weeks. In experimental group we practiced the worked out methodic of recreation. In control group we use classic massage.

Pedagogic testing was conducted by 12 tests, which are used in combined teams of Ukraine and Russia [14]. Psycho-physiological tests were the following: determination of time of simple and complex response to light irritator in different modes of signal‟s supply. Tests were conducted by program "Psycho-diagnostics" [16].

Results of the research

We worked out methodic of combined application of cupping massage and autogenic training (AT). The methodic implies repeating of text, describing alternating natural images, by instructor or independently by sportsmen. With application of such AT methodic text can be varied in wide range, but for achievement of required effect it is necessary to follow main principles: 1- the best relaxation effect is reached with the help of image of grand landscape ("ocean", "deep river", "glade with a lot of flowers", "sky, covered with stars", "sun shine" and so on); 2 – images of nature shall be beautiful, easy for perception, well known in everyday life; 3- text AT is constructed so that sinking in natural image would be gradual and smooth [14].

Besides autogenic training, cupping massage was a component of complex methodic. The massage was applied twice a week after training. Peculiarity of the massage is its influence on not only muscles, but on ligament as well.

http://dx.doi.org/10.15561/18189172.2015.0503

Before starting of cupping massage we carried out light stroking with hands and rubbing in of massage oil. Then we took silicon cup (200 ml volume) and created vacuum in it by pressing it when putting on body. Duration of massage was 5-15 minutes everyday or on alternate days. Time of massage was chosen individually.

Application of authors methodic of cupping massage‟s combining with modified form of autogenic training for recreation of female basketball players resulted in strengthening of special; physical and technical fitness. It is witnessed by improvement of results of test "Jump quickness": in experimental group quantity of jumps for 20 seconds increased from 26.33±5.13 times to 35.67±4.89 times ($p<0.01$). In control group such changes are unconfident (from 32.33±9.31 times to 32.50±9.79 times ($p>0.05$) (see fig.1). Analogous results we received in test "Speed technique": in experimental group time of test fulfillment reduced from 190±6.0 sec. to 139±5.4 sec. ($p<0.05$). In control group – from 10.07±0.76 sec. to 9.83±0.63 sec. ($p>0.05$) (see fig.1).

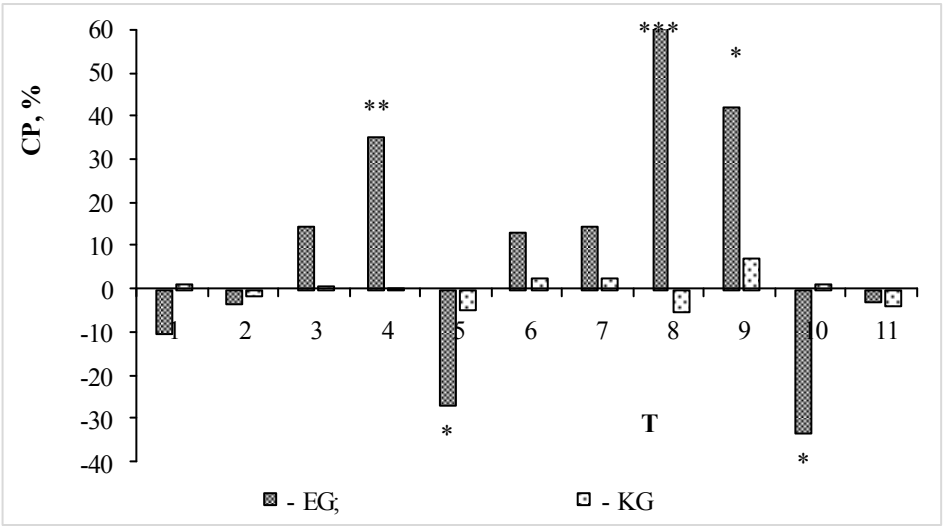

Fig.1. Change of female basketball players' physical fitness resulted from application of methodic of workability's recreation:

1 – 6 meters‟ run, sec.; 2 - 2*28 meters‟ run, sec.; 3 - High jump, cm; 4 – "Jump quickness", quantity of times; 5 – "Speed technique", sec.; 6 – Throw of filled ball from run, meters; 7 - Throw of filled ball from the spot, meters; 8 – Ball throws from middle distance, q-ty of hits from 10; 9 – Penalty throws, q-ty of hits from 20; 10 – Special endurance, sec.; 11 – HBR in rest, b.p.m. $^{-1}$; * - $p<0.05$; ** - $p<0.01$; *** - $p<0.001$; EG - експериментальна група; CG –control group; T –tests, CI –change of indicators.

Besides, in experimental group we observed increase of throws‟ accuracy (middle distance from 10 throws): from 2.50±1.05 times to 7.33±1.97 times ($p<0.001$), in control group such changes were not confident (from 1.76±0.82 times to 1.67±1.21 разів ($p>0.05$).

The worked out authors‟ methodic, combining cupping massage and modified autogenic training resulted in reduction of mistakes in simple and complex responses to visual irritator that indirectly witnesses about strengthening of nervous processes (Ye.P. Ilyin, 2011; V.B. Lizogub, M.I. Makarenko, 2012).

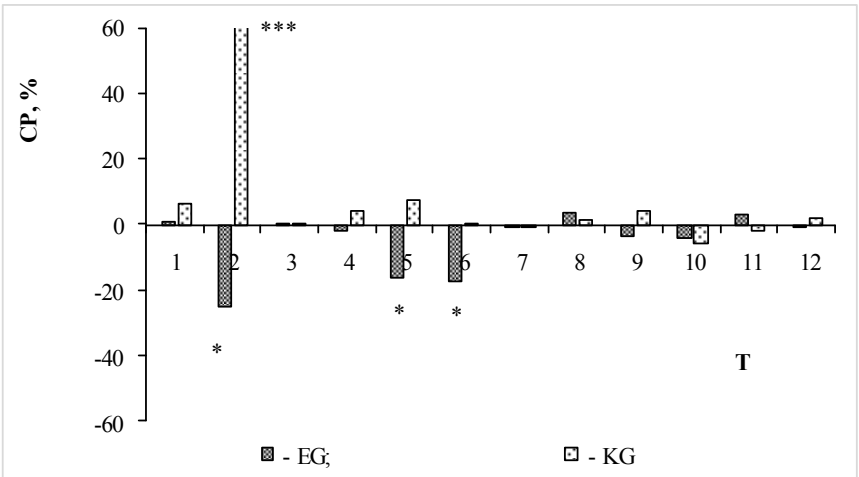

Fig2. Change of indicators of female basketball players' psycho-physiological potentials resulted from application of authors' methodic of workability's recreation:

1 – Simple visual motor response, time, m.sec.; 2 – Simple visual motor response, mistakes, quantity; 3 - Simple visual

motor response, mistakes S, m.sec.; 4 – Complex visual motor response, time, m.sec.; 5 - Complex visual motor response, mistakes, quantity; 6 - Complex visual motor response, S, m.sec.; 7 - Complex visual motor response with feedback, time, m.sec.; 8 - Complex visual motor response with feedback,mistakes, quantity; 9 - Complex visual motor response with feedback, S, m.sec.; 10 - Complex visual motor response with feedback, minimal time of signal"s exposition, m.sec.; 11 - Complex visual motor response with feedback, general time of test"s fulfillment, m.sec.; 12 - Complex visual motor response with feedback, time of coming to minimal exposition, m.sec.; * - $p<0.05$; ** - $p<0.01$; *** - $p<0.001$; EG – Experimental group; CG – Control group; T – tests; CI – Change of indicators, %

In experimental group quantity of mistakes in complex visual-motor response reduced from ($\bar{x} \pm S$) 14.67±2.34 to 12.33 ±2.25 ($p<0.05$), while in control group analogous changes were unconfident (from 13.0±3.85 to 14.0±3.69 ($p>0.05$).

Discussion

Potentials of construction of training process with application of combined sportsmen"s recreational means (including sportswomen-basketball players) have not been studied sufficiently yet [24, 27, 29, 30, 32]. We initiated an attempt to determine potentials of complex appication of cupping massage after classic massage and mofified autogenic training.

Application of this methodic increased desire of experimental group memebers to fulfill exersises for general and special endurance (as a rule sportsmen of all age groups do not like them). Besides, efficiency of tests for special endurance in basketball improved. We connect this fact with influence of cupping massage on blood circulation system [21] and detoxication of organism. In combination with sportsmen imagination"s concentration on abstract images effectiveness of cupping massage increases. It agrees with data of authors, whostudied complex influence of different recraetional means. It can be explained by the fact that concsious approach to any training aspect significantly strengthens direct effect of training factor [12, 13, 14, 22].

Thus, application of complex methodic of workability"s recreation is raher effective in comparison with different traditional methodic (classic massage, which was used in control group).

We have proved that mind can influence on organism"s recreation just after loads. In compliaence with principles of motor physiology [23] and practical experiments [5, 6, 12, 13, 14, 22], coordination interlinks between separate sectors of nervous system and nervous muscular apparatuse improve. It was confirmed by received by us data concerning improvement of female basketball players" coordination (improved accuracy of throws, reduction of tests" with basketball technical elements fulfillment time).

Conclusions

1. The authors worked out methodic of combined application of cupping massage and autogenic training. Autogenic training implies repeating of text, describing alternating images of Nature by instructor or by sportsman independently. Peculiarity of massage application was influence of massage passes on muscles and ligaments.

2. Application of authors methodic of cupping massage combined with modified autogenic training resulted in improvement of special and technical fitness.

3. Application of the authors" methodic also resulted in reduction of quantity of mistakes in simple and complex responses to visual irritator that indirectly witnesses about strengthening of nervous processes.

The prospects of further researches imply improvement of system of sportsmen workability"s recreation.

Acknowledgement

The present researches have been conducted in compliance with "Combined plan of scientific and research works in sphere of physical culture and sports for 2011-2015" by topic 2.4 "Theoretical-methodic principles of individualization in physical education and sports" (state registration No. 0112U002001) and in compliance with scientific governmentally financed works (by Ministry of education and science of Ukraine) for 2013-2014 "Theoretical-methodic principles of application of informational, pedagogic and medical biological technologies for healthy life style formation" (state registration No. 0113U002003) and for 2014–2015 "Theoretical methodic provisioning of formation of personality"s healthy life style in conditions of educational establishment in context of European integration" (state registration No. 0114U001781).

Conflict of interests

Authors declare absence of any conflict of interests.

Reference:

1. Boguszewski Dariusz, Kowalska Sylwia, Adamczyk Jakub Grzegorz, Białoszewski Dariusz. Assessment of effectiveness of sports massage in supporting of warm-up. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2014, vol.10, pp. 67-71. doi:10.5281/zenodo.10496
2. Buksha S.B., Shabashov S.V. Effektivnost' kompleksnoj fizicheskoj reabilitacii pri gipertonicheskoj bolezni I stepeni na ambulatorno-poliklinicheskom etape [The effectiveness of comprehensive physical rehabilitation with hypertension I degree at the outpatient stage]. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2012, vol.1, pp. 38 - 41. (in Russian)
3. Borovs'kij S., Chudik S. Efektivnist' vikoristannia prirodnikh bal'zamiv i netradicijnikh form autogennogo trenuvannia dlia pidvishchennia pracezdatnosti i vidnovlennia basketbolistiv [The effectiveness of natural balms and non-traditional forms of autogenous training to improve performance and recovery basketball]. *3 mizhnarodna konferenciia studentiv ta aspirantiv „Fizichna kul'tura, sport ta zdorov'ia*" [3rd International conference of

students and graduate students "Physical culture, sport and health"], Kharkiv, KSAPC, 2001, pp. 101-102. (in Ukrainian)
4. Grigus I.M. Rezul'taty provedeniia fizicheskoj reabilitacii bol'nykh khronicheskim gastritom [Results of physical rehabilitation of patients with chronic gastritis]. *Pedagogics, psychology, medical-biological problems of physical training and sports,* 2011, vol.2, pp. 28 - 30. (in Russian)
5. Iermakov S.S. Psikhologicheskie testy v seti internet i perspektivy ikh primeneniia v sportivnoj praktike [Psychological tests on the Internet and the prospects for their use in sports practice]. *Fiziceskoe vospitanie studentov tvorceskih special'nostej*, 2004, vol.3, pp. 8–24. (in Russian)
6. Efimenko P.B., Kanishcheva O.P. Vnedrenie innovacionnykh tekhnologij v uchebnyj process discipliny massazh pri podgotovke specialistov po fizicheskoj reabilitacii [Introduction of innovative technologies in the educational process discipline massage with training in physical rehabilitation]. *Pedagogics, psychology, medical-biological problems of physical training and sports,* 2009, vol.12, pp. 58 - 60. (in Russian)
7. Kozina Zh.L. Analiz i obobshchenie rezul'tatov prakticheskoj realizacii koncepcii individual'nogo podkhoda v trenirovochnom processe v sportivnykh igrakh [Analysis and generalization of the results of practical implementation of the concept of individual approach in the training process in sports]. *Fiziceskoe vospitanie studentov tvorceskih special'nostej*, 2009, vol.2, pp. 34-47. (in Russian)
8. Kozina Zh.L. Matematicheskoe modelirovanie individual'nykh osobennostej sportsmenov [Mathematical modeling of the individual characteristics of athletes]. Pedagogics*, psychology, medical-biological problems of physical training and sports*, 2008, vol.4, pp. 56-59. (in Russian)
9. Kozina Zh.L., Kozin V.Iu. *Rozhdenie rebenka* [Birth of a child]. Kharkov, 1998, 64 p. (in Russian)
10. Kozina Zh.L. Metody primeneniia sovremennykh informacionnykh tekhnologij dlia aktivizacii obraznogo vospriiatiia zanimaiushchimisia elementov tekhniki i taktiki v sportivnykh igrakh [Methods of application of modern information technologies to enhance the perception of figurative elements involved in techniques and tactics in sports]. *Pedagogics, psychology, medical-biological problems of physical training and sports,* 2007, vol.1, pp. 58-65. (in Russian)
11. Kozina Zh.L. Nauchno-metodicheskie puti individualizacii uchebno-trenirovochnogo processa v sportivnykh igrakh [Scientific and methodical way of individualization of training process in sports]. *Problemy i perspektivy razvitiia sportivnykh igr i edinoborstv v vysshikh uchebnykh zavedeniiakh* [Problems and prospects of development of sports and martial arts in higher education], Kharkov, KSADA, 2005, pp. 188. (in Russian)
12. Kozina Zh.L. Osnovnye nauchno-metodicheskie podkhody k processu individualizacii podgotovki sportsmenov (na primere basketbola) [The main scientific and methodological approaches to the process of individualization of training athletes (for example, basketball)]. *Fiziceskoe vospitanie studentov tvorceskih special'nostej*, 2005, vol.5, pp. 8-20. (in Russian)
13. Kozina Zh.L. Rezul'taty razrabotki i primeneniia universal'nykh metodik individualizacii uchebno-trenirovochnogo processa v sportivnykh igrakh [The development and use of universal methods of individualization of training process in sports]. *Slobozhans'kij naukovo-sportivnij visnik*, 2008, vol.3, pp. 73-79. (in Russian)
14. Kozina Zh.L. *Sistema individualizacii podgotovki sportsmenov v igrovykh vidakh sporta* [The system of individualization of training athletes in team sports], Lambret Academic Publishing Russia, 2011, 532 p. (in Russian)
15. Kozina Zh.L. Teoretichni osnovi i rezul'tati praktichnogo zastosuvannia sistemnogo analizu v naukovikh doslidzhenniakh v oblasti sportivnikh igor [The theoretical basis and practical results of a systematic analysis in research in the field of sports games]. *Teoriia ta metodika fizichnogo vikhovannia*, 2007, vol.6, pp. 15-18. (in Ukrainian)
16. Kozina Zh.L., Barybina L.N., Mishchenko D.I. Programma «Psikhodiagnostika» kak sredstvo opredeleniia psikhofiziologicheskikh osobennostej i funkcional'nogo sostoianiia v fizicheskom vospitanii studentov [The "Psychodiagnostics" as a means of determination of psycho-physiological characteristics and functional status in physical education students]. *Physical Education of Students*, 2011, vol.3, pp. 56–60. (in Russian)
17. Kozina Zh.L., Chesnokov G.S., Seryj A.V., Bez"iazychnyj B.I. Primenenie autogennoj trenirovki dlia povysheniia adaptacionnykh vozmozhnostej studentov [The use of autogenous training to enhance adaptive capacities of students]. *Fiziceskoe vospitanie studentov tvorceskih special'nostej*, 2008, vol.4, pp. 85-94. (in Russian)
18. Pristupa T.D. Vliianie chastichnogo sportivnogo massazha na pokazateli arterial'nogo davleniia i pul'sa [Effect of partial sports massage on blood pressure and heart rate]. *Physical Education of Students*, 2013, vol.6, pp. 55-59. doi:10.6084/m9.figshare.840504 (in Russian)
19. Redkovec T.G., Romman Kh.D. Sovremennyj vzgliad na problemu fizicheskoj reabilitacii podrostkov s blizorukost'iu [The modern view on the problem of physical rehabilitation of adolescents with myopia]. *Physical Education of Students*, 2012, vol.5, pp. 85 - 91. (in Russian)
20. Zajcev V.P., Iermakov S.S., Manucharian S.V., Fediaj I.A. Rekreaciia kak nauchnaia disciplina i ee istoricheskie aspekty [Recreation as a scientific discipline and its historical aspects]. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2012, S. 46-52. (in Russian)
21. Sliziuk Iu.S. Vakuum-terapiia (banochnyj massazh) kak metod reabilitacii pri osteokhondroze s nestabil'nost'iu poiasnichno-krestcovogo otdela [Vacuum Therapy (cupping massage) as a method of rehabilitation in

osteochondrosis with the instability of the lumbosacral]. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2009, vol.6, pp. 140 - 143. (in Russian)

22. Khrust I. Efektivnist' zastosuvannia netradicijnikh zasobiv vidnovlennia pracezdatnosti v navchal'no-trenuval'nomu procesi basketbolistok visokogo klasu [The effectiveness of unconventional means of rehabilitation in the training process of high-end basketball]. *4 mizhnarodna konferenciia studentiv ta aspirantiv „Fizichna kul'tura, sport ta zdorov'ia"* [4rd International conference of students and graduate students "Physical culture, sport and health"], Kharkiv, KSAPC,2002, pp. 38. (in Ukrainian)
23. Adashevsky Volodymyr, Iermakov Sergii, Prusik Krzystof, Prusik Katarzyna, Gorner Karol. *Biomechanics: theory and practice*, Gdansk, Zdrowie-Projekt, 2012, 184 p.
24. Cieślicka M., Napierała M., Zukow W. State building somatic and motor abilities in kids practicing tennis on prebasic training. In: *Health - the proper functioning of man in all spheres of life*. (red.) M. Hagner-Derengowska, W. Zukow, School of Bydgoszcz, Bydgoszcz. 2012, pp. 173 – 184.
25. Cieślicka M., Napierała M. The somatic build of lightweight rowers. *Medical and Biological Sciences*. 2009, vol.23(3), pp. 33 – 38.
26. Forzoni R. Personal motivational videos: so where‟s the downside? *The Sport and Exercise Scientist, March.* 2006, vol.7, pp. 10–11
27. Gonzalez S. P., Metzler J. N., Newton M. The influence of simulated „pep talk‟ on athlete inspiration, situational motivation, and emotion‟. *International Journal of Sports Science and Coaching*, 2011, vol.6(3), pp. 445–459.
28. Loewenstein V. R. *Handbook of Sensor Physiology. Principles of Receptor Physiology.* Berlin-Heidelberg-New York, Springer, 1992, pp. 46-49.
29. Prusik Katarzyna, Iermakov S.S. Kozina Zh. L. Indexes of physical development, physical preparedness and functional state of polish students. *Pedagogics, psychology, medical-biological problems of physical training and sports,* 2012, vol.12, pp. 113-122.
30. Reginald Xi Wang. *Self-determination and framing. An Interactionist Perspective on Self-Determination Theory: Place for Framing in AutonomySupport.* New York University, 2013, 200 p.
31. Shiloh S., Salton E., Sharabi D. Individual differences in rational and intuitive thinking styles as predictors of heuristic responses and framing effects. *Personality and Individual Differences*, 2002, vol.32, pp. 415-429.
32. Thomas A. K., Millar P. R. Reducing the framing effect in older and younger adults by encouraging analytic processing. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences,* 2012, vol.67(2), pp. 139-149.
33. Vargas T. M., Short S. E. Athletes‟ perceptions of the psychological emotional, and performance effects of coaches‟ pre-game speeches‟. *International Journal of Coaching Science*, 2011, vol.5(1), pp. 27–43.

Information about the authors:

Kozina Zh.L.: http://orcid.org/0000-0001-5588-4825; Zhanneta.kozina@gmail.com; H.S. Skovoroda Kharkiv National Pedagogical University; Artema str. 29, Kharkov, 61002, Ukraine.

Kozhuhar L.V.: http://orcid.org/0000-0003-3248-5439; Zhanneta.kozina@gmail.com; H.S. Skovoroda Kharkiv National Pedagogical University; Artema str. 29, Kharkov, 61002, Ukraine.

Sobko I. N.: http://orcid.org/0000-0002-4920-9775; sobko.kh@mail.ru; Kharkov National Economic University; Lenina boulevard 9a, 61001, Kharkov, Ukraine.

Vaksler M.A.: http://orcid.org/0000-0001-5310-6472; vakslerm@mail.ru; H.S. Skovoroda Kharkiv National Pedagogical University; Artema str. 29, Kharkov, 61002, Ukraine.

Tihonova A.A.: http://orcid.org/0000-0001-8383-3005; tihonov1976@rambler.ru; H.S. Skovoroda Kharkiv National Pedagogical University; Artema str. 29, Kharkov, 61002, Ukraine.

Cite this article as: Kozina Zh.L., Kozhuhar L.V., Sobko I. N., Vaksler M.A., Tihonova A.A. Workability's recreation methodic with application of cupping massage and autogenic training of women student teams' basketball players. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 16-21. http://dx.doi.org/10.15561/18189172.2015.0503

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

Received: 29.03.2015
Accepted: 14.04.2015; Published: 30.04.2015

PSYCHO-PHYSIOLOGICAL CHARACTERISTICS OF STUDENTS-POWERLIFTERS OF DIFFERENT TRAINING EXPERIENCE, WHO HAVE AFFECTIONS OF MUSCULAR SKELETAL APPARATUS

Lobko V.S.
Luhansk Taras Shevchenko National University

Abstract. *Purpose:* study of many years' power lifting trainings influence on psycho-physiological and other characteristics of students, who have affections of muscular skeletal apparatus. *Material:* the research covered 73 students of 18-22 yrs. Age, who have different training experience. To exclude influence of previous training on experiment's results, researches were conducted after 2-3 days of rest. The author studied personality's features (by T. Elers). Psychological diagnostic was conducted by methodic of M.V. Makarenko. *Results:* different psycho-physiological characteristics, indicators of psychological state and personality's features were found in students, depending on their power lifting training experience. Improvement of functional and nervous power indicators under influence of systemic power lifting trainings was detected. *Conclusions:* it was determined that improvement of students' sportsmanship is accompanied by noticeable improvement of practically all tested indicators.
Key words: health, personality, power-lifting, psycho-physiological, state, students.

Introduction

As per data of specialists one of the most wide-spread diseases of students is connected with affections of muscular skeletal apparatus [1, 5, 8]. With it the highest threat of theses diseases is not so defects as certain psychological discomfort, which appears in process of person's socialization in society [2, 4, 7, 10, 11, 14]. Analysis of recent researches points that one of promising solution of the mentioned problem is working out of appropriate methodic on the base of power lifting physical exercises in extra curriculum work with students [1, 12, 13, 15-19]. With it scientists note that up to the present time peculiarities of this kind of sports influence on psychological characteristics of students with affections of muscular skeletal apparatus has been being unsolved sufficiently [2, 7].

Purpose, tasks of the work, material and methods

The purpose of the work: to analyze dynamic of psycho-physiological characteristics, indicators of psychological state and personality's features of students, who have affections of muscular skeletal apparatus under influence of many years' power lifting training.

Material and methods of the research: 73 students of 18-22 yrs age with different experience of power lifting training, who have affections of muscular skeletal apparatus, participated in the research: 21 students trained power lifting for 1 year, 18- 2 years, 12 – 3 years, 11 – 4 years and 11 – 5 years of training. The methods of the research: theoretical analysis, synthesis and generalization of information, methods of psychological diagnostics and mathematical statistics.

As per the tasks of the research the author studied dynamic of psycho-physiological characteristics, indicators of psychological state and personality's features of students with affections of muscular skeletal apparatus under influence of may years' power lifting trainings.

For psychological diagnostics we used well known methodic by M.V. Makarenko, which permits to register latent period of simple visual-motor response (m.sec), latent period of response to choice of one or two irritators from three (m.sec), functional mobility of nervous processes (sec.) and power of nervous processes (quantity of symbols for 5 minutes). Besides, on the base of express-methodic "Prognoz" we assessed nervous-psychic stability of students and studied personality's features (by T. Elers), their motivation for success and ability to avoid misfortune. In order to exclude influence of preceding trainings on results of experiment, we conducted tests after 2-3 days of rest. In tables 1 and 2 indicators of students' psychological diagnostic are presented.

Results of the research

In table 1 one can see that many years' power lifting trainings facilitate improvement of students' (who have affections of muscular skeletal apparatus) psycho-physiological indicators. For example, in the course of the researches we registered steady increase of indicators of simple visual motor response latent period of students-power-lifters with different training experience: 1 year – 330.5 m.sec.; 2 years – 310.9 m.sec.; 3 years – 295.4 m.sec.; 4 years – 281.6 m.sec.; 5 years – 248.4 m.sec.

With it confident differences ($p<0.05$) were registered as follows: between data of 1^{st} and 2^{nd} year students; between indicators of 4^{th} and 5^{th} year students.

We also determined that parameters of latent period of simple visual motor response (by M.V. Makarenko's scale) of 1^{st}-3^{rd} year students were assessed as "below middle" and 4^{th} – 5^{th} year students – as "middle". Experiment permitted to detect that characteristics of latent period of visual motor response to choice of one or two from three irritators also increase with increasing of power lifting training experience – from 427.5 m.sec. of 1^{st} year students to 355.9 m.sec. of 5^{th} year students.

Such increase is characterized by confident ($p<0.05$) increase of indicators of students from 3^{rd} to 5^{th} year of studying. With it indicators of latent period of visual motor response to choice of one or two from three irritators of 1^{st} –

http://dx.doi.org/10.15561/18189172.2015.0504

3rd year students were assessed as "below middle" and the same of 4th-5th year students – as "middle". Analogous – positive dynamic of indicators- was registered in studying of influence of many years' power lifting trainings on characteristics of latent period of visual motor response to choice of one from three irritators of students, who have affections of muscular skeletal apparatus: 1st year students– 500.2 m.sec.; 2nd year students– 483.3 m.sec.; 3rd year students – 474.9 m.sec.; 4th year students– 462.1 m.sec. and 5th year students– 430.7 m.sec.

Table 1

Psycho-physiological indicators of students with affections of muscular skeletal apparatus in process of power lifting trainings fro first to fifth years of study

Tested indicators	First year (n=21)		p	Second year (n=18)		p	Third year (n=12)		p	Forth year (n=11)		p	Fifth year (n=11)	
	$\overline{X}$	m		$\overline{X}$	m		$\overline{X}$	m		$\overline{X}$	m		$\overline{X}$	m
Latent period of simple visual motor response, m.sec.	330.5	6.58	<0.05	310.9	5,98	>0.05	295.4	6.01	>0.05	281.6	5.95	<0.05	248.4	7.01
Latent period of response to choice of one from three irritators, m.sec.	427.5	7.48	>0.05	409.5	6.71	>0.05	403.7	7.26	<0.05	383.2	7.15	<0.05	355.9	7.85
Latent period of response to choice of two from three irritators, m.sec.	500.2	8.43	>0.05	483.3	8.12	>0.05	474.9	7.05	>0.05	462.1	6.78	<0.05	430.7	7.01
Functional mobility of nervous processes, sec.	74.1	1.27	>0.05	70.3	1.32	>0.05	67.8	1.12	>0.05	66.4	0.99	<0.05	62.9	0.85
Power of nervous processes, quantity of symbols per 5 minutes	590.3	9.11	>0.05	605.2	9.15	>0.05	618.3	9.11	>0.05	640.1	9.26	>0.05	648.7	9.31
Nervous-psychic stability	22.31	0.14	<0.05	18.47	0.18	<0.05	16.51	0.15	<0.05	12.43	0.16	<0.05	8.15	0.10
Motivation for success	9.37	0.08	<0.05	12.15	0.09	<0.05	16.8	0.14	<0.05	17.9	0.20	<0.05	19.0	0.19
Motivation for avoiding misfortune	10.56	0.11	<0.05	13.85	0.14	<0.05	16.91	0.12	<0.05	18.0	0.18	>0.05	18.6	0.21

With it confident distinctions ($p<0.05$) were found between indicators of 4th and 5th year students. Besides, it was determined that parameters of latent period of response to choice of two from three irritators were fixed in 1st – 3rd year students. As per M.V. Makarenko's scale they are assessed as "below middle" while in 4th-5th years students – as "middle".

Analysis of other psycho-physiological characteristics of students (indicators of functional mobility and power of nervous processes) also showed that they improved under influence of systemic power-lofting trainings. As it is seen in table 1, 1st year students' parameters of nervous system functional mobility are 74.1sec. and 5th year students' - 62.9 sec. This increase is characterized by confident ($p<0.05$) improvement of indicators of students from 4th to 5th

years. Quantitative characteristics of nervous system processes' power improved in the following way: 1st year students – 590.3 symbols per 5 minutes; 2nd year students – 605.2 symbols per 5 minutes; 3rd year students – 618.3; 4th year students - 640.1 and 5th year students – 648.7 symbols per 5 minutes.

The data, received in the course of the researches, point at substantial improvement of psycho-physiological characteristics of students with affections of muscular skeletal apparatus under influence of many years' trainings of power lifting. They also coincide with works of some scientists, devoted to influence of different kinds of sports on mental health of pupils and students, who have after effects of cerebral palsy. These authors proved that with specially worked out football and track and fields training methodic such students demonstrate improvements of psycho-physiological characteristics in parallel to improvement of sport results.

In the course of our experiments we determined that permanent power lifting trainings also positively influence on mental state and personality's features of students with affections of muscular skeletal apparatus. As it is seen from table 2 indicators of nervous mental stability increase ($p<0.05$) with increasing of period of power lifting trainings in the following way: 1st year students-power lifters – 22.31 points; 2nd year students – 18.47 points; 3rd year students – 16.51 points; 4th year students – 12.43 points; 5th year students – 8.15 points. Analogous trend to increasing ($p<0.05$) of appropriate parameters we found during testing of students personality's features. It is illustrated by materials of table 2. In particular 1st year students demonstrated low motivation for success (9.37 points), that confidently increase ($p<0.05$) in process of systemic power lifting trainings. 2nd and 3rd year students demonstrate middle level (12.15 and 16.8 points). 4th and 5th year students have moderately high level (17.9 and 19 points). In the same way students' motivation for avoiding of misfortune is characterized (1st year students – 10.56 points) changes up to middle level (2nd and 3rd year students) and high level (4th and 5th year students) under influence of many years' power lifting trainings.

Discussion

It should be noted that together with studying of psycho-physiological characteristics, indicators of psychic state and personality's features we conducted pedagogic observations over students' behavior and their progress in education. They resulted in the fact that 4th-5th year students are better in listed above psycho-physiological indicators. They also differ from 1st – 3rd year students-sportsmen by better average mark in educational process and are more assured in communication with their healthy peers. In our opinion it illustrates complex influence of many years' power lifting trainings on different physiological systems of organism, mental potentials and psycho-emotional sphere of students with affections of muscular skeletal apparatus. It should be noted that obtained in experiments results point at improvement of mental state indicators and personality's features of students with affections of muscular skeletal apparatus in the process of many years' power lifting trainings. They also prove analogous data about positive influence of track and fields and football trainings on organisms of patients with cerebral palsy, substantially ($p<0.05$) improve characteristics of nervous-mental stability and features of personality.

Conclusions

1. Analysis of the received results of the conducted experimental research permitted to determine quantitative parameters of changes in psychological fitness's characteristics of students with affections of muscular skeletal apparatus in the process of many years' power lifting trainings. In particular, it was detected that increase of students-power lifters' sportsmanship is accompanied by confident ($p<0.05$) improvement of the following characteristics:

- Parameters of latent period of simple visual-motor response, response to choice of one from three or two from three irritators;
- Quantitative indicators of functional mobility and nervous processes' power, of nervous-mental stability;
- Indicators, characterizing students' motivation for success and avoiding of failures.

2.The characteristics, obtained in our research can be used for control over indicators of psychological fitness of students with different training experience in this kind of sports. The presented results correlate with data of some authors, prove and justify demand in working out and implementation of special extra curricular power lifting's training methodic for students with affections of muscular skeletal apparatus, which would be based on theoretical-methodic approaches and practical experience of sportsmen-power lifters' training.

The prospects of further researches in this direction can be connected with substantiation of appropriate health related power lifting training methodic for students with affections of muscular skeletal apparatus considering already received material.

Acknowledgement

The present work has been fulfilled as per complex program of scientific research of Olympic and professional sports department of Luhansk Taras Shevchenko National University by problem "Theoretical-methodic principles of physical culture training and pupils'/students' health culture" (healthy and disabled subjects of education), state registration No. 0110U000394.

Conflict of interests

Author declares no conflict of interests.

References:

1. Apanasenko G., Dovzhenko L. Riven' zdorov'ia i fiziologichni rezervi organizmu [The level of health and physiological body reserves]. *Teoriia i metodika fizichnogo vikhovannia i sportu*, 2007, vol.1, pp. 17–21. (in Ukrainian)
2. Bened' V. P., Koval'chuk N. M., Zavac'kij V. I. Cilespriamovani dii fizichnikh vprav na rozumovu pracezdatnist' liudini [Targeted action of exercise on mental performance rights], Luck, Nadstyr'ya, 1996, 104 p. (in Ukrainian)
3. Denisenko N. Osoblivosti rivnia zdorov'ia, fizichnoi pidgotovlenosti, samopochuttia ta vedennia zdorovogo sposobu zhittia v uchniv zagal'noosvitnikh shkil i gimnazij [Features of health, physical fitness, health and healthy lifestyles in the students of secondary schools and high schools]. *Slobozhans'kij naukovo-sportivnij visnik*, 2007, vol.3, pp. 44–46. (in Ukrainian)
4. Korinchik L. Vpliv fizichnikh navantazhen' na rozumovu i sercevu diial'nist' molodi [Effect of physical activity on mental and cardiac function of youth]. *Sportivnij visnik Pridniprov'ia*, 2004, vol.7, pp. 147–149. (in Ukrainian)
5. Kusel'man A. I., Solov'eva I. L., Cherdancev A. P. *Sostoianie zdorov'ia detej, obuchaiushchikhsia po razlichnym shkol'nym programmam* [The health status of children enrolled in the various school programs]. Pediatriia, 2002, pp. 6, pp. 53–57. (in Russian)Platonov V.N. *Obshchaia teoriia podgotovki sportsmenov v Olimpijskom sporte* [A general theory of preparation of sportsmen in Olympic sport], Kiev, Olympic Literature, 1997, 584 p. (in Russian)
6. Prezliata G., Shpil'chak A. *Zaniattia fizkul'turoiu ta zdorov'ia* [Physical education and health], Kiev, World School, Halichyna, 2006, 112 p. (in Ukrainian)
7. Sutula V. O., Kochuieva M. M., Bondar T. S. Zdorov'ia shkoliariv iak social'no-pedagogichna problema [Health of pupils as socio-pedagogical problem]. *Visnik Lugans'kogo nacional'nogo universitetu imeni Tarasa Shevchenka*, 2010, vol.17(204), pp. 295–305. (in Ukrainian)
8. Chudnaia R. V. *Adaptivnoe fizicheskoe vospitanie* [Adaptive physical education]. Kiev, Scientific opinion, 2000, 360 p. (in Russian)
9. Astrand P., Rodahl K. *Textbook of work physiology.* New York, Mc Graw-Hill, 1986, pp. 523–576.
10. Keogh J.W.L, Hume P.A., Pearson S.N., Mellow P. To what extent does sexual dimorphism exist in competitive powerlifters? *Journal of Sports Sciences*. 2008, vol.26(5), pp. 531-541. http://dx.doi.org/10.1080/02640410701644034
11. Keogh J.W.L., Hume P.A., Pearson S.N., Mellow P. Anthropometric dimensions of male powerlifters of varying body mass. *Journal of Sports Sciences*. 2007, vol.25(12), pp. 1365-1376. http://dx.doi.org/10.1080/02640410601059630
12. Korobeynikov Georgiy, Korobeinikova Lesia, Shatskih Vladimir. Psychophysiological Diagnostics of the Functional States in Wrestlers. *International Journal of Wrestling Science*. 2013, vol.3(2), pp. 5-13. http://dx.doi.org/10.1080/21615667.2013.10878983
13. Kotendzhy L. V. Special equipment in competitive activities of powerlifters and dynamics of its manufacture. *Physical Education of Students*. 2012, vol.2, pp. 46 - 49.
14. Nizhnichenko D.O. Intercommunication between the indexes of morphological, functional, speed-power and special preparedness of powerlifters on the stage of previous base preparation. *Pedagogics, psychology, medical-biological problems of physical training and sports.* 2009, vol.7, pp. 128-134.
15. Pyšný L., Holá N. Chromosome investigations in weightlifters and powerlifters after intake of anabolic steroids. *Sports Medicine, Training and Rehabilitation*. 1993, vol.4(1), pp. 15-19. http://dx.doi.org/10.1080/15438629309511961
16. Stetsenko A.I. The highest achievements of Ukrainian powerlifting at international events during its origin and formation (1981-2012). *Physical Education of Students*, 2014, vol.1, pp. 44-49. http://dx.doi.org/10.6084/m9.figshare.903693
17. Stetsenko A.I. Theoretical and methodological support of educational process of students-powerlifters using Internet resources. *Pedagogics, psychology, medical-biological problems of physical training and sports*. 2011, vol.11, pp. 118-124.
18. Wilmore J. H., Costill D. L. *Physiology of sport and exercise*. Champaign, Illinois, Human Kinetics, 2004, 726 p.

Information about the author:

Lobko V.S.: http://orcid.org/0000-0002-5546-3200; vodolikarnia@mail.ru; Luhansk Taras Shevchenko National University; Sq. Gogol, 1, Starobilsk, 91011, Ukraine.

Cite this article as: Lobko V.S. Psycho-physiological characteristics of students-powerlifters of different training experience, who have affections of muscular skeletal apparatus. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 22-26. http://dx.doi.org/10.15561/18189172.2015.0504

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

Received: 14.03.2015
Accepted: 14.04.2015; Published: 30.04.2015

METHODIC OF COORDINATION'S PERFECTION OF JUNIOR THAEQUANDOISTS AT STAGE OF PRE-BASIC TRAINING

Pashkov I.N.
Kharkov State Academy of Physical Culture

Abstract. *Purpose:* experimental substantiation of effectiveness of coordination training methodic of junior thaequandoists at stage of pre-basic training. *Material:* in the research 30 thaequandoists of 12-14 yrs age, who composed control and experimental groups, participated. *Results:* we determined means and methods of training of thaequandoists' coordination abilities. Correlation of exercises for sense of space, muscular sense, sense of time took from 15 to 25% of total time of training. During 5 seconds' work quantity of repetitions was from 8 to 12-15 times. Rest pauses between exercises were from 1 to 1-2 minutes. The offered methodic facilitated improvement of coordination fitness indicators of thaequandoists: keeping of static balance with open eyes – by 5.08 % and with closed eyes – by 5.63 %; Romberg's test on left foot – by 11,4% and on tight – by 8.22%; response of choice – by 15.9%; high jump from the spot – by 11.39%; shuttle run – by 5.8%. *Conclusions:* in the process of perfection of thaequandoists' coordination it is necessary to solve the following tasks: master more and more complex coordination structures of motor tasks; master quick re-switching of motor functioning, depending on change of situation; improve accuracy of required motor actions; develop stability of space orientation.
Key words: coordination abilities, methodic, load, thaequando.

Introduction

Coordination is one of the most important components of thaequandoist's motor training. High level of coordination is a foundation of success, in which final result is conditioned by high technical fitness; it also facilitates mastering of technique of movements.

V.N. Platonov says that achievement of high sport results in motor functioning is possible under condition of mastering of ability to assess and accurately regulate time and space parameters of movements. As it is known, the highest results are achieved by those sportsmen, who have highly developed sensor and perceptive abilities [3, 8, 9].

Technical and tactical level on battle field is conditioned by stability of motor skills as well as by ability to build and coordinate movements with supreme manifestation of this ability – motor coordination [1, 2, 6, 9, 10].

Alongside with it, different authors' views on determination of place and role of coordination training in system of sportsman's training are rather variable. It is recommended to train coordination in integrated way in course of technical training [4, 5, 10, 11, 13, 14]. Training of coordination cannot be reduced to one of sides of general training but is the core of all its content [7–9, 19]. That is why it is possible to affirm that up to the present time there has existed a deficit of scientific-theoretical and methodic publication in the field of methodic of coordination training in thaequando.

Purpose, tasks of the work, material and methods

The purpose of the research is to experimentally substatiate effectiveness of methodic of coordination training of junior taequandoists of 12-14 yrs. age at stage of pre-basic training.

The tasks of the research: 1. Basing on scientific methodic literature study level of development and structure of coordination abilities of 12-14 yrs. age thaequandoists at stage of pre-basic training. 2. Work out and experimentally prove methodic of coordination abilities' training at stage of pre-basic training, considering individual potentials.

Participation in experiment was organized on voluntary basis. 30 sportsmen participated: 15 persons in experimental and 15 persons in control groups. Groups were analogous by age, height and body mass of sportsmen. The program of our methodic was oriented on training of adequate responding to sudden situations, improvement of space orientation, increasing of resistance to irritators of vestibular analyzer at account of rotating movements, coordination of movements, formation of ability to asses and regulate dynamic and space-time movements' parameters.

Results of the research

The methodology of our researches was based on theoretical knowledge and generalized experience of children's sport training, described in scientific works [1, 3–5, 7–9, 13, 19]. In the course of study of junior thaequandoists physical condition's structure we used fundamental principles of theory of physical qualities' training and theory of adaptation to specific loads [1, 3, 8–12, 14–18, 20].

In fulfillment of coordination exercises we gradually, from training to training, increased load at the account of the following:

- Increase of coordination complexity by increasing of exercise; variability;
- Raising of requirements to accuracy, quickness, purposefulness, economic character and stability of techniques' fulfillment at one and the same time;
- Shortening of pauses between exercises and, accordingly, between series of exercises;

http://dx.doi.org/10.15561/18189172.2015.0505

- Accent on "coordination" in fulfillment of exercises, for other physical qualities;
- Fulfillment of exercises for coordination after physical loads.

At stage of pre-basic training for junior thaequandoists intensity levels and coordination complexity of fulfilled exercises increased (see table 1).

Table 1

Components of load with fulfillment of coordination exercises by junior thaequandoists

	Components of load					
Age (years)	Duration of exercise	Intensity of exercise	Rest intervals between exercises	Character of rest	Quantity of repetitions of exercise	Coordination complexity of exercise
12–14	From several seconds to 1-2 minutes	From low to sub-maximal	From several seconds to 3-5 minutes	Passive, active	From 5 to 20 times in series, quantity of series 2–6	Low and moderate

Correlation of exercises for prevailing development of space sense, coordination, muscular sense, sense of time and speed-power qualities takes from 15 to 25% from total time of one training.

At stage of pre-basic training, for thaequandoists training of coordination is naturally connected with technical-tactic perfection, with training of speed-power qualities, endurance in conditions of specific training and competition loads. That is why intensity of work to large extent was determined by demand in complex solution of tasks of sportsman's special training at stage of pre-basic training (see table 2).

Table 2

Intensity of training loads of junior thaequandoists

Main indicators of trainings		General preparatory stage	Special preparatory stage	Stage of preliminary training
Zones	Heart beats rate			
3	170–180	20 %	30 %	30 %
2	150–170	40 %	35 %	40 %
1	130–150	40 %	35 %	30 %

In the process of coordination's perfection of junior thaequandoists duration of continuous work in any one exercise, (series of repetitions of one and the same movements) or task (continuous fulfillment of different interconnected movements) varied in wide range, determined by task of every certain case.

In training of balance, like in other cases, we can mark out basic and special directions (see table 3).

Table 3

Exercises for balance

№	Basic exercises	Special exercises
1	Jumps on the spot and in motion, with turns by 90°, 180°, 270°, 360°, attention to be paid at accuracy of fulfillment and landing.	Exercises for balance: fencing with arms, standing on floor or on gymnastic bench, at the spot or in movement.
2	Exercises for balance: standing on one foot, moving on little support, gymnastic bench (forward, backward, sideward), rotations of torso, arms, standing on one or two feet.	Fulfillment of strikes by signal with sharp stoppage of movement (with keeping of posture) and sharp change of strike's trajectory or character of movement.
3	Sharp turns, bends and head rotations, standing on one or two feet, with arms, torso or free leg in different positions or their rotations.	Fulfillment of combinations (including formal exercises for technique of movements) in accelerated temp, with closed eyes.

4	Running or walking of certain distance with closed eyes.	Fulfillment of combinations 9series) after rolls.

Duration of continuous work was clearly determined and did not exceed 10-20 seconds. With not long work in every exercise (up to 5 sec.), quantity of repetitions was rather great: from 8 to 12-15 times. With more durable exercises quantity of repetitions was proportionally reduced and did not exceed 2-5 sec. It permitted to support high activity of trainees and their interest to certain task.

If coordination had to be trained in conditions of tiredness, quantity of repetitions increased: up to 20-25 times in short and up to 2-12 times in long tasks.

Pauses between exercises were rather long – from 1 to 2 or 5 minutes and ensured restoration of workability. When it was required to fulfill a task in conditions of tiredness, rest pauses were significantly shortened (sometimes up to 10-15 seconds) that ensured conditions of progressing tiredness.

For coordination we used general and special exercises:

- Acrobatic exercises (forward, backward and over shoulder rolls, rolls in jumps, stance on head);
- Actions by special signals (including fight with shadow and sparring);
- Duel in unusual stance with different opponents;
- Duel on small-size site;
- Kicking with arms behind back;
- Basketball, football;
- Duels with different sparring partners;
- Fulfillment of technical elements with weights (0.5 kg) and (0.5 kg) and rubber ropes.

The structure of training for coordination was worked out with consideration of individual potentials of experimental group members. Coordination abilities reflect general coordination conditions: static balance with open eyes – by 5.08 %, with open eyes – by 5.63 %; Romberg's test on left foot – by 11.4%, on right foot – by 8.22%; response of choice – by 15.9%; high jump from the spot – by 11.39%; shuttle run – by 5.8%.

Reproduction of time intervals for 1 sec. was as follows: in experimental group $\overline{X}$ –0.25±0.02, in control group $\overline{X}$ –0.27±0.03. Results of reproduction of time intervals for 5 sec. are the following: in experimental group– $\overline{X}$ –0.49±0.08, in control group – $\overline{X}$ –0.5±0.08. Indicators of time intervals' reproduction for 10 sec.: in experimental group – $\overline{X}$ –1.07±0.08, in control group – $\overline{X}$ –1.16±0.19.

In experimental group, in tests forward long jump from the spot indicator was: $\overline{X}$ – 178.6±3.51 cm, in control group - $\overline{X}$ – 175.3±4.14 cm.

In experimental group indicator of backward long jump from the spot was $\overline{X}$ – 126.3±2.44 cm, in control group – $\overline{X}$ –111.6±1.39 cm. Differences between tests forward long jump from the spot and backward long jump from the spot were: in experimental group – $\overline{X}$ –52.3±2.19 cm, in control group – $\overline{X}$ –63.7±4.47 cm.

Discussion

Materials of our research *supplement* theoretical principles of structure and content of junior thaequandoists' competition and coordination fitness at stage of pre-basic training [1, 4, 9, 13] and *expand* knowledge about possibilities to selectively influence on special motor skills for increasing of coordination fitness; it, in its turn, influences on quality of technical actions' fulfillment in thaequando [5, 10, 15, 20].

Conclusions:

1. The received results permit to state that in the process of coordination's perfection in taequando it is necessary to solve the following tasks: mastering of more and more coordination structures; raise quickness of re-switching of motor functioning, in compliance with changes of situation; increasing of accuracy of techniques fulfillment; increasing of thaequandoists' space orientation.
2. Level of coordination abilities is conditioned by sportsman's ability to process information, coming from sensor systems (visual, kinesthetic, vestibular and hearing analyzers). Correct perception of movements and sportsman's response to them are realized in thaequando on the basis of sensor information, which determine thaequandoists coordination skills' realization.
3. The worked out methodic of training for coordination facilitated improvement of fitness and formation of thaequandoists' different skills.

In further researches we are going to study the problems of training process's individualization and to work out technical means, oriented on perfection of thaequandoists' different sides of fitness at different stages of pre-basic training.

Conflict of interests

Author declares absence of any conflict of interests.

References:

1. Babak Iu. M., Konstantinova E. A. , Volkova Iu. A. , Pashkov I. N., Mut'ev A. V. *Tkhekvondo* [Taekwondo], Kiev, 2010, 96 p. (in Russian)
2. Bojchenko N. V. *Sovershenstvovanie koordinacionnykh sposobnostej dziudoistov* [Perfection of judoists' coordination abilities], Kharkov, KSAPC, 2014, 36 p. (in Russian)
3. Volkov L. V. *Teoriia i metodika detskogo i iunosheskogo sporta* [Theory and methodic of children and junior sports], Kiev, Olympic Literature, 2002, 293 p. (in Russian)
4. Gorbenko V.P., Novikova E.V. Mesto koordinacionnykh sposobnostej v strukture special'noj fizicheskoj podgotovki iunykh tkhekvondistov [Place of coordination in structure of special physical fitness of junior taekwondo athletes]. *Molodaia sportivnaia nauka Donbassa* [Young sport science of Donbass], Donetsk, 2002, pp. 73-76. (in Russian)
5. Gorbenko V.P., Novikova E.V. Razvitie special'nykh dvigatel'nykh sposobnostej iunykh tkhekvondistov na nachal'nykh etapakh mnogoletnego sportivnogo sovershenstvovaniia [Training of special motor skills of junior taekwondo athletes at initial stages of many years' sport perfection]. *Aktual'ni problemi iunac'kogo sportu* [Urgent problems of junior sports], Kherson, KSU, 2003, pp. 47-51. (in Russian)
6. Klimenko A. I. Koordinacijni zdibnosti v strukturi special'noi rukhovoi pidgotovlenosti iedinoborciv [Coordination in structure of special motor fitness of martial arts' wrestlers]. *Pedagogics, psychology, medical-biological problems of physical training and sports,* 2010, vol.3. pp. 33-36. (in Ukrainian)
7. Pashkov I.N. Rol' sensornykh sistem pri razvitii koordinacionnykh sposobnostej [Role of sensor systems in training of coordination]. *Fiziceskoe vospitanie studentov tvorceskih special'nostej*, 2008, vol.1. pp. 38-43. (in Russian)
8. Platonov V. N. *Sistema podgotovki sportsmenov v olimpijskom sporte* [System of sportsmen's training in Olympic sports], Kiev, Olympic Literature, 2004, 808 p. (in Russian)
9. Rovnyj A. S., Romanenko V. V., Pashkov I. N. *Upravlenie podgotovkoj tkhekvondistov* [Management of taekwondo athletes training], Kharkov, 2013, 312 p. (in Russian)
10. Romanenko V. A. *Diagnostika dvigatel'nykh sposobnostej* [Diagnostics of motor abilities], Donetsk, DNU, 2005, 209 p. (in Russian)
11. Alricson M., Harms-Ringdahl K., Wermer S. Reliability of sports related functional tests with emphasis on speed and agility in young athletes. *Scand. J. Sci. Sports,* 2001, vol.11, pp. 229-232.
12. Gibson Adam. *Taekwondo Sparring Strategies: For the Ring and the Street.* Unique Publications, 2000, 261 p.
13. Hirtz P., Schnabel G., Harre D., Borde A. *Coordination training. Training science*. 1997, 225 p.
14. Hirtz P., Starosta W. Sensitive and critical periods of motor coordination development and its relation to motor learning. *Journal of Human Kinetics*, 2002, vol. 7, pp. 19-28
15. Kim Sang, Lee Kyong Myong, Jeong Kook Hyun. *Taekwondo kyorugi*. Turtle Press (CT), 1999, 219 p.
16. Kim Un Yong. *Taekwondo textbook*. Kukkiwon. Seoul, O-sung Publishing Co., 1997, 766 p.
17. Starosta W., Hirtz P. Sensitive and critical periods in development of coordination abilities in children and youths. *Biology of Sport*, 1989, vol.6(3), pp. 276-282.
18. Reiman M. P., Manske R. C. *Functional testing in human performance*. Champaign, IL. : Human Kinetics, 2009, 308 p.
19. Starosta W. *Global and local motor coordination in physical education and sport - and conditional volatility*, Poznan, AWF, 2006, 738 p.
20. Starosta W. *Motor coordination capacity*. Warsaw, Institute sport, 2003, 564 p.

Information about the author:

Pashkov I.N.: http://orcid.org/0000-0002-7569-2115; pashkovtkd@mail.ru; Kharkiv State Academy of Physical Culture; Klochkovskaya st., 99, Kharkov, 61058, Ukraine.

Cite this article as: Pashkov I.N. Methodic of coordination's perfection of junior taekwondo athletes at stage of pre-basic training. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 27-31. http://dx.doi.org/10.15561/18189172.2015.0505

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

Received: 16.04.2015
Accepted: 28.04.2015; Published: 28.04.2015

TRENDS IN CHANGES OF ELITE SPORTSWOMEN' TECHNIQUE, SPECIALIZING IN 20 KM RACE WALK, CONSIDERING RISING OF THEIR SPORTS RESULTS

Sovenko S.P., Lytvynchuk T.V., Budkevich G.B.
National University of Physical Education and Sports of Ukraine
Mukachevo State University

Abstract. *Purpose:* on the base of bio-mechanical characteristics' analysis determination of trends in technique's changes of elite sportswomen, specializing in 20 kilometers' race walk, with rising of their sport results. *Material:* the research covered 13 elite sportswomen, specializing in 20 kilometers' race walk (396 measurements). *Results:* bio-mechanical characteristics of the best 20 kilometers' race walk sportswomen at Ukrainian championships 2014-2015 have been elucidated. Comparative analysis of elite sportswomen, having different sport results, has been conducted. *Conclusions:* improvement of sportsmanship to world level (from 1:38:37 to 1:31:35) takes place at the account of increasing of step length to 1.10 m (S = 0,01); shortening of phase of single support X average = 0.26 sec.; S = 0.01) owing to reduction of shock absorption time to 0.08 sec.
Key words: trends, sportswomen, race walk, technique.

Introduction

Level of results of the most important world 20 kilometers' race walk championships' winners among women has being constantly raises. For example, the best in the world 11sportswomen of 2014 showed the highest achievements at main start – world cup in Thai Tsagn (China). Alongside with it requirements to sportswomen's technical and physical fitness also grow. It requires detail analysis and further improvement of training process at stages of preparation to highest achievements and maximal realization of individual potentials [1, 3, 6, 15].

In race walk sport result depends on special endurance, which is determined by organism's ability to keep balance between demand in oxygen and its consumption during long period of time. Sport result also depends on technique of competition exercise's fulfillment. Considering long period of its fulfillment, perfection of technical skillfulness is realized in close connection with training of special endurance and is one of the most important directions in optimizing of sportsmen's training in general [7, 8, 10, 11, 14].

Basing on analysis of trends in changes of sportswomen's technique it is possible to realize rational choice of the most effective means of technical training and determine their specific orientation. It will permit to determine methodic approaches to technique's assessment and potentials of further improvement of sportswomen's technical skillfulness.

Some scientific works elucidate basis for solution of this problem [2, 5, 13, 17, 19]. That is why there exists a demand in further seeking of ways for sport results' perfection through rising sportswomen's technical skillfulness.

Purpose, tasks of the work, material and methods

The purpose of the research: is to determine trends in changes of technique of 20 kilometers' sportswomen-race-walkers, depending on their sport results.

Material and methods: for solution of our tasks we used analysis of scientific-methodic literature, pedagogic observations, video-recording and computer analysis of sportswomen's motor functioning, methods of mathematical statistics.

Bio-mechanical analysis of 13 sportswomen' technique of competition exercise's fulfillment was carried out on the base of video-recording of Ukrainian race walk championships: 2014 – in Alushta and Sumy; 2015 in Ivano-Frankovsk. With it, some sportswomen participated in both starts. Total quantity of sport results was 18. Bio-mechanical characteristics were registered at three parts of distance – 2, 10 and 18 kilometers. For more convenient perception of material we present in this article averaged bio-mechanical characteristics, which were calculated as mean arithmetic from three components (total quantity for every indicator – 54).

Analysis of video records was conducted with the help of program complex «Lumax», main performance characteristics and potentials of which are described in detail in publications of developers [9].

Registration of body positions in fulfillment of competition exercise was realized with video camera «Sony DCR-SR 65» at speed of 25 frames per second with further division of them in 50 semi frames.

In the course of the research we considered all metrological requirements. It permitted to correctly locate camera and minimize systemic and random mistakes. For digitization of frames we used 20-links model of human body. With it points were marked in strict sequence.

In the course of the research sportswomen were divided in two groups by their results (see table 1). Every group was uniform by level of results, anthropometrical and bio-mechanical characteristics (with exclusion of only indicators of flight duration). Value of variation coefficient did not exceed 10 %. We compared main bio-mechanical characteristics of athletes' technique with world level of sport results (first group – results higher than standard of

http://dx.doi.org/10.15561/18189172.2015.0506

international master of sports of Ukraine) and sportswomen with lower level of achievements (second group – results were higher than standard of master of sports of Ukraine).

Sportswomen of both groups did not differ by main anthropometrical parameters – body length and body mass.

Results of the research

In race walk result depends on mean speed of movement, which, in its turn, depends on length and frequency of steps. Thus, registration of these characteristics and determination of their correlation is the basis of assessment of race walk's technique [11, 14].

For achieving of world level results in 20 kilometers' race walk length of steps at competition distance shall be within 1.06–1.19 m with frequency of 3.34–3.60 step per sec.$^{-1}$ [4, 16, 18]. These indicators and their correlation can vary in different sportsmen and depend on body height (length of legs) and level of technical and physical fitness. Table 1

Bio-mechanical characteristics of elite sportswomen, specializing in 20 kilometers' race walk (n=54)

Group	Sportswoman	Характеристика												
		result	Height, cm	Body mass, kg	Average speed, m·p.sec.$^{-1}$	Length of step, m	Frequency of steps step·p.sec.$^{-1}$	Time of single support, sec.	Flight time, sec.	Time of shock absorption in phase of single support, sec.	Angle of foot setting on ground, degrees	Angle of pushing off, degrees	Angle in knee joint, degrees	K_a
I	K-na	1:30:17	163	49	3.69	1.11	3.33	0.26	0.04	0.08	66.50	44.11	178.84	0.68
	Sh-na	1:30:41	160	48	3.68	1.10	3.33	0.25	0.05	0.08	65.02	42.24	178.08	0.69
	B-ka	1:32:35	163	50	3.60	1.08	3.33	0.26	0.04	0.08	65.53	44.16	178.73	0.66
	Ya-uk	1:32:46	167	53	3.59	1.10	3.28	0.27	0.04	0.08	64.94	44.28	178.24	0.66
	$\bar{x}$	**1:31:35**	**163**	**50.00**	**3.64**	**1.10**	**3.32**	**0.26**	**0.04**	**0.08**	**65.50**	**43.70**	**178.47**	**0.67**
	S	**1:17**	**2.9**	**2.16**	**0.05**	**0.01**	**0.03**	**0.01**	**0.01**	**0**	**0.72**	**0.97**	**0.37**	**0.01**
	V	**1**	**2**	**4**	**1**	**1**	**1**	**3**	**12**	**0**	**1**	**2**	**0.2**	**2**
II	K-na	1:34:51	163	49	3.51	1.05	3.33	0.27	0.03	0.10	65,70	46.27	179.09	0.64
	Ya-ko	1:34:36	167	53	3.52	1.04	3.39	0.26	0.04	0.10	65.32	50.17	178.94	0.62
		1:37:59	167	53	3.40	1.02	3.33	0.26	0.04	0.09	65.41	47.25	179.63	0.61
	V-ik	1:35:24	168	53	3.49	1.08	3.23	0.28	0.03	0.09	65.35	43.7	178.39	0.64
	M-uk	1:36:45	165	53	3.45	1.03	3.33	0.28	0.02	0.11	64.86	38.79	178.12	0.62
		1:39:34	165	53	3.35	1.04	3.23	0.27	0.04	0.10	65.33	44.72	177.98	0.63
	K-ych	1:37:02	168	48	3.44	1.06	3.23	0.27	0.04	0.10	65.06	44.71	178.74	0.63
		1:38:15	168	48	3.39	1.05	3.23	0.28	0.03	0.10	65.89	43.35	178.34	0.63
	T-ych	1:37:28	170	55	3.42	1.06	3.23	0.28	0.03	0.10	65.44	45.35	177.94	0.62
	P-iuk	1:38:05	165	53	3.40	1.05	3.23	0.28	0.03	0.10	65.36	44.44	178.06	0.64
	K-l	1:40:13	158	48	3.33	1.00	3.33	0.26	0.04	0.10	65.95	44.65	178.83	0.63
		1:39:42	158	48	3.34	1.00	3.33	0.26	0.04	0.08	65.56	41.43	179.01	0.63
	R-ko	1:40:43	162	50	3.31	1.03	3.23	0.28	0.03	0.11	64.28	44.92	178.92	0.64
	O-ka	1:40:58	168	59	3.30	1.02	3.23	0.28	0.03	0.11	64.06	43.38	178.74	0.61
	$\bar{x}$	**1:38:37**	**165**	**51.64**	**3.40**	**1.04**	**3.28**	**0.27**	**0.03**	**0.10**	**65.26**	**44.51**	**178.62**	**0.63**
	S	**2:06**	**3.7**	**3.27**	**0.07**	**0.02**	**0.06**	**0.01**	**0,.01**	**0.01**	**0.54**	**2.62**	**0.50**	**0.01**
	V	**2**	**2**	**6**	**2**	**2**	**2**	**3**	**19**	**8**	**1**	**6**	**0.3**	**2**
	p*	p<0.01	p>0.05	p>0.05	p<0.01	p<0.01	p>0.05	p<0.05	p<0.05	p<0.01	p>0.05	p>0.05	p>0.05	p<0.01

* – criterion of Manna-Witny

As it is shown in table 1 mean indicators of step length of more qualified sportswomen were 1.10 m (S = 0.01), athletes of second group had 1.04 m (S = 0.02) ($p < 0.01$). With it, it is important that increasing of step length does not result in reducing of angle of foot setting on ground and increasing of pushing off angle. In its turn frequency of steps of first group sportswomen was insignificantly higher than in second group and was accordingly: 3.32 step p.sec.$^{-1}$ (S = 0.03) and 3.28 step p.sec.$^{-1}$ (S = 0.06) ($p > 0.05$). Thus, improvement of sport result is resulted from, mainly, increasing of step length. It also is proved by confident differences in coefficients of anthropometrical data usage (correlation of step length and height of a sportswoman). Athletes of the first group have this coefficient at level of advanced world sportswomen: $K_a = 0.67$ (S = 0.01) [12].

If to speak about time of flight then its value also influence on step length. For example, more qualified sportswomen have it by 0.01 second higher. With mean speed it gives advantage in step length of about 3.7 cm. However, such trend can not be regarded as promising one, as far as further increasing of flight phase will result in its visual detection and disqualification. That is why it is important to analyze characteristics of mobility in hip joints, which also influence on step length [18].

It should be noted that increasing of step length and frequency to large extent depends on effectiveness of pushing off. More effective fulfillment of it by advanced world sportswomen is witnessed by indicator of duration– $\bar{x}$ = 0.26 sec. (S = 0.01). It is, in average, by 0.01 sec. More than in second group ($p < 0.05$). It is also important that shortening of pushing off time happens at the account of decreasing of shock absorption time in phase of single support up to 0.08 sec. (second group sportswomen have it equal to 0.10 sec. $p < 0.01$). With it time of pushing off phase increases by 0.01 sec. All these witness about higher effectiveness of power interaction with support. It is conditioned by corresponding manifestation of speed-power abilities together with special endurance.

Discussion

The received results prove demand in seeking of new ways of sport results' perfection for improvement of race walkers' sportsmanship [2, 18]. In our researches we determined that improvement of sport results in 20 kilometers' race walking takes place at the account of step length's increasing. It supplements the data of other scientists [16, 17, 19].

We also found out that important indicator of assessment and further perfection of race walkers' technique was coefficient of usage of anthropological parameters. Determination of this coefficient's values permits to create preconditions for individualization of training process of sportswomen.

For further perfection of elite sportswomen's technical skillfulness the direction of the first priority is seeking of the most effective means, oriented on increasing of sportswomen's step length with maintaining or increasing of step frequency.

Conclusions

In the process of our researches we analyzed bio-mechanical characteristics of elite sportswomen's technique, who specialize in 20 kilometers' race walk. With it, it was found that improvement of result up to world level (from 1:38:37 to 1:31:35) to large extent happens at the account of increasing of step length to 1.10 м (S = 0.01), shortening of single support phase ($\bar{x}$ = 0.26 sec.; S = 0.01) mainly due to reducing of shock absorption time up to 0.08 sec.

One of important directions of further researches is determination of characteristics of power interaction with support as well as seeking of more efficient means of technical training of elite sportswomen-race walkers.

Acknowledgement

The present research was conducted in compliance with combined plan of SRW in sphere of physical culture and sports for 2011-2015 of Ministry of education and science, youth and sports of Ukraine by topic 2.2 "Theoretical-methodic principles of elite sportsmen training in conditions of professionalization (on example of track and field events)", state registration number 0111U001721.

Conflict of interests

Authors declare absence of any conflict of interests.

References:

1. Artiushenko O.F. *Legka atletika* [Track and field], Cherkasy, Brama-Ukraine, 2008, 632 p. (in Ukrainian)
2. Gamalij V.V. Modelirovanie tekhniki dvigatel'nykh dejstvij v sporte [Modeling technique of motor actions in sport], *Nauka v olimpijskom sporte*, 2005, vol.2, pp. 108–116. (in Russian)
3. Bondarenko S.K. *Sportivnaia khod'ba* [Sport walk], Sankt Petersburg, TSLPS, 1993, 96 p. (in Russian)
4. Korolev G.I. *Da zdravstvuet khod'ba* [Long live the walking], Moscow, World athletes, 2003, 538 p. (in Russian)
5. Korolev G.I. *Upravlenie sistemoj podgotovki v sporte* [System management training in sport], Moscow, World athletes, 2005, 192 p. (in Russian)
6. Chesnokov N.N., Nikitushkin V.G. *Legkaia atletika* [Track and field], Moscow, Physical Culture, 2010, 448 p. (in Russian)
7. Matveev L.P. *Obshchaia teoriia sporta i ee prikladnye aspekty* [The general theory of sport and its applications], Moscow, Soviet sport, 2010, 340 p. (in Russian)
8. Ozolin N.G. *Nastol'naia kniga trenera* [Coach Handbook], Moscow, Astrel, 2003, 864 p. (in Russian)

9. Ostrovs'kij M.V. Videokomp'iuternij analiz rukhiv iak zasib kontroliu za vstanovlenniam tekhnichnoi majsternosti atleta [Video computer analysis of movements as a means of monitoring the establishment of technical skill athlete]. *Teoriia i metodika fizichnogo vikhovannia i sportu*, 2003, vol.1, pp. 130–133. (in Ukrai-nian)
10. Platonov V.N. *Periodizaciia sportivnoj trenirovki* [Periodization of athletic training], Kiev, Olympic Literature, 2013, 624 p. (in Russian)
11. Sovenko S., Ostrovskij Maksim. Osnovnye aspekty ocenki tekhniki skorokhodov vysokoj kvalifikacii [The main aspects of evaluation techniques walkers of high qualifications]. *Aktual'ni problemi fizichnoi kul'turi i sportu,* 2014, vol.29(1), pp. 35–39. (in Russian)
12. Sovenko S.P., Budkevych H.B., Lytvynchuk T.V., Technical specifications of qualified sportswomen who specialize in race walking for 10 km. *Physical Education of Students*, 2014, vol.4, pp. 37-41. doi:10.6084/m9.figshare.996013
13. Tiupa V.V., Arakelian E.E., Primakov Iu.N. *Biomekhanicheskie osnovy tekhniki sportivnoj khod'by i bega* [Biomechanical basic techniques of sports walking and runs], Moscow, Olympia, 2009, 64 p. (in Russian)
14. Fruktov A.L., Travin Iu.G. *Sportivnaia khod'ba* [Sport walk], Moscow, Physical Culture and Sport, 1989, S. 37–41, 312–334. (in Russian)
15. Antonio La Torre, Gianluca Vernillo. The training for the 20-km. what has changed and what might change? In Martin Pupiš (Ed.), *World race walking research*, 2011, pp. 80–94.
16. By Brian Hanley, Andrew Drake, Athanassios Bissas. The biomechanics of elite race walking: technique analysis and the effects of fatigue. *New studies in athletics*, 2008, vol.4, pp. 17–25.
17. By Brian Hanley, Athanassios Bissas, Andrew Drake. Initial findings of a biomechanical analysis at the 2008 IAAF World Race Walking Cup. *New studies in athletics*, 2008. vol.4, pp. 27–34.
18. By Brian Hanley, Athanassios Bissas, Andrew Drake. The biomechanics of efficient race walking. In Martin Pupiš (Ed.), *World race walking research*, 2011, pp. 171–192.
19. Jaroslav Broďani, Peter Šelinger. Miroslav Vavak. Athletic walking in terms of kinematic parameters of walking step. In Martin Pupiš (Ed.), *World race walking research*, 2011, pp. 162–170.

Information about the authors:

Sovenko S.P.: http://orcid.org/0000-0001-9996-4712; sovenkos@ukr.net; National University of Physical Education and Sports of Ukraine; Fizkultury str. 1, Kiev, 03680, Ukraine.

Lytvynchuk T.V.: http://orcid.org/0000-0001-7490-8386; tatiana061190@ukr.net; National University of Physical Education and Sports of Ukraine; Fizkultury str. 1, Kiev, 03680, Ukraine

Budkevich G.B.: http://orcid.org/0000-0002-3254-3515; flazak@yandex.ru; Mukachevo State University; Uzhhorodska str. 26, Mukachevo, 89600, Ukraine.

Cite this article as: Sovenko S., Lytvynchuk T., Budkevich G. Trends in changes of elite sportswomen' technique, specializing in 20 km race walk, considering rising of their sports results. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 32-36. http://dx.doi.org/10.15561/18189172.2015.0506

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

Received: 07.04.2015
Accepted: 25.04.2015; Published: 30.04.2015

SIMULATION OF JUNIOR PUPILS' TRAINING OF BALL THROSING TO VERTIVCAL TARGET

Chernenko S.O.
Donbass State Machine-building Academy

Abstract. *Purpose:* determination of motor skills' peculiarities of junior pupils. *Material:* the research covered 172 pupils. *Results:* effectiveness of training of 1-4 forms' pupils to ~~"b~~all throw to verticat target" is positively influenced by increasing of starts quantity up to 12, quantity of repetitions in one start – up to 3 with rest interval of 60 sec. For 1st form pupils quantity of repetitions in one start was accentuated; for 2nd form pupils – reduction of rest interval up to 60 sec.; for 3rd form – quantity of starts and quantity of repetitions in one start were accentuated and for 4th form pupils – interaction of quantity of starts and repetitions in one start. *Conclusions:* experiment permitted to study multi-factor structure of physical training process of 1st-4th forms pupils, to specify optimal correlations of quantity of starts, quantity of repetitions in one start and rest interval in training to ~~"b~~all throw to target" at physical culture lessons.
Key words: training, motor skills, ball throw, junior pupils.

Introduction

One of problem of school physical education is seeking of new ways of schoolclidren learning process's optimizing (Cieślicka M., Muszkieta R., Napierała M., Żukow W. [24]; Ivashchenko O.V., Khudolii O.M., Yermakova T.S., Pilewska W., Muszkieta R., Stankiewicz B. [25]; Zdanevich A. A. [1]).

The works of A.A. Zdanevich [1], O.v. Ivaschenko [2], V Rybalko [4], D.T. Miroshnichenko [5], o.m. Khudolii [10.12, 13, 15], O.M. Khudoliy, O.V. Ivaschenko, S.S. Yermakov [14], O.M. Khudolii, O.V. Ivaschenko [19, 20]. Junior school age children's motor fitness is influenced by correlation of learning process and development of motor abilities. Development of motor abilities is effective if they become a component of motor skills (O.M. Khudolii, O.V. Ivaschenko, S.O. Chernenko [17, 18]. It was determined that effectiveness of learning increases, if method of algorithmic orders is used (O.M. Khydolii [10, 15], O.V. Ivaschenko [2],) and regiment of exercises and rest alternate (O.M. Khudolii [9], O.V. Ivaschenko [3], V.I. Miroshnichenko [4], O.M. Khudolii, O.V. Ivaschenko [19, 20, 21]. One of methods of study of children's and adolescents' motor skills formation is simulation, coneption of which is rendered in works of O.M. Khudolii [9], O.M. Khudolii, O.V. Ivaschenko [16, 19, 20], O.M. Khudolii, O.V. Ivaschenko, S.S. Yermakov [14], Ivashchenko O.V., Khudolii O.M., Yermakova T.S., Pilewska W., Muszkieta R., Stankiewicz B. [20], Adashevskiy V. M., Iermakov S. S. [23].

Thus, studying of peculiarities of junior schoolchildren's motor skills is rather urgent..

Purpose, tasks of he work, material and methods

The purpose of the work is determination of peculiarities of motor skills' formation of junior schoolchildren.

The methods and organization of the research: analysis and eneralization of scientific and methodic literature, general-scientific theoretical methods such as analogy, analysis, synthesis, abstraction, induction; general empirical methods: observations, testing, experiment.

In the process of our research we used conceptual approaches to planning of experiment for studying of effectiveness of learning process and working out of learning processes' models, which were substantiated in works of O.M. Khudolii, T.V. Karpunets [7], O.M. Khudolii, O.V. Ivaschenko [8, 20], O.M. Khudolii [9]. In dissertation thesis of O.M. Khudolii 13], O.V. Ivaschenko [3], V.I. Miroshnichenko [4] there was defined that control of learning process would be more effective, if learning modes are determined on the base of regressive models, received as a result of complete factor experiment (CFE) of CFE 2^{κ} type.

In our research we used plans of factor eexperiment of CFE 2^3 type (see table 1). We studied motor modes of 1st-4th form pupils' training to ball throw to target. The purpose of CFE was to optimize training modes and, on the base of analisis ofregression equations, determine peculiarities of 1st-4th form pupils' motor skills' peculiarities.

In pedagogic experiment we studied influence of quantity of starts (X_1), quantity of repetitions in start (X_2) and rest intervals (X_3) on level of exercises' mastering by 1st-4th form pupils.

In the process of track and fields events exercoses' training, level of mastering (~~"f~~ulfilled", ~~"n~~ot fulfilled") was assessed at every lesson; probability of exercis's fulfillment was calculated (p = n/m, where n — quantity of successful fulfillments, m — general quantity of attempts).

In training of junior school age children method of algorithmic orders was used. Transition to next exercise was permitted after three successful fulfillments of previous one. In 1st-4th forms ball throw to vertical target was trained (see table 2)[1, 6, 10].

Technique of ball throw to vertical target is as follows: stand with left side, facing the target; feet – at shoulder width. Bending right leg, incline torso to the right. Right arm with ball move to the right, left arm shall be bent in front of chest. Throw is fullfiled with active unbending of right leg,chest turn to side of throw and shifting body mass to left leg, taking position of pulled bow: both legs are straight, right leg is on toe, left – on full foot,; arm with ball is bent under approximately 120° angle and moved backward. From this position without any pause and fixing, straigten torso and move arm with ball over shoulder. After throwing of ball turn torso to the right, move left arm aside.

http://dx.doi.org/10.15561/18189172.2015.0507

Training of ball throw to vertical target was conducted in 1st-4th form as per program, presented in table 2. In the research 48 pupils from every form (172 in total) participated.

Results of the research

Results of factor experiment are given in tables 3-4.

Table 1

Matrix of factor experiment of 2^3 type, (study of influence of different exercise's repetition modes on level of their mastering)

Experimental groups	Factors		
	X_1 quantity of starts (times)	X_2 quantity of repetitions in a start (times)	X_3 rest interval (sec.)
1	6	1	60
2	12	1	60
3	6	3	60
4	12	3	60
5	6	1	180
6	12	1	180
7	6	3	180
8	12	3	180

Table 2

Training tasks for ball throw to vertical target for junior pupils (A.A. Zdanevich, 1995; V. Rybalko 2005; modified)

Exercises	Methodic of assessment
1. Ball throws on floor	*Mark «0».* Ball completely on hand. Biting hand's movement is absent. *Mark «1».* Correct and relaxed hold with index and middle fingers behind the ball; thumb and ring fingers support its side. Biting movement: quick proximal joint's movement in direction of throw, then shtp braking.
2. Ball throws forward-upward, feet on shoulder width	*Mark «0».* Initial position of elbow aside of head, feet are not parted, ball is thrown from shoulder. *Mark «1».* Ball is over shoulder a little higher than head; arm is slightly bent in radiocarpal joint, elbow is at ear level, left arm is a little raised. Hand fulfills biting movement.
3. Ball throws forward-upward, left feet in front.	*Mark «0».* Moving of throwing arm aside torso; in initial position body mass is concentrated on front foot; left arm is dropped. *Mark «1».* From initial position left leg moves forward, torso is bent backward, body mass – concentrated ona little bent right leg; arm with ball is shifted upward-backward; left arm is raised upward-forward. Consequent work of right leg, torso, left leg and throwing arm shall be executed.
4. Ball throws forward-upward, with left side facing direction of throw	*Mark «0».* Torso forward bent at the moment of throw, arm with ball moves in side trajectory, left leg is bent in knee at throw moment. *Mark «1».* Correctness of initial position, videlicet left side faces to target, feet – at shoulder width; body mass – on right foot, turned outside at angle of 25-45 degrees; bode mass is transferred on left foot at moment of taking position –pulled bow" with turning face to target.
5. Ball throws with side facing wall	*Mark «0».* Absence of shoulders' turn with left side facing direction of throw after moving ball; absence of body mass transferring on front foot at the Account of back leg's unbending at moment of jerk; absence of biting movement at moment of ball throw; torso bends forward and aside. *Mark «1».* Ball throw is fulfilled from the same initial position. Legs are completely straighten, chest moves forward-upward, hand fulfills biting movenet at the moment of throw.

6. Ball throws to target from 3 meters' distance	*Mark «0».* Not correct initial position, body mass transferring on front foot, bending of right leg at the moment of body mass transferring forward, no hitting the target. *Mark «1».* Ball throw from the same initial position. Throw at due time, hitting the target.
7. Ball throws to target from 5 meters' distance	Ditto
8. Ball throws to target from 8 meters' distance	Ditto

Table 3

Regressive dependence of mastering level of small ball throw to target on quantity od starts (X_1), quantity of repetitions in one start (X_2) and rest intervals (X_3) of 1st-4th form pupils y

Form	Quantity of exercises	Equation of regression for coded variables
1	1. Ball throws on floor	$Y = 0,76 - 0,085x_2 + 0,04x_1x_2$
	2. Ball throws forward-upward (feet at shoulder width)	$Y = 0,77 - 0,051x_2 + 0,046x_1x_2$
	3. Ball throws forward-upward with front left foot	$Y = 0.8 – 0.044x_2 + 0.049x_1x_2$
	4. Ball throws forward-upward with left side facing direction of throw	$Y = 0.67 + 0.091x_1 + 0.056x_2 – 0.096x_1x_2$
2	1. Ball throws on floor	$Y = 0.701 + 0.034x_1x_2 + 0.041x_1x_2x_3$
	2. Ball throws forward-upward (feet at shoulder width)	$Y = 0.755 + 0.025x_2x_3 + 0.033x_1x_2x_3$
	3. Ball throws forward-upward with front left foot	$Y = 0.735 + 0.03x_2x_3 + 0.04x_1x_2x_3$
	4. Ball throws forward-upward with left side facing direction of throw	$Y = 0.554 + 0.086x_1 + 0.071x_2 - 0.061x_1x_2$
3	1. Ball throws on floor	$Y = 0.783 – 0.023x_1 – 0.028x_1x_3$
	2. Ball throws forward-upward (feet at shoulder width)	$Y = 0.738 + 0.02x_1 – 0.035x_3$
	3. Ball throws forward-upward with front left foot	$Y = 0.773 + 0.05x_1 + 0.028x_1x_2x_3$
	4. Ball throws forward-upward with left side facing direction of throw	$Y = 0.686 – 0.05x_2 + 0.041x_1x_3 – 0.041x_2x_3$
	5. Ball throws with left side facing wall	$Y = 0.591 + 0.06x_1 + 0.09x_2 – 0.086x_1x_2$
4	1. Ball throws on floor	$Y = 0.754 + 0.024x_1 + 0.026x_2$
	2. Ball throws forward-upward (feet at shoulder width)	$Y = 0.766 + 0.034x_1 + 0.039x_2$
	3. Ball throws forward-upward with front left foot	$Y = 0.828 + 0.035x_1$-$0.038x_2x_3$
	4. *Ball throws forward-upward with left side facing direction of throw*	$Y = 0.696 + 0.021x_1 + 0.021x_3 + 0.026x_1x_3$
	5. Ball throws with left side facing wall	$Y = 0.683 + 0.06x_1 + 0.038x_2$

Table 4

Results of dispersion analysis for CFE ПФЕ 2^3, which determines dependence of mastering level in ball throw to target on quantity f starts (X_1), quantity of repetitions in start (X_2) and rest intervals (X_3) of 1st-4th form pupils

Form	Quantity of exercises	Relations of mean squares (%)						
		x_1	x_2	x_1x_2	x_3	x_1x_3	x_2x_3	$x_1x_2x_3$
1	1. Ball throws on floor	2.25	72.25	16	0.25	0	0.25	9.0

	2. Ball throws forward-upward (feet at shoulder width)	6.74	50.4	41.04	0.74	0.02	0.26	0.74
	3. Ball throws forward-upward with front left foot	2.20	33.36	41.43	4.6	12.01	0.24	6.12
	4. Ball throws forward-upward with left side facing direction of throw	37.34	14.18	41.54	3.09	0.17	0.56	3.09
2	1. Ball throws on floor	5.34	19.78	23.07	2.56	0.79	13.96	34.47
	2. Ball throws forward-upward (feet at shoulder width)	14.46	11.42	8.75	2.85	14,46	17.85	30.17
	3. Ball throws forward-upward with front left foot	3.47	0.86	0.86	7.82	0	31.30	55.65
	4. Ball throws forward-upward with left side facing direction of throw	41.67	28.44	21.01	0.07	3.86	1.05	3.86
3	1. Ball throws on floor	28.22	8.71	8.71	8.71	42.16	3.13	0.34
	2. Ball throws forward-upward (feet at shoulder width)	19.81	2.78	1.23	60.68	0.30	0	15.17
	3. Ball throws forward-upward with front left foot	61.82	2.47	1.39	12.51	0.61	2.47	18.70
	4. Ball throws forward-upward with left side facing direction of throw	10.98	31.58	2.51	9.15	22.61	22.61	0.51
	5. Ball throws with left side facing wall	19.38	35.49	35.49	3.28	0.90	3.28	2.15
4	1. Ball throws on floor	40.3	49.2	0.11	9.05	0.11	1.0	0.11
	2. Ball throws forward-upward (feet at shoulder width)	38.3	50.5	2.5	4.2	0.05	4.2	0.05
	3. Ball throws forward-upward with front left foot	31.06	0.6	7.7	0.6	1.4	35.6	22.8
	4. Ball throws forward-upward with left side facing direction of throw	25.8	0.8	7.2	25.8	39.4	0.08	0.8
	5. Ball throws with left side facing wall	51.8	20.2	12.9	10.8	0.3	2.2	1.4

.

Analysis pf equations of regression showed that for *first form pupils* mastering level in *first* exercise –ball throws on floor" is begateively influenced by quantity of repetitions (x_2) and positively influenced by interaction of quantity of starts and quantity of repetitions in start (x_1x_2) (see table 1). Training results depend by 72.25 % on quantity of repetitions in start (x_2) and by 16 % on interaction of quantity of starts and quantity of repetitions in start (x_1x_2).

Mastering level in *second* exercise –Ball throws forward-upward (feet at shoulder width)' is negatively influenced by quantity of repetitions (x_2) and positively – by interaction of quantity of starts and quantity of repetitions in start (x_1x_2).Training results depend by 50.4 % % on quantity of repetitions in start (x_2) and by 41.04 % on interaction of quantity of starts and quantity of repetitions in start (x_1x_2).

Mastreing level in *third* exercise –Ball throws forward-upward with front left foot" is negatively influenced by quantity of starts (x_2) and positively by interaction of quantity of starts and quantity of repetitions in start (x_1x_2). Training results depend by 33.36 % % on quantity of repetitions in start (x_2) and by 41.43 % on interaction of quantity of starts and quantity of repetitions in start (x_1x_2).

There is positive influence on mastering level in *forth* exercise –Ball throws forward-upward with left side facing direction of throw" rendered by quantity of starts (x_1), quantity of repetitions in start (x_2) and negative influencei rendered by interaction of quantity of starts and quantity of repetitions in start (x_1x_2). Training results depend by 37.34 % % on quantity of starts (x_1) and by 14.18 % on quantity of repetitions in start ($x2$) and by 41.54% on interaction of quantity of starts and quantity of repetitions in start (x_1x_2).

Thus, effectiveness of *first form* schoolchildren's training to –Ball throw to vertical target" is positevily influenced by 6-12 starts with quantity of repetitions in every start – 2; rest interval of 60-180 sec. Quantity of

repetitions in start shall be accentuated in choosing of training mode.

Mastering level of *2nd form* pupils *in first* exercises –Ball throws on floor" is positively influenced by interaction of quantity of starts and quantity of repetitions in start (x_1x_2) and interaction of all factors ($x_1x_2x_3$). Training results depend by 23.07 % % on interaction of quantity of starts and quantity of repetitions in start (x_1x_2) and by 34.47% - on interaction of all factors ($x_1x_2x_3$).

Mastering level of *second* exercise –Ball throws forward-upward (feet at shoulder width)" is positively influenced by interaction of quantity of starts and quantity of repetitions in start (x_1x_2) and interaction of all factors ($x_1x_2x_3$). Training results depend by 17.8 % on interaction of quantity of starts and quantity of repetitions in start (x_1x_2) and by 30.17% - on interaction of all factors ($x_1x_2x_3$).

In *third* exercise –Ball throws forward-upward with front left foot" mastering level is positively influenced by interaction of quantity of repetitions in one start with rest intervals (x_2x_3) and interaction of all factors ($x_1x_2x_3$). Training result depends by 31.03 % on interaction of quantity of repetitions in start with rest interval (x_2x_3) and by 55.65 % on interaction of all factors ($x_1x_2x_3$).

Level of *forth* exercise –Ball throws forward-upward with left side facing direction of throw " mastering is positively influenced by quantity of starts (x_1), quantity of repetitions in one start (x_2) т and negatively influenced by by their interaction (x_1x_2). Training result depends by 41.67 % on quantity of starts (x_1), by 28.44 % — on quantity of repetitions in one start (x_2) and by 21.01 % — on interaction of quantity of starts with quantity of repetition in start (x_1x_2).

Thus effectiveness of training of *2nd form* pupils to –ball throw to vertical target" is positively influenced by increasing of quantity of starts up to 12 times, quantity of repetitions in one start – to 3 times and reduction of rest interval to 60 sec. Interaction of three factors ($x_1x_2x_3$) shall be accentuated when choosing mode of training.

Mastering level of *3rd form* pupils in *first* exercise –Ball throws on floor" is negatively influenced by quantity of starts (x_1) and interaction of quantity of starts and rest intervals (x_1x_3). Training result depends by 28.22 % on quantity of starts (x_1) and by 42.16 % — on interaction of quantity of starts and rest intervals (x_1x_3).

In *second* exercise –Ball throws forward-upward (feet at shoulder width)" mastering level is positively influenced by quantity of starts (x_1) and negatively – by rest interval (x_3). Training result depends by 19.81 % on quantity of starts (x_1) and by 60.68 % — on rest interval (x_1x_3). Increasing of rest interval to 180 sec. reduces mastering level.

In *third* exercise –Ball throws forward-upward with front left foot" mastering level is positively influenced by quantity of starts (x_1) and interaction of all factors ($x_1x_2x_3$). Training result depends by 61.82 % on quantity of starts (x_1) and by 18.7 % — on interaction of all factors ($x_1x_2x_3$).

Level of mastering in *forth* exercise –Ball throws forward-upward with left side facing direction of throw" is influenced positively by interaction of quantity of starts and rest interval (x_1x_3) and negatively – by quantity of repetitions in one start (x_2), as well as by interaction of quantity of repetitions in start and rest interval (x_2x_3). Training result depends by 31.58 % on quantity of repetitions in one start (x_2), by 22.61 % — on quantity of starts and rest intervals (x_1x_3), by 22.61 % — on interaction of quantity of repetitions in start and rest interval (x_2x_3).

Mastering level in *fifth* exercise –Ball throws with left side facing wall " is positively influenced by quantity of starts (x_1),rest intervals (x_3), and negatively – by interaction of quantity of starts with quantity of repetitions in one start (x_1x_2). Training result depends by 38 % on quantity of starts (x_1), by 35.49 % — on rest interval (x_2), by 35.49 % — on interaction of quantity of starts with quantity of repetitions in one start.

Thus effectiveness of *3rd form pupils'* training to –Ball throw to vertical target" is positively influenced by quantity of starts up to 12 times, quantity of repetitions in start – to 3 times and reduction of rest interval up to 60 sec. In training process it is nesseary to accentuate attention at interaction of quantity of starts and quantity of repetitions in one start.

Mastering level of *4th form pupils* in *first* exercise –Ball throws on floor" is positively influenced by quantity of starts (x_1), quantity of repetitions in one start (x_2). Training result depends by 40.3 % on quantity of starts (x_1) and by 49.2 % on quantity of repetitions in one (x_2).

Mastering level in *second* exercise –Ball throws forward-upward (feet at shoulder width)" is positively influenced by quantity of starts (x_1), quantity of repetitions in one start (x_2). Training result depends by 38.3 % on quantity of starts (x_1) and by 50.5 % — on quantity of repetitions in one start (x_2).

In *third* exercise –Ball throws forward-upward with front left foot" level of mastering is positively influenced by quantity of starts (x_1) and negatively – by interaction of quantity of starts and rest intervals (x_2x_3). Training result depends by 31.06 % on quantity of starts (x_1) and by 35.5 % — on interaction of quantity of starts and rest intervals (x_2x_3).

Mastering level in *forth* –Ball throws forward-upward with left side facing direction of throw" exercise is positively influenced by quantity of approaches (x_1), rest interval (x_3) and their interaction (x_1x_3). Training result depends by 25.8 %by quantity of starts (x_1), by 25.8 % — on rest interval (x_3), by 39.4 % — on their interaction (x_1x_3).

In *fifth* exercise –Ball throws with left side facing wall" mastering level is positively influenced by quantity of starts (x_1) and quantity of repetitions in one start (x_2). Training result depends by 51.8 % on quantity of starts (x_1) and by 20.2 % — on quantity of repetitions in one start (x_2).

Thus, effectiveness of *4th form pupils'* training to –ball throw to vertical target" is positively influenced by increasing of starts to 12 times, quantity of repetitions – to 3 times with rest interval 60 sec. Attention shall be

accentuated to quantity of starts and quantity of repetitions in one start.

Discussion

Results of the research permitted to supplement data about planning experiment for study of training process's effectiveness and working out of of training models (O.M. Khudolii, T.V. Karpunets [7], O.M. Khudolii, O.V. Ivaschenko [8], O.M. Khudolii [9]). We have proved that control over training process becomes more effective is training modes are determined on the base of regressive models, received as a result of complete factor experiment of CFE 2^{κ} type (O.M. Khudolii [13], O.B. Ivaschenko [3], V.I. Miroshnichenko [4]).

Data about modes of training of 1^{st}-4^{th} schoolchildren to physical exercises are the novelty.

Conclusions

Experiment of 2^3 type permitted to study multi factor structure of modes of 1^{st}-4^{th} form pupils' training to physical exercises, to determine optimal correlations of starts' quantity, quantity of repetitions in one start and rest interval in training of ~~–b~~all throws".

Effectiveness of 1^{st}-4^{th} form pupils' training to ~~–b~~all throw to vertical target" is positively influenced by increase of starts' quantity to 12, quantity of repetitions in one start – to 3 times with rest interval of 60 sec. For first form pupils quantity of repetitions in one start shall be accentuated when choosing mode of training; for second form pupils – reduction of rest interval to 60 sec. shall be paid attention to; for third form pupils – interaction of quantity of starts and quantity of repetitions in one start; for forth form pupils interaction of starts' quantity and repetitions in one star shall be accentuated.

The prospects of further researches imply determination of influence of training modes on dynamic of junior schoolchildren motor skills' indicators.

Acknowledgement

The research has been fulfilled as per plan of scientific and research works of Ministry of education and science, youth and sports of Ukraine, by topic 13.04 «Simulation of training process and development of children's and adolescents' motor skills» (2013—2014) (state registration number 0113U002102).

Conflict of interests

Author declares absence of any conflict of interests.

References:

1. Zdanevich A. A. U mladshikh shkol'nikov — metanie v cel' [For junior pupils – throw in target]. *Fizicheskaia kul'tura v shkole,* 1995, vol.1, pp. 13—16. (in Russian)
2. Ivashchenko O. V. Metodika navchannia gimnastichnim vpravam shkil'noi programi [Methodic of gymnastic exercises' training in school program]. *Teoriia ta praktika fizichnogo vikhovannia*, 2001, vol.1, pp. 26—31. http://dx.doi.org/10.17309/tmfv.2001.1.7 (in Ukrainian)
3. Ivashchenko O. V. *Normativnye pokazateli trenirovochnykh nagruzok na nachal'nom etape podgotovki iunykh gimnastok 6—8 let. Cand. Diss*. [Normative indicators of training loads at initial stage of junior, 6-8 yrs., girl-gymnasts,1988, 17 p. (in Russian)
4. Miroshnichenko V. I. *Metodika formirovaniia dvigatel'nykh navykov u detej mladshego shkol'nogo vozrasta. Cand. Diss.* [Methodic of motor skills' formation in junior school age children. Cand. Diss.], Moscow, NIIFDP APN USSR, 1988, 24 p. (in Russian)
5. Miroshnichenko D. T. Metodika navchannia akrobatichnim vpravam uchniv molodshikh klasiv [Methodic of junior form pupils' training to acrobatic exercises]. *Teoriia ta metodika fizichnogo vikhovannia*, 2007, vol.12, pp. 29—31. (in Ukrainian)
6. Ribalko V. Navchannia tekhniki metannia m'iacha na urokakh fizichnoi kul'turi [Training of ball throw technique at physical culture lessons]. *Fizichne vikhovannia v shkoli*, 2005, vol.5, pp. 27—31. (in Ukrainian)
7. Khudolii O. M., Karpunec' T. V. Planuvannia eksperimentu v doslidzhenni procesu pidgotovki iunikh gimnastiv [Planning of experiment in study of junior gymnasts' training]. *Teoriia ta metodika fizichnogo vikhovannia*, 2002, vol.4, pp. 2—8. http://dx.doi.org/10.17309/tmfv.2002.4.73 (in Ukrainian)
8. Khudolii O. M., Ivashchenko O. V. Konceptual'ni pidkhodi do rozrobki programi naukovikh doslidzhen' u fizichnomu vikhovanni [Conceptual approaches to working out of program of scientific researches in physical education]. *Teoriia ta metodika fizichnogo vikhovannia*, 2004, vol.4, pp. 2—5. http://dx.doi.org/10.17309/tmfv.2004.4.140 (in Ukrainian)
9. Khudolii O. N. *Modelirovanie processa podgotovki iunykh gimnastov* [Simulation of junior gymnasts' training process], Kharkiv, "OVS", 2005, 336 p. (in Russian)
10. Khudolii O. M. *Osnovi metodiki vikladannia gimnastiki* [Principles of gymnastic's training methodic], Kharkiv, "OVS", 2008, T.1, 414 p. (in Ukrainian)
11. Khudolii O. M. Tekhnologiia navchannia gimnastichnim vpravam. Dopovid' 1 [Technology of gymnastic exercises' training. Report 1]. *Teoriia ta metodika fizichnogo vikhovannia*, 2009, vol.8, pp. 19—34. http://dx.doi.org/10.17309/tmfv.2009.9.562 (in Ukrainian)
12. Khudolii O. M. Tekhnologiia navchannia gimnastichnim vpravam. Dopovid' 2 [Technology of gymnastic exercises' training. Report 2]. *Teoriia ta metodika fizichnogo vikhovannia*, 2009, vol.9, pp. 19—34.

http://dx.doi.org/10.17309/tmfv.2009.9.562 (in Ukrainian)
13. Khudolii O.M. *Teoretiko-metodichni zasadi sistemi pidgotovki iunikh gimnastiv 7—13 rokiv. Dokt. Diss.* [Theoretical-methodic principles of system of junior, 7-13 yrs. age, gymnasts' training Dokt. Diss.,], Kiev, 2011, 44 p. (in Ukrainian)
14. Khudolii O.M., Iermakov S.S. Zakonomirnosti procesu navchannia iunikh gimnastiv [Training process of junior gymnasts]. *Teoriia ta metodika fizichnogo vikhovannia*, 2011, vol.5, pp. 3—18, http://dx.doi.org/10.17309/tmfv.2011.5.707 (in Ukrainian)
15. Khudolii O.N. Zakonomernosti formirovaniia dvigatel'nykh navykov u iunykh gimnastov [Regularities of motor skills' formation in junior gymnasts]. *Nauka v olimpijskom sporte*, 2012, vol.1, pp. 36—46 (in Russian)
16. Khudolii O.M., Ivashchenko O.V. Konceptual'ni pidkhodi do modeliuvannia procesu navchannia i rozvitku rukhovikh zdibnostej u ditej i pidlitkiv [Conceptual approaches to simulation of training process and development of children's and adolescents' motor skills]. *Teoriia ta metodika fizichnogo vikhovannia*, 2013, vol.2, pp. 3—16. http://dx.doi.org/10.17309/tmfv.2013.2.1012 (in Ukrainian)
17. Khudolii O.M., Ivashchenko O.V., Chernenko S.O. Chinniki, shcho vplivaiut' na efektivnist' navchannia fizichnim vpravam khlopchikiv molodshikh klasiv [Factors, influencing on effectiveness of physical exercises' training of junior form boys]. *Teoriia ta metodika fizichnogo vikhovannia*, 2013, vol.1, pp. 21—26. http://dx.doi.org/10.17309/tmfv.2013.1.1006 (in Ukrainian)
18. Khudolii O.M., Ivashchenko O.V., Chernenko S.O. Chinniki, shcho vplivaiut' na efektivnist' navchannia fizichnim vpravam divchatok molodshikh klasiv [Factors, influencing on effectiveness of physical exercises' training of junior form girls]. *Teoriia ta metodika fizichnogo vikhovannia*, 2013, vol.2, pp. 43—47. http://dx.doi.org/10.17309/tmfv.2013.2.1016 (in Ukrainian)
19. Khudolii O.M., Ivashchenko O.V. Informacijne zabezpechennia procesu navchannia i rozvitku rukhovikh zdibnostej ditej i pidlitkiv (na prikladi sportivnoi gimnastiki) [Informational provisioning of training process and development of children's and adolescents, motor skills (on example of calisthenics)]. *Teoriia ta metodika fizichnogo vikhovannia*, 2013, vol.4, pp. 3–18. http://dx.doi.org/10.17309/tmfv.2013.4.1031 (in Ukrainian)
20. Khudolii O.M., Ivashchenko O.V. *Modeliuvannia procesu navchannia ta rozvitku rukhovikh zdibnostej u ditej i pidlitkiv* [Simulation of training process and development of children's and adolescents' motor skills], Kharkiv, "OVS", 2014, 240 p. (in Ukrainian)
21. Khudolii O.M., Ivashchenko O.V. *Teoriia ta metodika vikladannia gimnastiki* [Theory and methodic of gymnastic's training], Kharkiv, "OVS", 2014, 240 p. (in Ukrainian)
22. Khudolii O.M., Ivashchenko O.V. *Osnovi naukovo-doslidnoi roboti u fizichnomu vikhovanni i sporti* [Principles of scientific research work in physical education and sports], Kharkiv, "OVS", 2014, 200 p. (in Ukrainian)
23. Adashevskiy V. M., Iermakov S. S. Firsova Iu. Iu. Physical mathematical modelling of difficult elements of acrobatic rockand-roll. *Physical Education of Students*, 2013, vol.3, pp. 3-10.
24. Cieślicka M., Muszkieta R., Napierała M., Żukow W. Motor functioning of youth from Gniezno [Aktywność ruchowa młodzieży w Gnieźnie]. In: (Red.) Marek Napierała, Radosław Muszkieta, Walery Żukow. *Human being-Recreation-Health* [Człowiek — rekreacja — zdrowie], WSG Bydgoszcz, 2009, pp. 24—39.
25. Ivashchenko O.V., Khudolii O.M., Yermakova T.S., Pilewska W., Muszkieta R., Stankiewicz B. Simulation as method of classification of 7-9th form boy pupils' motor fitness. *Journal of Physical Education and Sport (JPES),* 2015, vol.15 (1), pp. 142–147. http://dx.doi.org/10.7752/jpes.2015.01023

Information about the author:

Chernenko S.O.: http://orcid.org/0000-0001-9375-4220; chernenko.sergey@mail.ru; Donbass State Machine-building Academy st. Shkadinova, 72, Kramatorsk, Donetsk region, 84313, Ukraine.

Cite this article as: Chernenko S.O. Simulation of junior pupils' training of ball throsing to vertivcal target. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 37-43. http://dx.doi.org/10.15561/18189172.2015.0507

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

Received: 07.04.2015
Accepted: 25.04.2015; Published: 30.04.2015

PSYCHOMOTOR THERAPY AS A EFFECTIVE METHOD OF ALLEVIATING THE SYMPTOMS OF CHILD'S NON-HARMONIOUS DEVELOPMENT

Gnitecka Jolanta, Nowak Agata, Romanowska-Tołloczko Anna
University School of Physical Education in Wrocław

Abstract. *Purpose:* assess the influence of a therapy conducted according to the Belgian School on the psychomotor development of children suffering from developmental dissonance. *Material and methods:* the studies involved 32 six yrs. old children, having symptoms of developmental dissonance, who qualified for Belgian psychomotor therapy and who came from different areas in Poland. Two measurements of the selected areas of the psychomotor field have been performed using the following tests: MOT 4-6 by R. Zimmer and M. Volkammer; PST 6-8 by S. Naville and A. Weber, B. Mock; WET 3-6 by P. Deimann and U. Kastner-Koller , as well as SCSIT by J. Ayres. The undertaken studies lasted for approximately 6 months and were a pedagogic quasi-experiment in nature. *Results:* upon the conclusion of experimental factor's influence i.e. the Belgian psychomotor therapy, it has been observed that in the study pertaining to the psychomotor development, the results obtained by the six-year-old children cease to significantly differ from the values obtained by their peers, displaying no symptoms of dissonance. *Conclusion:* psychomotor therapy according to the Belgian School is a useful method of alleviating the symptoms of a non-harmonious development of a six-year-old child. A scientific confirmation of the research problem's significance can facilitate therapist's work. The results of the research will also contribute to the development of knowledge about diagnosis of developmental dissonance and Belgian psychomotor therapy.
Key words: Belgian, psychomotor, therapy, development, dissonance.

Introduction

The problem we researched was based on many years' experience of European therapists and neurologists. It also constitutes a continuation of a pilot study among 500 kindergarten pupils from Poland, out of whom I have selected a significant number of children showing disorders of developmental dissonance (10%) [1].

The presentation of this topic in scientific literature expresses the need for of an early and effective intervention [2,3,4,5]. Also our own personal professional experience as part of the Early Intervention Government Program demonstrates the need for a prompt and professional activities of informative and therapeutic nature already at the kindergarten level [6], especially among children who are preparing for their school education duty [7].

The psychomotor therapy according to Procus and Block, proposed in the research, falls into the trend of integration therapies. Initially applied in the 60s of the 20th century in Belgium, and then in the 90s in Poland is based on neuro-physiological and psycho-pedagogical knowledge [8].

Psychomotor therapy is a system for rehabilitation in pre-school and junior school children (from the ages of two and a half to ten), which shows mild neuro-psychological symptoms referred to as minimal brain dysfunction (MBD) or as developmental disharmony [9]. According to Laucht, developmental disharmony is the mild neurological syndromes observed at the age of about four years [10]. There is around a 10% occurrence of symptoms of developmental disharmony within the school population [1]. It follows to emphasize however that the frequency is much higher amongst children who were born prematurely. Belgian psychomotor therapy has been developed on the basis of knowledge of neuro-physiological developmental processes of the brain during the prenatal period and in early childhood, taking into consideration both the genetic and environmental conditioning of maturity in the nerve system as well as the phenomena of integration and brain plasticity. Therapy according to Procus and Block is located within the current of integration therapies in which, on the basis of motor exercises, the development of many functions of central nervous system is stimulated, particularly within the scope of their mutual coupling and integration. The aim and effect of the therapy is the construction and activation of neuronal networks which are responsible for brain integration processes. In the method Procus and Block assume that through consciousness and achievement of a target movement a child will gradually obtain a control of the psychological process, control over himself, which will lead to a improvement in the cognitive processes: understanding, speech, memory. Gradually the integration of the nervous system as a whole will improve [11].

Therapy according to Procus and Block fits within the integrated therapy current, in which stimulation in the development of many functions of CNS, particularly in the scope of their mutual interlocking (coupling) and integration, is on the basis of motor exercises. The aim of the therapy is to suppress various types of brain disorders connected with: motor functions (clumsiness and hyperactivity), in the area of behavior, emotional disorders and difficulties with adaptation in family and school environment, problems of somatognosia, speech function (delay, dysphasia) [11]. As a result of which the child obtains the ability to function optimally in its environment, relative to age and psycho-physical predispositions. Within the clinical dimension the aim of the therapy is the eradication of pathology and motor disturbance of various kinds, eye-movement coordination, behavior, emotions, memory, attention, reading, writing.

http://dx.doi.org/10.15561/18189172.2015.0508

The results of the research by Kulakowska et al. [12] conducted from Psychomotor therapy according to Procus and Block may, even in a short period of application, have a significant influence on the treatment of somatognosis disturbances in children with developmental disharmony.

Purpose

The object of scientific research is the Belgian psychomotor therapy among children at kindergarten age suffering from developmental dissonance. The fundamental research problem of the project is contained in the following question: What changes in the psychomotor development of a kindergarten child suffering from developmental dissonance can be observed under the influence of the psychomotor therapy according to the Procus and Block model? The cognitive aim of the study is to present the concept of the Belgian psychomotor activity and its usefulness in the work with a child at kindergarten age.

Material and methods

Over a period of 6 months we were conduct a study among 32 children (9 boys and 23 girls), displaying the symptoms of developmental dissonance on the basis of the following tests: MOT 4-6 according to Zimmer, PST 6-8 by S. Naville, WET 3-6 according to Deimann, Kastner-Koller [13] and Southern California Sensory Integration Tests according to Ayres [14]. The study was carried out in 2 cycles, 1 child had pretest and posttest (before and after the Belgian psychomotor therapy). It was 17 research psychomotor tasks for each child. The fundamental research method, to be applied in the project, included a quasi-experiment method. The applied research technique included an international psychomotor tests and analysis of documents. The interview prepared for the purpose of the research was directed towards the parents of children with developmental dissonance. The next step was include conducting research and using selected international tests (MOT 4-6 according to Zimmer, PST 6-8 by Naville, WET 3-6 according to Deimann, Kastner-Koller and Southern California Sensory Integration Tests according to Ayres) intended to diagnose the children suffering from developmental dissonance. During each session of psychomotor diagnosis, we conducted a detailed observation which was written down on a child's chart.

Results

The expected result of the conducted research was the precise evaluation of the changes which took place in the psychomotor development of the children suffering from developmental dissonance exposed to the Belgian psychomotor therapy.

Figures 1-3 present the results of evaluation of the psychomotor development in the tested group before (Fig. 1.) and after (Fig.2) the Belgian therapy. Results were expressed in total score (0-2 points for each tasks).

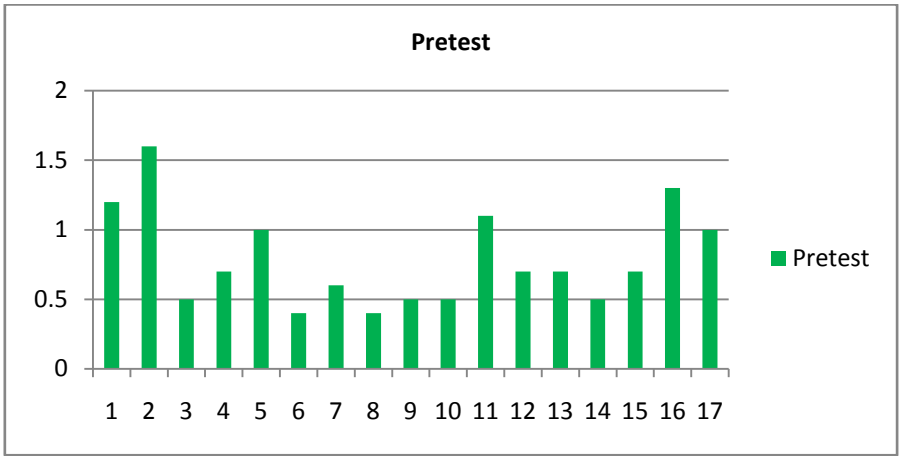

Fig.1. Level of the psychomotor development before Belgian psychomotor therapy (pretest)

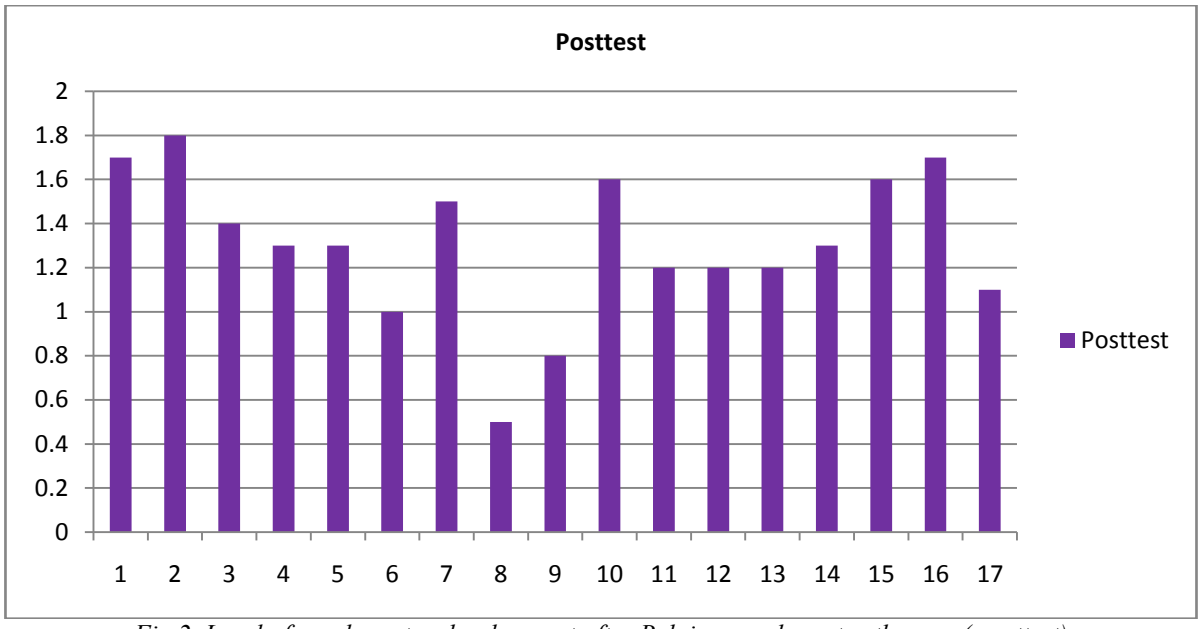

Fig.2. Level of psychomotor development after Belgian psychomotor therapy (posttest)

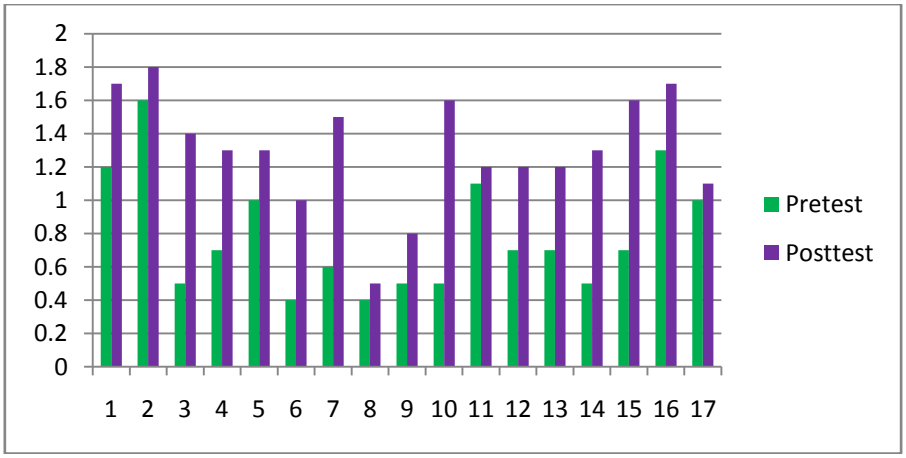

Fig.3. The results of evaluation of psychomotor development before (pretest) and after (posttest) therapy by six-year-old children suffering from developmental dissonance

Statistical analysis was based on the Wilcoxon test, R equivalent effect and Spearman's rank order correlation coefficient. Differences at $p<0.05$ were considered statistically significant.

Before therapy the scores showed lower levels of the psychomotor parameter.

Statistical analysis of psychomotor tasks showed that by the children suffering from developmental dissonance difference between the initial (Fig. 1) and final (Fig 2.) test results was statistically significant (Wilcoxon test, $p=0.0001$). The level of the effects R equivalent = 0.66 (middle effect).

Discussion

General hypothesis of the research: the application of the Belgian psychomotor therapy will bring changes in the development which can be observed both during a neurological examination, as well as during a psychomotor examination.

Upon the conclusion of the influence of the experimental factor, i.e. the Belgian psychomotor therapy, it has been observed that in the study pertaining to the psychomotor development, the results obtained by the six-year-old children cease to significantly differ from the values obtained by their peers, displaying no symptoms of dissonance [12].

Psychomotor therapy by the Procus and Block method may already within a short 3 to 4 month period of application have a significant influence on the treatment of psychomotor disorders that occur in children with developmental disharmony [11].

One of the effects was include the reduction of the intensity of the symptoms of developmental dissonance in children. Determining the relationships between the level of the changes in the psychomotor development of the children and the symptoms of developmental dissonance and a Belgian psychomotor therapy [8,12].

Kułakowska et al. [11,12], Gnitecka at al. [7, 8] and Nowak at al. [6,4] and others studied the issue of impact of the relationship between the symptoms of a non-harmonious development of a child. The results of Kułakowska et al.

[11, 12] indicated a correlations between the psychomotor therapy and the level of the aspects of somatognosia disorders [15,16]. Gnitecka et.al. [7,8] also showed that, in the examined population of children with MBD [17,18,19,20] the level of somatic and motor development was similar regardless the origin of the dysfunctions.

The significance of the implementation of the research for the Polish society is enormous. The implementation of the research will contribute to the development of a field of science and a scientific discipline i.e. kindergarten physiotherapy based on physical culture sciences [8,6,4]. Although the therapy in the Procus and Block model is becoming more and more popular in Poland, amongst physicians, physiotherapists, speech therapists, psychologists, as well as the parents of children with impeded development it is rather unknown. Thus, there is a need in popularizing it. The obtained results might also constitute a starting point for activities aimed at increasing the number of hours of physical movement classes in kindergartens and schools. There is an evaluation of the possibility to utilize the results of the conducted research in practice, along with the continuation of the study. Confirmation of the effectiveness of psychomotor therapy by means of the Procus and Block method requires the conduction of tests in conjunction with a control group.

The implementation of the project will contribute to the development of a field of the psychomotor diagnosis of children commence their school education obligation in Poland.

The application of Belgian psychomotor therapy for the rehabilitation of neurological disorders may prove to be very useful; however, it requires further research in this field to confirm the effectiveness and therapeutic potential of this method.

Conclusions

The effect of the conducted experimental study is statistically significant improvement of results in experimental group. It showed need in further studies of psychomotor therapy's influence on the level of psychomotor development of children suffering from developmental dissonance. Subsequent experiments should be conducted on larger populations, which should be selected with regard to etiology and the type of non-harmonious development.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

References

1. Marlow N. For the EPICURE Study group: Neurologic and Developmental Disability at Six of Age after Extremely Preterm Birth. *New England Journal of Medicine,* 2005, vol.353, pp. 9-19.
2. Bremer A., Stucke Ch. *Development of equilibrium function in children of pre-school age with regard to their social environment*. WCPAS VII, Magdeburg 2008, p. 35.
3. Choi Y.S., Lee E.J. The effects of Psychomotor on self concept, sociability and aggression in preschoolers. *Journal oh Korean Academy of Child Health Nursing,* 2008, vol.14, pp. 379-387.
4. Nowak A., Gnitecka J. Parents' awareness of the child's psychomotor development as an aspect of promoting health in kindergartens. *Annales Universitatis Mariae Curie-Skłodowska,* Sect. D Med. 2007, vol. 62,18 (5), pp. 297-300.
5. Trouli K. Psychomotor education in preschool years - an experimental research. *European Psychomotricity Journal,* 2008, vol. 1, pp. 23-27.
6. Nowak A., Bartusiak I., Gnitecka J. Promoting health awareness in kindesgartens from the perspective of psychomotor researches. *Annales Universitatis Mariae Curie-Skłodowska,* Sect. D Med. 2007, vol. 62, 18, (2) pp. 360-364.
7. Gnitecka J. Psychomotoric therapy by children with MBD. In: Kossakowski Cz. (ed.) *A person with a disability in the system of rehabilitation, education and social support*. Olsztyn 2007, pp. 55-62.
8. Gnitecka J., Nowak A. Belgian psychomotor therapy as a tool of prophylactic and promoting health awareness of children. *Annales Universitatis Mariae Curie-Skłodowska,* Sect. D Med. 2007, vol.62, 18(2), pp. 365-368.
9. Wojnarowska K., Olechnowicz Ł., Gnitecka J. Supporting speech development of children with hearing defect by the use of mvarious types of motor therapy. In: Kruk-Lasocka J. (ed.) *Psychomotoric: Movement Full of Meaning*. Wroclaw 2008, pp. 55-62.
10. Laucht M. Developmental outcome of infants born with biological and psychosocial risks. *Journal of Child Psychology and Psychiatry,* 1997, vol.38(7), pp. 843-853.
11. Kułakowska Z., Szamotulska K., Zychowicz B., Gnitecka J. Psychomotor rehabilitation of children by the Procus and Block method. *Medical Rehabilitation* [Medycyna Rehabilitacyjna], 2009, vol.13(4), pp. 22-38.
12. Kułakowska Z. Changes in the somatagnosis of children with developmental disharmony who have undergone psychomotor therapy by means of the Procus and Block method. *Medical Rehabilitation* [Medycyna Rehabilitacyjna] 2010, vol.14(4), pp. 9-17.
13. Deimann P., Kastner-Koller U. *Wiener Entwicklungstest*. Göttingen, 2002, pp. 10-11.
14. Ayres J. *The Southern California Sensory Integration Tests*. Warszawa, 2009, pp. 10-20.
15. Counsell S. J. Magnetic resonance imaging of preterm brain injury. *Archives of Disease in Childhood*. 2002, vol. 88, pp. 269-274.
16. Inder T.E. Periventricular white matter injury in the prematureinfants is followed by reduced cerebal cortical gray matter volume at term. *Annals of neurology,* 1999, vol.46, pp. 755-760.

17. Touwen B., Prechtl H. Neurological development in infancy. *Clinics in Developmental Medicine*, 1976, vol.58, pp. 136-141.
18. Michelsson K. *Minimal Brain damage*. Essentialia, 1985, vol.14, pp. 1-3.
19. Petersen R.C. Mild cognitive impairment as a diagnostic entity. *Journal of Internal Medicine,* 2004, vol.256(3), pp. 183-194.
20. Berger W. Developmental aspects of equilibrium control during stance: a kinematic and EMG study. *Gait & Posture,* 1995, vol.3, pp. 149-155.

Information about the authors:

Gnitecka Jolanta: http://orcid.org/0000-0001-5855-1057; Jolanta.Gnitecka@awf.wroc.pl; University School of Physical Education in Wrocław; Paderewskiego 35, 51-612 Wrocław, Poland.

Nowak Agata: http://orcid.org/0000-0001-7924-0944; Agata.Nowak@awf.wroc.pl; University School of Physical Education in Wrocław; Paderewskiego 35, 51-612 Wrocław, Poland.

Romanowska-Tołłoczko Anna: http://orcid.org/000-0003-2236-7519; Anna.Romanowska-Tolloczko@awf.wroc.pl; University School of Physical Education in Wrocław; Paderewskiego 35, 51-612 Wrocław, Poland.

Cite this article as: Gnitecka Jolanta, Nowak Agata, Romanowska-Tołłoczko Anna. Psychomotor therapy as a effective method of alleviating the symptoms of child's non-harmonious development. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 44-48. http://dx.doi.org/10.15561/18189172.2015.0508

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

Received: 31.03.2015
Accepted: 25.04.2015; Published: 30.04.2015

THE EFFECT OF GLYCEMIC INDEX ON PLASMA IL-6 IN SUB-MAX EXERCISE

Hasani S.H.[1], Silalerdetkul S. [1], Mehranpour A.B. [1], Mitranun W. [2]
[1]Physical Education & Sport science Department, Islamic Azad University, mahallat, Iran,
[2]Faculty of Physical Education & Sport science, Srinakharinwirot University, Bangkok, Thailand

Abstract. *Purpose:* This study examined the effect of a pre-exercise meal with different glycemic index (GI) on plasma IL-6 concentration and glucose metabolism during sub-max exercise (endurance performance run). *Material*: Ten men completed 1 h running at 70%-75% VO2max on a level treadmill on three occasions. In each trial, one of the three prescribed beverages as meal, i.e. high GI and low GL or placebo was consumed by the subjects 45 min before exercise. Blood samples were collected before, after, 1h and 24h after exercise. *Result:* Concentration of Plasma IL-6 in LGI group was less than HGI and Pla groups, IL-6 tended to significantly increase after exercise in groups (all $P < 0.05$), also there was significant difference for plasma IL-6 concentration between placebo and low glycemic groups in after exercise (P=.003) and 1hour after exercise (P=.005) . CK was significantly elevated at all- time points after exercise in 3 groups (all $P < 0.05$). Concentration of serum CK in LGI group was less than HGI and Pla groups but there not significantly. The consumption of the LGI beverage before exercise could minimize the increasing of plasma IL-6 concentration immediately after exercise and during the 1 h recovery period compared with the HGI beverage and Pla. *Conclusion: This* result suggested that the LGI beverage consumed as pre-exercise meal could modify the inflammatory response in prolonged exercise.

Key words: Sub-max, exercise, glycemic, index, plasma.

Introduction

Exercise can induce inflammation by raising the levels of IL-6 (Nieman et al., 2006). Intensity, duration, and the muscle mass involved in the exercise are factors known to influence the quantity of IL-6 found in plasma (Ostrowski et al., 2000). Carbohydrate(CHO) consumption before, during and after exercise can attenuate stress hormone response and improves exercise performance by enhancing blood glucose availability (Bishop et al., 2002; Febbraio et al., 2003; Nieman et al., 2003). Otherwise, CHO feeding before exercise cause a rapid increase in blood glucose and insulin can cause hypoglycemia in some individuals at the start of exercise (Foster et al., 1979; Kuipers et al., 1999).

This observation led to the investigation into the effect of different types and structures of CHO and their comparison on exercise performance (Guezennec et al., 1989, 1993; Koivisto et al., 1981). Numerous studies have suggested that a low glycemic (LGI) meal consumed at different times, to prolonged exercise could maintain higher blood glucose concentrations, decrease plasma lactate concentrations during exercise and/or post-exercise, (Wee et al., 1999; DeMarco et al., 1999). Furthermore in prolonged exercise minimizing the glycemic and insulin response could sustain CHO supply during exercise. These responses could decrease the cortisol response, IL-6, TNF-α and other inflammatory biomarkers (Bishop et al., 2001), also there is some evidences that a diet whit high amount of glucose could increase pro-inflammatory cytokine (Kirwan et al., 2001).High glycemic (HGI) diet is the exacerbation of glucose spike that occurs immediately after eating (Pittas et al., 2006), this spike could alter glucose and insulin dynamics during exercise.

These data suggest that consuming food with different glycemic index could be effect on inflammatory responses in exercise. Despite the recent advances in researches are on the relation between immune suppression and CHO supplementation during prolong exercise or CHO as meal before exercise. Therefore, knowing about that which type of CHO be able to reduce inflammatory responses in exercise, could guide the athletes for choosing beneficial nutrition to improve their performance. More research is necessary to elucidate the relationship between systemic inflammation and GI diets in prolong exercise. Few studies, if any, have directly investigated the influence of a GI beverage on IL-6 response to prolonged exercise. There is clearly a pressing need to clarify the role of GI on IL-6 responses before prolonged exercise. Using an identical design and subject population, this study aimed to examine the effect of a pre-exercise beverage with different GI on IL-6 responses to a sub-max exercise. The aim of this study was determine whether there are differences in plasma IL-6 concentration and glucose metabolism between low and high GI beverage in sub-max exercise.

Materials and Methods

Subjects

Ten healthy endurance male runners (age 21±2 years; body mass 68±8 kg; high 176±6 cm; fat percentage (%)10±2; VO2max 56±21ml/kg per min and training experience 5±1years) were volunteered to participate in this study which was approved by the Ethical Committee of Qom University of medical science. Written informed consent was obtained from all subjects. They were also required to complete a general health questionnaire and were excluded if any medication had been taken during the 6 weeks prior to the study and if symptoms of upper respiratory infection had been experienced in the 4 weeks training and were accumulating at least 50 km of running distance per week. Subjects were asked to refrain from alcohol consumption 24 hours prior to sample collection.

Exercise familiarization

2015 http://dx.doi.org/10.15561/18189172.2015.0509

At least 1 week prior to main trial all subjects reported to the laboratory for becoming familiar with treadmill running and the experimental procedures, they were required to undertake vo2 max test via Bruce protocol. Before the main trials, participant kept a 3-day diary of their dietary intake before the main trial and energy intake and dietary composition were subsequently analyzed (The Food Processor 10.0, Esha).They were required to repeat the same diet before each main trial to minimize the variation in muscle and liver glycogen concentrations.

Experimental procedure

A standardized prolong exercise protocol, 1 h constant running at 70% -75% VO2max was used in this study (Fig. 1). This study is a counterbalanced cross-over design and the order of three trials were randomized, separated by at least14 days. Subjects were randomized to consume GI beverage High-GI (1 g of glucose/kg body mass in 400 ml water, GI = 83), Low-GI (1 g of fructose/kg body mass in 400 ml water, GI = 36) or placebo (an equal volume of flavor- and color-matched artificially sweetened placebo) (Gleeson et al., 1986) for 45 min pre-exercise .Blood samples (10 mL) were collected at baseline, before and immediately after exercise , 1 and 24 h after exercise.

On the day of the main trial, subjects reported to the laboratory at about 8:00 am after an overnight fast of 12 h. After collection of the baseline blood samples the participants were consumed either the GI beverage (High-GI, Low-GI) or placebo. They remained seated in a quiet section of the laboratory for 45 min with minimal level of activity and after 45 min resting period, they were started training: standardized 5 min warm-up at 60% VO2 max was performed. Then subjects were run on the treadmill at a fixed speed of 70% -75%VO2 max for 1 h. All of the trials were performed under similar conditions of barometric pressure, temperature, and relative humidity. No food was been allowed until after the final blood sample were be taken.

Blood sampling:

10 ml venous blood was drawn from an antecubital vein in the forearm at each time point : 1- Fast blood sample (F.B.S) ,2 - Pre-exercise (PRE-ex) , 3-Immediately post-exercise (POST) 4- 1 h after exercise (POST-60 min) 5- 24 hour after exercise, into two different evacuated collection tubes (Vacutainer; Becton Dickinson, Mountain View, CA). The first (5 ml) venous blood sample was drawn into a vacuum tube with clot activator and serum separator for collection of serum to analyze glucose by BIOSEN C (EKF Diagnostic GmbH, West Germany) and CK by SYNCHRON® System(s) (Beckman Coulter, Inc.USA). The second (5 ml) venous blood sample was taken in to K3 EDTA vacutainers .5ml blood sample was spun at 1500 g for 10 min at 4°C to obtain plasma which was immediately stored at -70 °C before being analyzed for IL-6 . IL-6 was determined with the use of quantitative sandwich type enzyme-linked immunosorbant assay (ELISA) kits from R&D systems (Minneapolis, MN). All standards and solutions were prepared, and procedures were followed according to the kit specifications. Samples were diluted when necessary to ensure that the measurement fell within the range of the standard curve.

Data analysis

All collected data will be presented as mean and standard deviation (Mean ± SD). Repeated measures 5 × 3 (time × groups) ANOVAs was used to assess metabolic and immune differences between groups. Any significant F ratios shown were assessed using Bonferroni correction test. Assumptions of homogeneity and sphericity in the data were checked. Statistical significance was accepted at $p < 0.05$. The data was analyzed by using the statistical package SPSS, PC program, version 19.0 (SPSS Inc., USA).

Results:

10 Subjects completed 3 sessions of endurance exercise (Table 1) running at a fixed speed of 70% -75%VO2 max for 1 h on the treadmill.

Table1. Individual characteristic: N = 10.Values = mean ± SD. VO2max = predicted maximal oxygen consumption.

Characteristics	***M± SD***
Age (yrs)	21±2
Height (cm)	176±6
Body mass (kg)	68±8
Fat percentage (%)	10±2
VO_2max ($ml.kg^{-1}.min^{-1}$)	56±2
Training experience (yrs)	5±1

Markers of inflammation

Plasma IL-6 concentration and CK were measured as indicators of inflammation as a result of muscle damage. At the baseline, there was no significant difference for IL-6 between trials. Concentration of Plasma IL-6 in LGI group was less than HGI and Pla groups, IL-6 tended to significantly increase after exercise in 3 groups (all $P < 0.05$), also there was significant difference for plasma IL-6 concentration between placebo and low glycemic groups in after exercise (P=.003) and 1hour after exercise (P=.005) The IL-6 data are presented in figure (Fig.1). For CK at the baseline, there was no significant difference between trials. Concentration of serum CK in LGI group was less than HGI and Pla groups. CK was significantly elevated above baseline values at all- time points after exercise in 3 groups (all $P < 0.05$), but there was no significant difference for CK between 3 groups (Fig.2).

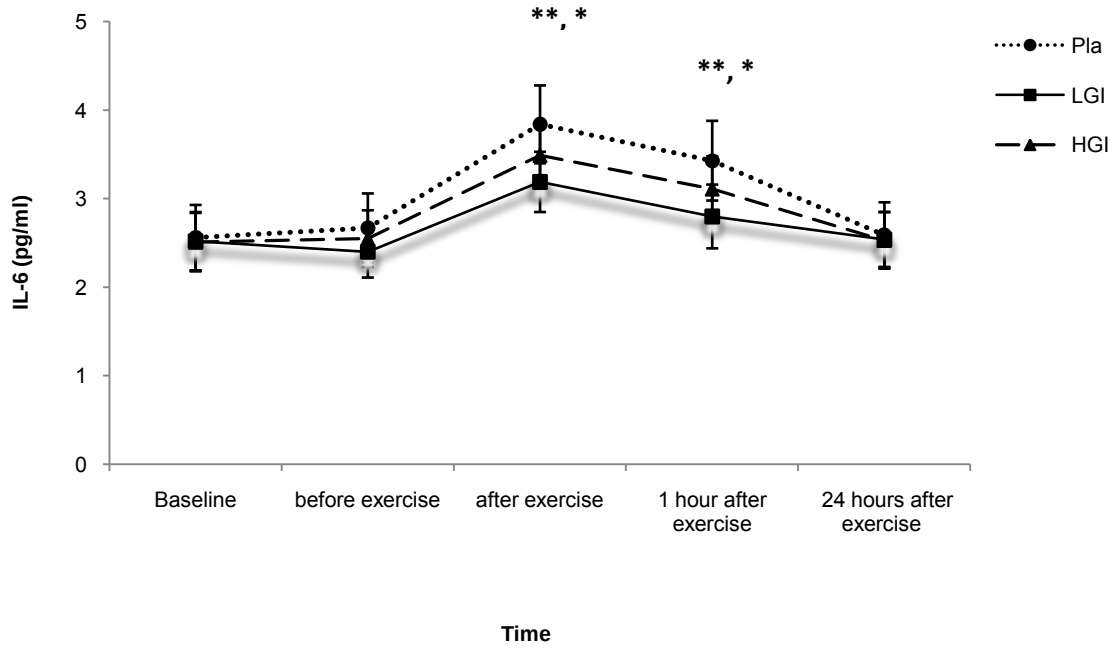

Fig. 1 Mean concentration of plasma IL-6 for Pla, LGI and HGI diet groups at the various time points. Significant differences between Pla and LGI (treatment effect) are indicated with (**) where P <0.05; where P < 0.05; Significant differences from baseline (time effect) are denoted by (*) where P < 0.05. Solid black bar represents resistance exercise bout; Pla = placebo, LGI = Low glycemic index, HGI = High glycemic index. Values are mean ± SE.

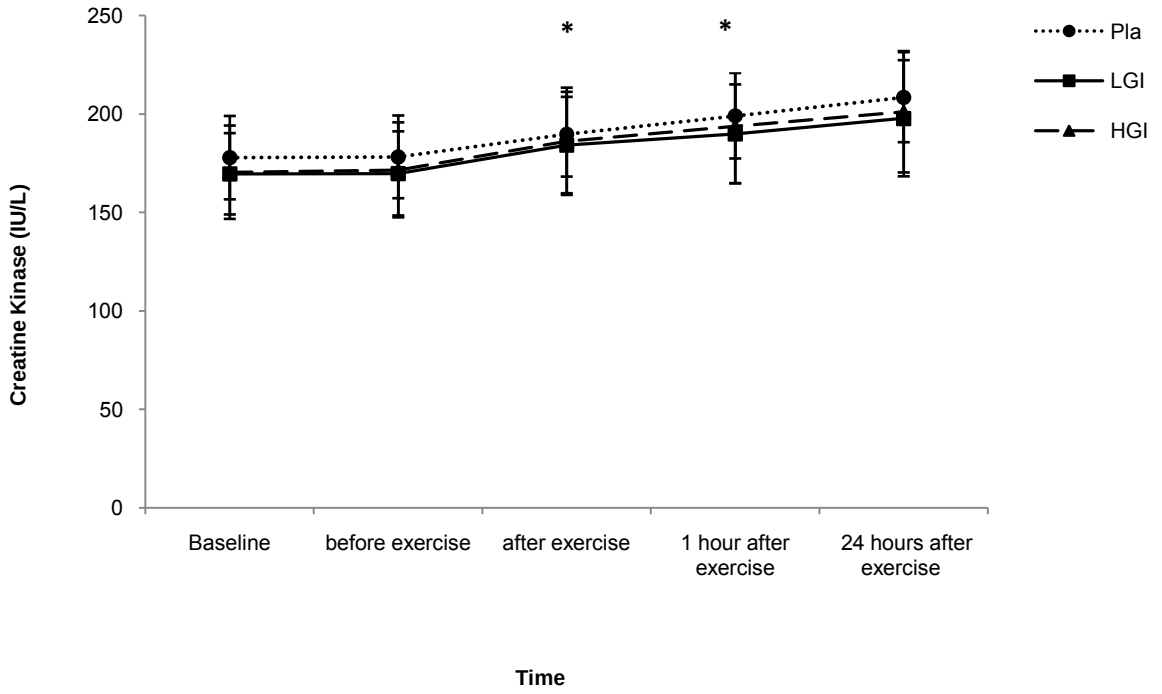

Fig. 2. Mean concentration of serum CK for Pla, LGI and HGI diet groups at the various time points. Significant differences from baseline (time effect) are denoted by (*) where P < 0.05. Values are mean ± SE. Pla = placebo, LGI = Low glycemic index, HGI = High glycemic index.

Blood glucose

At the baseline, there was no significant difference for glucose between trials. Concentration of glucose in HGI group was more than LGI and Pla groups ,the serum concentration of glucose increased significantly above baseline values at before exercise and decrease significantly after exercise in LGI and HGI groups (all $P < 0.05$) . Furthermore there was significant difference for glucose between placebo with low glycemic groups (P=0.00) and placebo with high glycemic in before exercise (P=0.00), also placebo with low glycemic groups (P=0.00) and placebo with high glycemic in after exercise (P = 0.01) (Fig.3).

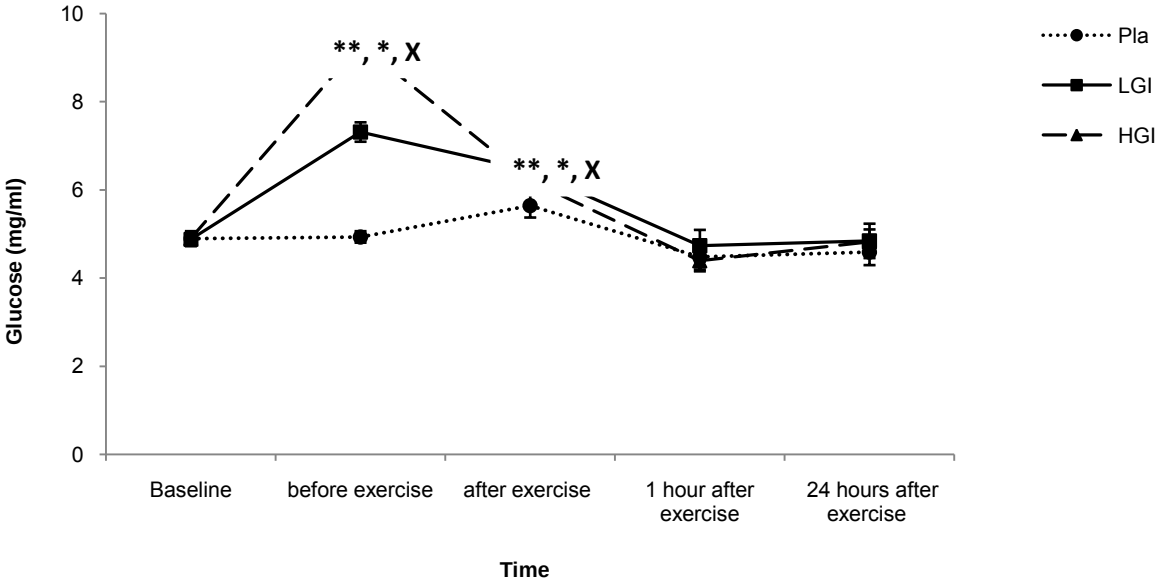

Fig. 3. Mean concentration of serum glucose for Pla, LGI and HGI diet groups at the various time points.
Significant differences between Pla and LGI (treatment effect) are indicated with (**)where P <0.05; Significant differences between Pla and HGI (treatment effect) are indicated with (X) where $P < 0.05$ Significant differences from baseline (time effect) are denoted by (*) where $P < 0.05$. Solid black bar represents resistance exercise bout; Pla = placebo, LGI = Low glycemic index, HGI = High glycemic index. Values are mean ± SE.

Discussion

To our knowledge, this may be the first study that directly determined the role of GI as beverage on immune responses during endurance exercise. The major finding of the present study revealed that the consumption of a LGI beverage, before endurance exercise decreased the elevation of plasma IL-6 concentrations immediately after exercise and during the 1 h recovery period compared with the HGI and Pla groups. These responses were accompanied by an attenuated increase in serum CK concentrations in LGI group compared with the HGI and Pla groups at the end of the 1 h recovery period.

It has been reported that the noticeable increase in circulating IL-6 concentrations are related to exercise intensity, duration, mass of muscle involved, and endurance capacity (Bishop et al., 2001; Matthys et al., 1995). In the present study, IL-6 increased immediately after exercise significantly. Recent studies demonstrate that IL-6 is produced by skeletal muscles contraction during exercise and this release also related to contraction and low muscle glycogen (Bishop et al., 1999). On the other hand most studies of CHO intervention have used continuous prolonged exercise of fixed intensity (%VO2max) and duration and CHO ingestion in this situation is effective in minimizing perturbations in circulating stress hormones and immune responses (Bishop et al.,2001; Li et al.,2004). CHO ingestion attenuated elevations in plasma IL-6 during both running and cycling mainly because of its effect at the post-transcriptional level of IL-6 (Nieman et al., 1998; Pedersen et al., 2008; Nehlsen et al., 1997), whereas low muscle glycogen concentrations further enhanced IL-6mRNA and the transcription rate for IL-6 (Steensberg et al., 2003). Therefore, muscle glycogen content appears to be an important stimulus for IL-6 which acts as an energy sensor. However, in our finding IL-6 in LGI group was significantly less than HGI and Pla groups. In endurance exercise minimizing the glycemic response could sustain CHO supply during exercise, that cause to decrease the cortisol response, IL-6 and other inflammatory biomarkers (Bishop et al., 2001), however a HGI diet could increase pro-inflammatory cytokine (Kirwan et al., 2001). HGI diet is the exacerbation of glucose spike that occurs immediately after eating this spike could alter glucose and insulin dynamics during exercise (Pittas et al., 2006), which was in agreement with the findings in our present study.

Creatine kinasis (CK) is an enzyme normally found only in skeletal muscle that used as an indirect marker of muscle damage in the present study. CK was measured during the time in three conditions and increasing observed over the time. Concentration of serum CK in LGI group was less than HGI and Pla groups but there were no significant changes in CK between conditions. The phenomena of peak CK at 48 hours post-exercise as seen in the LGI group is also not uncommon (Malm et al. 2004). This difference could be a result of a gradually increase in insulin following

consumption of a LGI diet versus the HGI diet before exercise. Insulin is a powerful promoter of protein synthesis (Cockburn et al., 2010). On the other hand CK can be elevated for several days in individuals (Miles et al., 2010) because of this our protocol couldn't have significant effect on CK concentration.

Conclusion

The consumption of the LGI beverage before exercise could minimize the increasing of plasma IL-6 concentration immediately after exercise and during the 1 h recovery period compared with the HGI beverage and Pla. This acute improvement is consistent with studies that have noticed to the benefits of a LGI diet as most evident in individuals who follow this diet long-term. This result suggested that the LGI beverage consumed as pre-exercise meal could modify the inflammatory response in prolonged exercise. Further research is needed to establish the connection between glucose kinetics of GI meal and immune function.

Conflict interests

The authors declare they have no conflict interests.

References

Bishop N.C., Blannin A.K., Robson P.J. The effects of carbohydrate supplementation on immune responses to a soccer-specific exercise protocol. *Journal of Sports Science*, 1999, vol.17, pp. 787-796.

Bishop N.C., Walsh N.P., Haines D.L. Pre exercise carbohydrate status and immune responses to prolonged cycling. II. Effect on plasma cytokine concentration. *International Journal of Sport Nutrition and Exercise Metabolism*, 2002, vol.11, pp. 503–512.

Bishop N.C., Walsh N.P., Haines D.L. Pre-exercise carbohydrate status and immune responses to prolonged cycling: I. Effect on neutrophil degranulation. *International Journal of Sport Nutrition and Exercise Metabolism*, 2001, vol.11, pp. 490-503.

Cockburn E., Robson-Ansley P., Hayes P.R. Effect of milk volume consumed on the attenuation of exercise-induced muscle damage. *European Journal of Applied Physiology*, 2011, vol.51, pp. 618-5.

DeMarco H.M., Sucher K.P., Cisar C.J. Pre-exercise carbohydrate meals: Application of glycemic index. *Medicine and Science in Sports and Exercise*, 1999, vol.31, pp. 164–170.

Febbraio M.A., Steensberg A., Keller C. Glucose ingestion attenuates interleukin-6 release from contracting skeletal muscle in humans. *Journal of Physiology*, 2003, vol.549(Pt 2), pp. 607–612.

Foster C.D., Costill W., Fink M. Effects of pre-exercise feedings on endurance performance. *Medicine and Science in Sports and Exercise*, 1979, vol.11, pp. 1-5.

Guezennec C.Y., Satabin P., Duforez F. The role of type and structure of complex carbohydrates response to physical exercise. *International Journal of Sports Medicine*, 1993, vol.14, pp. 224–231.

Guezennec C.Y., Satabin P., Duforez F. Oxidation of corn starch, glucose and fructose ingested before exercise. *Medicine and Science in Sports and Exercise*, 1989, vol.21, pp. 45–50.

Kirwan J.P., O'Gorman D.J., Cyr-Campbell D. Effects of a moderate glycemic meal on exercise duration and substrate utilization. *Medicine and Science in Sports and Exercise*, 2001, vol.33, pp. 1517–1523.

Koivisto V.A., Karonen S.L. , Nikkila E.A. Carbohydrate ingestion before exercise: Comparison of glucose, fructose, and sweet placebo. *Journal of Applied Physiology*, 1981, vol.51, pp. 783–787.

Kuipers H., Fransen E.J., Keizer H.A. Pre-exercise ingestion of carbohydrate and transient hypoglycemia during exercise. *International Journal of Sports Medicine*, 1999, vol.20, pp. 227–231.

Li T.L., Wu C.L., Gleeson M. The effects of preexercise high carbohydrate meals with different glycemic indices on blood leukocyte redistribution, IL-6, and hormonal responses during a subsequent prolonged exercise. *International Journal of Sport Nutrition and Exercise Metabolism*, 2004, vol.14, pp. 647–656.

Matthys P., Mitera T., Heremansl H. Anti-gamma interferon and anti-interleukin-6 antibodies affect staphylococcal enterotoxin B-induced weight loss, hypoglycemia, and cytokine release in D-galactosamine-sensitized and unsensitized mice. *Infection and Immunity*, 1995, vol.63, pp. 1158–1164.

Miles M.P., Depner C.M. Kirwan R.D. Influence of macronutrient intake and anthropometric characteristics on plasma insulin after eccentric exercise. *Metabolism: clinical and experimental*, 2010, vol.59, pp. 1456-1464.

Miles M.P., Pearson S.D., Andring J.M. Effect of carbohydrate intake during recovery from eccentric exercise on interleukin-6 and muscle-damage markers. *International Journal of Sport Nutrition and Exercise Metabolism,* 2007, vol.17, pp. 507–520.

Nehlsen-Cannarella S.L., Fagoaga O.R., Nieman D.C. Carbohydrate and the cytokine response to 2.5 h of running. *Journal of Applied Physiology*, 1997, vol.82, pp. 1662-1667.

Nieman D.C., Johanssen L., Lee J.W. Immune response to heavy exertion. *Journal of Applied Physiology*, 1998, vol.82, pp. 1385-1394.

Nieman D.C., Davis J.M., Henson D.A. Muscle cytokine mRNA changes after 2.5 h of cycling: influence of carbohydrate. *Medicine and Science in Sports and Exercise*. 2004, vol.37, pp. 1283-1290.

Nieman D.C., Dumke C.L., Henson D.A. Muscle damage is linked to cytokine changes following a 160-km race. *Brain, Behavior and Immunity*, 2006, vol.19, pp. 398-403.

Ostrowski K., Schjerling P., Pedersen B.K. Physical activity and plasma interleukin-6 in humans-effect of intensity of exercise. *European Journal of Applied Physiology*, 2000, vol.83, pp. 512-5.

Pedersen B.K., Febbraio M.A., Ullum H. Muscle as an endocrine organ: focus on muscle-derived interleukin-6. *Physiology Review*, 2008, vol.88, pp. 1379–1406.

Pittas A., Roberts S., Das S. The effects of the dietary glycemic load on type 2 diabetes risk factors during weight loss. *Obesity*, 2006, vol.65, pp. 2200-2209.

Steensberg A., Fischer C.P., Keller C. IL-6 enhances plasma IL-1ra, IL-10, and cortisol in humans. *American Journal of Physiology, Endocrinal Metabolism*, 2003, vol.285, pp. E433-E437.

Wee S.L., Williams C., Gray S. Influence of high and low glycemic index meals on endurance running capacity. *Medicine and Science in Sports and Exercise*, 1999, vol.31, pp. 393–399.

Information about the authors:

Hasani S.H.: http://orcid.org/0000-0002-7935-106X; sareh.hasani59@gmail.com; Islamic Azad University; P.O.BOX: 1666976113, No 75, 4th Golestan St., Pasdaran Ave, Tehran, Iran.

Supaporn S.: orcid.org/0000-0003-3245-1263; sareh.hasani59@gmail.com; Srinakharinwirot University of Bangkok; 2 Phra Chan Alley, Phra Borom Maha Ratchawang, Phra Nakhon, Bangkok, 10200, Thailand.

Mehranpour A.B.: orcid.org/0000-0002-8797-8313; mehranpour49@gmail.com; Srinakharinwirot University of Bangkok; 2 Phra Chan Alley, Phra Borom Maha Ratchawang, Phra Nakhon, Bangkok, 10200, Thailand.

Witid M.: orcid.org/0000-0001-8888-8398; sareh.hasani59@gmail.com; Srinakharinwirot University of Bangkok; 2 Phra Chan Alley, Phra Borom Maha Ratchawang, Phra Nakhon, Bangkok, 10200, Thailand.

Cite this article as: Hasani S.H., Supaporn S., Mehranpour A.B., Witid M. The effect of glycemic index on plasma il-6 in sub-max exercise. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 49-54. http://dx.doi.org/10.15561/18189172.2015.0509

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

Received: 05.04.2015
Accepted: 25.04.2015; Published: 30.04.2015

EFFECT OF TRAINING INFORMATION TECHNOLOGY AND COMMUNICATION DRIVING SCHOOL

Case of the teaching of O'Brien shot put style

Aymen Hawani, Maher Mrayeh, Mohamed sami Bousid
Higher Institute of Sport and Physical Education, Tunis, Tunisia

Abstract. The purpose of this study was to compare three different pedagogical approaches to training of complex motor skill: shot put style translation (O'Brien). The first is to introduce learning situations using an 'Audiovisual Projection' '(APA). The second is essentially based on demonstration of gesture, supported by verbal instructions (ADG). The third is based exclusively on verbal instructions (ACV). To do this, a group of 87 trainees from three classes of 7th base year participated in this study. Their average age was between 12 and 14 years, an average height of about ± 1.60m and a weight of 55 kg ±. All they had no practical experience in athletic activity, specifically in Shot Put. To each of three classes one of the three approaches was applied as well as 8 sessions alternating with three assessment sessions. The results showed that performance of trainees after using of the first approach (APA) was relatively better than that was achieved with using of other two approaches, especially when training of complex motor tasks, specific to the chosen style of throwing. This allows to deduce the existence of a relationship between complexity of the motor action to be reproduce and interpretation of audiovisual messages, presented by the coach in the middle of training cycle.

Keywords: Pedagogical approaches, complex motor skill, Audiovisual Projection, style translation, verbal instructions.

Introduction

In the area of motor skill acquisition, the theoretical framework of observational learning can be identified in the study of Carroll and Bandura (1982). Researchers reported that in a first phase the observation of an external model is effective in early learning for the acquisition of a new coordination complex consisting of motor sequence. While the second phase is particularly dedicated to knowledge of the performance that is delivered through video feedback, which helps to refine the internal model. In continuation of the work of Carroll and Bandura (1982), experimenting with Magill and Schoenfelder-Zuhdi (1995) highlights the complementary nature of the demonstration and knowledge of the performance for the acquisition of a series of rhythmic gymnastics sports rope. Specifically, the model, provided by the demonstration, gives information about body and positions of the various segments, while knowledge of the performance of the subject informs about travel of the machine.

The work of Lafont (1994) Cadopi (1995) & Laugier (1995) also highlights the effectiveness of simulation and demonstration, explained during the early phases of acquisition.

Numerous recent studies and researches have shown that acquisition of athletic ability by children can be optimized with the help of the same structuring of learning content. Bertsch (1995), and Scanff Bertsch (1995) showed the importance of environmental design for clarification of the task's purpose. This arrangement relates to the constraints of motor tasks in order to adapt the requirements of these processing resources for the beginner. It also involves the training sequence in order to introduce enough variability that beginners can build an engine program adapted to the problem that is posed to them.

Thus, in this work, we allow them to recognize the modes of instruction centered mainly on the repetition of ability to acquire and the constancy of learning conditions. According to Grehaigne and Mahut (1998, 2000) the acquisition motor skill by a child seems to depend more on ability of teacher to analyze characteristics of the proposed tasks, to identify requirements for adaptation to the constraints resources issues and to monitor the effects of changes introduced.

In summary, it appears that all motor skills, acquired by a student, are influenced by the quality of education of the teacher. Indeed, the acquisition involves the simultaneous consideration of environmental and plant data. It requires a suitable physical structure of a learner as well as taking into account the rules that allow the resolution of the engine problem.

Finally, it is necessary to take into account individual distinctions between learners, especially in cognitive and motor predispositions, taught in the process of physical activity.

Thus, during learning by observation, based on a pedagogical approach using audiovisual projection, how students from 7th year, not having a basic level of driving experience in the shot put style of O 'brien, can receive benefit from the training, offered to them? Do they obtain more benefit both qualitatively and quantitatively in a learning cycle engine of a motor action for the first time?

Methodology

Purpose of the Research

The purpose of this study is to highlight the effect of three pedagogical approaches of the quality of acquiring various technical tasks, necessary for learning the shot put (O'Brien style).

Experimental Sample

A group of 87 students participated in this study. Their ages range between 12 and 14 years, their average size is ± 1.60m and weight is 55kg ±. This group was from three basic classes of 7th , characterized by lack of practical

http://dx.doi.org/10.15561/18189172.2015.0510

experience in athletic functioning, specifically in Shot Put.

Similarly, this group has no practical experience in the shot put.

However, it should be noted that teacher with professional experience of ten years is a specialist in 'Handball'.

Experimental Procedures

The experimental task is to teach students the art of throwing weight by adopting the translation style (style of O'Brien). In this respect and to acquire this complex motor skills, 11 meetings have been scheduled; to 2 sessions per week for a period of 50 minutes each.

During this learning cycle, three assessments were planned: the first, predictive, - at the beginning of the cycle, the second was formative and conducted after the 5th session of learning, and the third, summarizing assessment was carried out after the 10^{th} training.

Three different teaching approaches have been proposed and put to test:

• The first approach is a demonstration gesture coupled with verbal instructions (ADG) of various motor tasks, offered during the cycle of the shot put.

• The second approach is a verbal description (ACV) - educational activities pointed to undertake and carry the part of students in each learning situation.

• The last approach is presenting of teaching situations at each session using an 'Audiovisual Projection' '(APA) content aimed to learn before taking action.

The projection of the training sequences specific motor skills in shot put (O'Brien style)

is based on the work of "Didier POPPE " (" path " - Illustrations IAAF Level 1) and the " Programming Cycle " and qualitative criteria used in the observation.

The experiment was conducted on a tray athletics basement, with 4 circles throwing regulations.

The technical performance of students at all trainings of the cycle were recorded by a Canon digital camera (25 frames in PAL) and performance is measured using a double tape measure.

Statistical Procedures

We processed the data of observation by "percentage calculation" and "chi-square" with a threshold of less than 0.05 probability.

Calculating the percentage was applied to identify the benefits of students, learning at different spots in specific motor launch weight (O'Brien style).

The chi-square calculation permitted to determine contribution of educational approaches, used in the acquisition of quality different motor tasks, necessary for learning the shot put (O'Brien style).**Results and Interpretation**

Effet of three pedagogical approaches on the quality of motor skill acquisition in shot put (Obrien style) .

Table 1

Increase the quality of students' performance during the first five learning sessions.

APPROACH / SKILLS	ACV		ADG		APA		Comparison of three approaches
	% H.M	% H.N.M	% H.M	% H.N.M	% H.M	% H.N.M	
Tenue of the craft	65.52%	34.48%	72.41%	27.59%	79.31%	20.69%	khi2= 1.381 ; ddl= 2, NS à P=0.501> 0.05
Position elbow	58.62 %	41.38 %	65.52 %	34.48 %	68.97 %	31.03 %	khi2= 0.702 ; ddl= 2, NS à P=0.704 > 0.05
Sursaut side	48.28 %	51.72 %	58.62 %	41.38 %	72.41 %	27.59 %	khi2 = 3.537 ; ddl= 2, NS à P=0.171 > 0.05
Extension of the free leg.	44.83 %	55.17 %	48.28 %	51.72 %	58.62 %	41.38 %	khi2 = 1.196 ; ddl= 2, NS à P=0.550 >0.05
Thrust Arm	48.28 %	51.72 %	55.17 %	44,.83 %	62.07 %	37.93 %	khi2 = 1.115 ; ddl= 2,NS à P=0.573 > 0.05

The analysis of the above rendered in Table 1 statistical data in shows that there is no significant difference between three teaching approaches (LCA, ADG and APA) regarding the quality of service for students during the first five sessions of scheduled training (P> 0.05).

However, difficulties have been identified mainly in learning 'Sursaut side', 'Laying the resumption of double support' and 'Driven arm' by (LCA) (failure rate exceeds 50%). Similarly, it is noted that the resumption of the "Placement double support " by (ADG) is a subject of an embarrassing learning with an equal 51.72% failure rate.

Influence of three pedagogical approaches on quality of motor skill's acquisition in shot put (Obrien style) .

Table 2:

Increase of the quality of students' performance at the end of the learning cycle.

APPROACH / SKILLS	ACV		ADG		APA		Comparison between the three approaches
	% H.M	% H.N.M	% H.M	% H.N.M	% H.M	% H.N.M	
Tenue of the craft	68.96%	31.04%	75.86 %	24.24 %	82.76 %	17.24 %	khi2 = 1.506 ; ddl= 2, NS à P=0.471 > 0.05
Position elbow	62.07%	37.93%	68.97%	31.03%	72.41%	27.59%	khi2 = 0.737 ; ddl= 2, NS à P=0.692 > 0.05
Lateral Sursaut	51.72%	48.28%	62.07%	37.93%	75.86%	24.24%	khi2 = 3.658; ddl= 2, NS à P=0.161 > 0.05
Investment recovery Double appuit	48.28%	51.72%	51.72%	48.28%	62.07%	37.93%	khi2 = 1.203; ddl= 2, NS à P=0.548 > 0.05
Thrust Arm	51.72%	48.28%	58.62%	41.38%	65.52%	34.48%	khi2 = 1.137; ddl= 2,NS à P=0.566 > 0.05
The Pulse by extending the free leg.	24.14 %	75.86 %	55.17 %	44.83 %	68.97 %	31.03 %	khi2 = 12.232 ; ddl= 2, SN à P=0.002 < 0.05.
Startle shaving	24.14 %	75.86 %	51.72 %	48.28 %	58.62 %	41.38 %	khi2 = 7.808 ; ddl= 2, SN à P=0.02 < 0.05.
Rotation of the pelvis	17.24 %	82.76 %	51.72 %	48.28 %	65.52 %	34.48 %	khi2 = 14.5 ; ddl= 2,TS à P=0.001 < 0.05.
Extension de la jambe libre	17.24 %	82.76 %	48.28 %	51.72 %	62.07 %	37.93 %	khi2 = 12.509 ; ddl= 2, TS à P=0.002 < 0.05.
Rotation of the body	17.24 %	82.76 %	44.83 %	55.17 %	58.62 %	41.38 %	khi2 = 10.708 ; ddl= 2, TS à P=0.005 < 0.05.

Analyzing the results, rendered in Table 2, we see that there is no clear and confident difference regarding the usage of three instructional approaches in learning the first five spots in specific motor launch weight (O'Brien style) throughout the programmed cycle (P> 0.05). Spots drive is also considered by experts athletics to be simple and easy to reproduce.

However, the data of the same table tell us that pedagogical approach based on audiovisual projection resulted inthe best quality performance, regarding specific learning complex motor tasks in shot put (O'Brien style) in Example of: the pulse of the free leg, start shaking, pelvic rotation, extension of free leg and body rotation. (P <0.05).

Discussion

The results,obtained in this study, show that usage of pedagogical approach, based on audiovisual projection, proves to be much more effective for the acquisition of the art of shot-style translation, compared with the use of the approach, based on gestures or demonstration and using of only verbal instructions.

By using the benefit of students during the interim assessment , we deduce through the percentage of motor control tasks scheduled for students, who were trained, basing on audiovisual projection (APA) and developed a good degree of sizeable assimilation for technical information, related to simple and easy to replicate sports (control rate exceeds 58.62%). So, referring to benefits for student summarizing assessment, we found that motor control tasks, scheduled throughout the cycle, are more prevalent than non-control ones (control rate exceeds 58.62% and up 82.76% for the Conduct of gear and 75.86% for the lateral Sursaut).

Indeed, with APA we have seen a gradual improvement in the performance of different motor sequence techniques. These results are consistent with the study of Sheffield FD (1961), which states that the observation should be combined with physical practice.

However, the beneficial effects of observation appear as soon as observers have opportunity to practice the task physically.

They also join the analyzes and Nachon Kohler (2001), in which the acquisition and retention of a motor skill, mastered for the first time, are being gradually built up by information of exteroceptive characters. This information is provided in this case by the audiovisual presentation, playing the role of director and finalizes representation of motor ability to reproduce.

It should also be noted that through audiovisual presentation the experienced can extract information about the activity presented; transform, assimilate to its own operational schemes, precisely to the extent of these patterns (Zetor, 1996). These results are proved by the work of 'Philippe Giroud'et 'Bettina Debu' (2004) who enhanced the effectiveness of learning by observation procedures for the acquisition of an educational hurdles in children, who begin the activity. Similarly, Rodrigues ST (Percept Mot Skills.2010) reports that audio-visual projection provides students with relevant information, necessary for learning very complex skills.

Therefore, we agree with the proposal of Sheffield FD (1961), who states that observation should be combined with physical practice to give the best results. Moreover, Shea CH et al. (2001) found that compliance is a "variable learning" during the phases of long-term retention.

On the other hand, in addition to what was presented, Möhnsen BS et al (2001) showed that audiovisual presentation provides a more flexible learning, interesting for the use of movement; the action can be viewed for several times and at different speeds. It can also be stopped at a specific element to be analyzed. All of these capabilities permit the practitioner to better discern different phases of movement and facilitates acquisition.

Regarding the effect of the pedagogical approach, based solely on the demonstration gesture (ADG), the analysis of performance of learners during interim assessment confirms that control motor skills programmed are much more distinguished (control rate exceeds ≈50%).

At the summarizing evaluation, difficulties have been identified mainly in learning of different specific complex motor sequences shot put (O'Brien style). Indeed, the failure rate exceeds 50% in learning the "extension of the free leg" (51.72%) and "body rotation" (55.17%).

However, the demonstration of gesture can be an effective way for learning of complicated tasks of simpler drive; this is confirmed by the theory of Bandura (1969) who states that the transmission of knowledge is established on engine on the basis of sign language model's reproduction. The level of learning complex motor tasks, the contribution of the ADG is very simple for the quality of execution.

This is entirely consistent with what has been advanced by Mrayeh et al, (2007), who showed that the demonstration gesture coupled with verbal instructions ensures better quality of sign language learning at demonstration of sport science to students, regardless of their driving experience in complex motor skills (Throwing Weight rotary style).

Regarding the effect of pedagogical approach, based solely on verbal instructions (LCA), we found that it does not have a significant effect on the quality of execution of various motor sequences (simple and complex) by novice students throughout the cycle of shot put style translation.

Indeed, during the interim assessment we found that students have difficulties in learning 'Sursaut side', 'Laying the resumption of double support' and la'Poussé arm '(failure rate exceeds 50 % during the interim assessment).

However, during the summarizing assessment, students have experienced significant difficulties in learning of complex motor tasks, such as Impulse leg free ',' Startle skimming ',' Rotation of the pelvis ', Extension of the free leg' and 'Rotation of the body' (the failure rate exceeds 75%). This performance of insufficient quality during the interim and summarizing assessment is directly related to difficulties, encountered at times of the reproduction of different sequences drive, following simple verbal instructions. Abstract tasks actually evoked an image with a low probability of reproduction (Famose, 1996). Similarly, Quintillon (1992) assumes that speech is only sequential, she says one thing at a time, one thing after another, it is fragmented; the gesture is itself more syncretic, providing more comprehensive view.

Also, weakness of qualitative performance comes from difficulties in learning of the principles of execution sequences of throwing art (Famose, 2000).

This is entirely consistent with what has been advanced by Mahut (2001), the higher is level of skill, the lower learner misinterprets and abstracts information model; these misinterpretations can bring to failure in identifying the learning context or style of throwing involved.

By using the benefit of the students during the intermediate and summarizing assessment, we can confirm percentage of mastery of different criteria, obtained for students, whose motor learning based on verbal information, to limits. These limits, as they were raised by Lafont (2002) are related to both the complexity of the proposed motor activity and degree of interpretation of verbal code from the learner.

This finding is supported by Juare and Pargman (1991) who have tstudied dance sequence in a series of six photographs of a hand, and used a corresponding set of six records, written on the other. They conclude superiority of photographic format on the verbal format. Indeed, during the implementation of instructions for a motor task, the subject is required to make the transition between two distinctly different sides of its business: understanding of verbal message on the one hand and the execution of motor action on the other (Annett, 1986).

However, many theorists of Physical Education as Hébrard, Famose, Simonet and Vives emphasized the need to go through phases of verbalization, or explicit, to promote learning and transfer and neglect the use of observational learning. We try to show that the relations between knowledge and skill are complex and must be approached with caution.

For Famose, Hébrard, Simonet and Vives (1979) and Hébrard (1986), observational learning is a very effective strategy. They suggest that children can not draw beneficial information, simulating (observational learning) in the heart of learning. While Wiese-Bjornstal and Weiss (1992) concluded that, in contrast to their predictions children were able, without verbal signal, to detect crucial information from the observation of the performance and correctly translate the

information into action.

Based on this debate, Wulf, Hob and Prinz (1998) showed that in the beginning, learning is optimized, when it directs attention to learning about the influence of their movements on the environment. Similarly, in the context of athletics, Arnaud (1996;. Arnaud et al 2000) distinguish information about body, organizing those on the spatial organization and advocate the use of instructions on the spatial organization in the beginning. Finally, the use of a visual model comforted the appropriateness of an external focus.

Similarly, the effectiveness of the instructions for execution of driving task can actually be analyzed from the standpoint of the compatibility between the format and the encoding mode, corresponding to the mental representation. (Denis 1990).

We can then consider that the construction of prior pictorial representation, as suggested by Annett (1986), is further facilitated by a figurative image type of information, video, drawing or diagram action by verbal instruction. Indeed, based on an audiovisual projection, learning helps students to focus on "right" information (Cornus S. 2007), while Adatte, G. (2008) argues that the subject must know the criteria to be successful with the taskm, so that it can be used with profit video. These results are confirmed by PL Laguna. (J Sports Sci. 2008), who states that the acquisition of a simple skill is benefited by the combination of observed patterns and physical practice, while the acquisition of a complex skill is enjoyed more by the combination of patterns observed and knowledge of performance practice.

In this respect, it is noted that the construction of a pictorial representation (or video) has also been explored in the comprehension and retention, particularly in the processing of spatial information (Denis & Robin, 1990). Indeed, this representation can increase the cognitive resources of working memory and visual-spatial imaging capabilities. This is confirmed by Philip G. (2004) in learning of complex sport skills, such as hurdling. Accordingly, he argues that learning, based on audiovisual projection, appears to be an effective teaching strategy for children, starting as if a number of tests sufficient practice is performed to obtain meaningful results for the objective task.

On the other hand, referring to the concept of proximal development zone - (which is the distance between what subject can do alone and what it can be achieved with the help of an adult or an expert (Vygotsky, 1934/1985)) - Mc Cullagh and Weiss (2001) discuss the effect of the level of skill demonstrated by model and the relevance of a "coping" model, i.e. a based on a model, which shows the audiovisual projection, adjusted to increase the demand for the task. This type of model seems to be useful in difficult situations and when the task is complex. Hence, we can assume that training of shot put with an audiovisual support allows to "work" closely within the zone of proximal development of novice trainees.

Using the difficulties, encountered by students during the execution of different motor sequences along the training cycle, can be explained, as Winnykamen (1990) argued, by the fact that with limited driving experience (such as the case of our present research) being in a situation,in which trainee has no exact reference to past experience, he must select all relevant information from current situation; this may justify, in our opinion, the usefulness of using an additional source of information, such as audio-visual projection in the acquisition of complex motor skills for novice trainees.

To complete we affirm that our results confirm the effectiveness of simulation procedure with audiovisual projection in process of training of complex sport skills such as shot put (O'Brien style). Consequently, the introduction of new technologies in training process, leads to new forms of coaches' practices (Marcel JF., 2007) and training (Barthes D. & S. Losfeld, 2008). The analysis of environments mediated formations leads to renewal of the framework and analysis of these environments (B. Albero, 2010) methods. In presenting of motivational aspect, the introduction of new technologies in education, put questions to the future of training content and the teaching-learning situation (Vérillon A., 2005)

The use of new technologies in education, where hardware support comes to play an intermediary role in the didactic situation (D. Barthes, 2006) puts questions to training environments instrumented (Rabardel, 1995); it also examines the types of offered teaching methods and underlying learning models (B Albero, 2010). This is entirely consistent with what has been advanced by Cloes Piéron M. & M. (1995), the ability to observation is a skill of teaching. Hence, it can be a learning and systemic development.

Conclusion

This study of complex motor skills' acquisition (shot put style translation) by examining of the effect of three different training approachesm, showed that audiovisual projection ensures better quality of training for trainees, who have no practical experience in athletic activity, specifically in Shot Put.

The influence of the audiovisual approach was observed in execution of different driving sequences. It resulted in efficiency of percentage up to 82% for certain motor sequences, which are necessary for the execution of the shot put (O'Brien style).

It is also noteworthy: this study found that more information about driving ability to be reproduced is easy to be read (the contribution of audiovisual projection during motor training) and reproduction quality is better (control rate exceeds 70% and up to 82.76% for "keeping the machine"; 72.41% for the "elbow position" and 75.86% for the "lateral jump").

However, it should be noted that usage of only demonstration at training sessions, trainees face difficulties predicted especially regarding the different specific training complex motor sequences of shot put (style O'Brien) the example of the "extension of the free leg" (failure rate equal to 51.72%) and "body rotation" (failure rate equal to 55.17%).

We also found that by using of verbal information at training sessions, trainees face difficulties in execution of different sequences of motor skills offered. This may be related to absence of movement's to be reproduced mental representation, its technical complexity and the degree of interaction with others, especially with the coach and model itself.

These first results, obtained in the observed training of complex motor skill, should lead us to extend our research in direction of increasing effect of the intervention methodology of a coach for him to promote interactive imitation in class.

Conflict interests

The authors declare absence of any conflict interests.

References

1. Annett J. On knowing how to do things. In H. Hener & C. Fromm Eds, *Génération of action*. Pattern, Springer, Berlin.1986, pp. 187-200.
2. Arnaud P., Gérard Y., Pradet M., Salamon H. Enseigner le Fosbury-flop. *Revue EPS*, 2000, vol.281, pp. 53-56.
3. Bandura A. *Psychological modeling: conflicting theories.* Chicago, Aldine-Atherton, 1971, 200 p.
4. Bandura A. *Principles of behavior modification*, New York, Holt, Rinehart & Winston, 1969, 168 p.
5. Bandura A. *Psychological Modeling: Conflicting Theories*. New York, Lieber-Atherton. 1974, 160 p.
6. Carroll W.R., Bandura A. The Role of Visual Monitoring in Observational Learning of Action Patterns : Making the Unobservable Observable. *Journal of Motor Behavior,* 1982, vol.142, pp. 153-167.
7. Carroll W., Bandura A. Role of timing of visual monitoring and motor rehearsal in observational learning of action patterns, *Journal of Motor Behavior*, 1985, vol.17(3), pp. 269-281.
8. Carroll W.R., Bandura A. Translating Cognition Into Action : The Role of Visual Guidance in Observational Learning. *Journal of Motor Behavior*, 1987, vol.193, pp. 385-398.
9. Carroll W.R., Bandura A. Representational Guidance of Action in Observationnal Learning : A Causal Analysis. *Journal of Motor Behavior*, 1990, vol.221, pp. 85-97.
10. C. Paul Newhouse. *Measuring the Impact of ICT on Teaching and Learning Prepared for the Department of Education and Training WA*. Dec., 2002, 124 p.
11. Denis M. *Image et cognition*. Paris, PUF, 1990, 104 p.
12. Gaetz G., Takkunen C. 2005 Theory to practice: Technology enhanced instruction in an integrated language arts, literature and educational technology course for preservice teachers. *In Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications*, Chesapeake, VA, AACE, 2005, pp. 2445-2448.
13. Guadagnoli M., Holcomb W., Davis M. The efficacy of video feedback for learning the golf swing. *Journal of Sports Science*, 2002, vol.20, pp. 615-622.
14. Holdich C.E., Chung P.W.H., Holdich R.G. Improving children's written grammar and style: revising and editing with HARRY. *Computers & Education*, 2004, vol.42, pp. 1- 23.
15. Kalkman D.L., Cummings C.C. Faculty Development and the Process of Change. In D. Willis et al. Eds., *Proceedings of Society for Information Technology & Teacher Education International Conference,* Chesapeake, VA, AACE. 2002, pp. 1564-1565.
16. Laguna P.L. Task complexity and sources of task-related information during the observational learning process . *J Sports S*ci. 2008, vol.2, pp. 56-63.
17. Mahut B. Construction of meaning of teaching gestures in swimming . *AIESEP world congress*. Madeira, 2001, pp. 20-22.
18. McCullagh P., Little, W. S. Demonstrations and knowledge of results in motor skill acquisition. *Perceptual and Motor Skills,* 1990, vol.71, pp. 735-742.
19. McCullagh P., Weiss M. Modeling : Considerations for motor skill performance and pychological responses. In R. N. Singer, H. A. Hausenblas, & C. M. Janelle Eds. *Handbook of Research on Sport Psychology.* New York, Wiley, 2001, pp. 205-238.
20. Mohnsen B.S. *Using technology in physical education*. 3d ed. Cerritos, Bonnie's Fitware, 2001, 210 p.
21. Raby R. Polite, well-dressed and on time: Secondary school conduct codes and the production of docile citizens. *Canadian Review of Sociology and Anthropology,* 2004, vol.421, pp. 71-91.
22. Rodrigues S.T., Ferracioli Mde C., Denardi R.A. Learning a complex motor skill from video and point-light demonstrations . *J Sports S*ci.2010, vol.1112, pp. 307-323.
23. Schoenfelder-Zohdi B., Magill R. Modeling and verbal feed-back interaction on learning a ryhtmic gymnastics skill. *International journal of sport psychology*, 1990, vol.27(1), pp. 7-22.
24. Scully D.R., Newell K.M. Observationnal learning and the acquisition of motor skills: toward a visual perception perspective. *Journal of Human Movement Studies*, 1985, vol.11, pp. 169-186.
25. Shea C. H., Wulf G., Park J.-H., Gaunt B. Effects of an auditory model on the learning of relative and absolute timing, *Journal of Motor Behavior,* 2001, vol.33, pp. 127-138.
26. Sheffield F. D. Theoretical consideration in the learning of complex sequential task from demonstration and practice. In A. A. Lumsdaine Edit., *Student response in programmed instruction*, Washington DC, National Academy of Sciences-National Research Council, 1961, pp. 13-32.
27. Tardif J. *The Challenges of the Information and Communication Technologies facing History Teaching*. Traduction Strasbourg, Éditions du Conseil de l'Europe. 1999, 120 p.

28. UNESCO. *Integrating ICTs into Education*: *Lessons Learned*. Bangkok, UNESCO, 2004, 60 p.
29. Wulf G., Höβ M., Prinz W. Instructions for Motor Learning : Differential Effects of Internal Versus External Focus of Attention . *Journal of Motor Behavior,* 1998, vol.302, pp. 169-179.
30. Wiese-Bjornstal D.M., Weiss M.R. Modeling Effects on Children's Form Kinematics, Performance Outcome, and Cognitive Recognition of a Sport Skill: An Integrated Perspective. *Research Quarterly for Exercise and Sport*, 1992, vol.631, pp. 67-75.
31. Wsis Gender Causus. *SchoolNetAfrica and other accredited NGOs on behalf of the WSIS Gender Caucus*. Sommet Mondial sur la Société de l'Information, Genève, 2003, 68 p.

Information about the authors:

Aymen Hawani: http://orcid.org/0000-0003-0692-3976; hawani.aymen@yahoo.com; Higher Institute of Sport and Physical Education; Road of Aeroport Km 0.5, BP 1169. 3029 Sfax, Tunis, Tunisia.;

Maher Mrayeh: http://orcid.org/0000-0002-4544-8138; mrayeh.meher@hotmail.fr; Higher Institute of Sport and Physical Education; Road of Aeroport Km 0.5, BP 1169. 3029 Sfax, Tunis, Tunisia.

Mohamed sami Bousid: http://orcid.org/0000-0002-0876-5177; mechrgui.aymen@gmail.com; Higher Institute of Sport and Physical Education; Road of Aeroport Km 0.5, BP 1169. 3029 Sfax, Tunis, Tunisia.

Cite this article as: Aymen Hawani, Maher Mrayeh, Mohamed sami Bousid. Effect of training information technology and communication driving school (Case of the teaching of O'Brien shot put style). *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 55-61. http://dx.doi.org/10.15561/18189172.2015.0510

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

Received: 10.04.2015
Accepted: 25.04.2015; Published: 30.04.2015

IMPACT OF CANINE ASSISTED THERAPY ON EMOTIONS AND MOTIVATION LEVEL IN CHILDREN WITH REDUCED MOBILITY IN PHYSICAL ACTIVITY CLASSES

Niewiadomska Monika, Makris Maria
University of Szczecin

Abstract. Canine assisted therapy is increasingly used in the treatment of children with various diseases. The participation of a dog in classes evokes positive emotions in children, which are often an important factor in the success of a therapy. *Purpose:* The aim of this study was to present the influence of emotions on the level of motivation toward physical activity in children with reduced mobility. *Material:* The study involved six 5-year-old children, i.e. 5 boys and one girl, who had refused to participate in physical activity classes. They reacted with anxiety, anger and did not want to exercise. Assessment of feelings and emotions of the children was based on observations and interviews with parents. *Results:* After introducing a dog to the physical activity classes, the children changed their attitude not only to training, but also to themselves and their classmates. There was an observed increase in their motivation for the exercises. Such a significant impact of a dog on child's emotions can be very important in the therapeutic process and is reported and recognized by many specialists. *Conclusions:* Canine assisted therapy sessions could be promoted in the treatment of children with locomotor impairment, as well as with other disabilities such as autism, obesity, cerebral palsy, learning difficulties and depression.

Keywords: canine, therapy, physical education, children.

Introduction

Rehabilitation as a medical and social process is a very important part of the healing process of patients with reduced mobility. In many cases, the use of kinesiotherapy or physiotherapy can provide very favourable results and lead to complete recovery. However, this is not always possible. In patients with permanent impairment of the nervous or locomotor system, mobilization therapy can only be helpful to a certain extent, dependent on the level of damage to the neuromuscular structures [5].

In general rehabilitation, an important role is also played by psychological therapy, applied along with the medical rehabilitation. The outcome of a treatment often depends on a patient's attitude and motivation. In people with reduced mobility following accidents, it is very difficult to rebuild motivation and prevent mental breakdowns. These are often children who deserve special care and a professional thoughtful psychological therapy. One form of such supporting treatment is canine assisted therapy involving the participation of a dog.

Contemporary canine assisted therapy is completely different from what it used to be in the 1970s and 1980s. A dog is an active helper for the physiotherapist, and the success of such work very often depends on its participation. There is a growing recognition of the importance of non-verbal communication between a patient and the dog [16]. The observation of non-verbal interactions between a child and the dog can result in diagnostically valuable information on the child's health condition [7]. Such a communication has also been observed in agility classes for children with type 1 diabetes in which a dog was involved [13,14].

Studies by Hunt [10], Silva [17] and Cipriani & Cooper [4] show that in canine assisted therapies both children and adults are more likely to have positive reactions; they are calmer, smile more often and endure pain more easily. The introduction of a dog in therapy sessions with autistic children has also been highly successful [8,15,19]. Research conducted by Silva et al. shows that the involvement of a dog in a group of autistic children provided a positive modulation of their behaviour. In the presence of a dog, autistic children displayed more positive behaviour for longer periods of time, while negative behaviour occurred for shorter periods and less frequently. In the medical community, these studies have become the main argument in discussions about the acceptance of therapy programs involving dogs [18]. The psychological impact of a dog has also been reported in children with special educational needs [1]. The results of tests on a group of boys aged 7-11 years show that the presence of a dog in the education process is justified and provides better results than the groups without a dog involved.

Research conducted over the past 30 years indicates that the participation of dogs in therapy may provide physiological, emotional, social and physical support to children. Although the dogs used in therapy are trained, children perceive them as usual dogs, friendly and empathic beings not holding any expectations. Such an interaction offers young patients a great form of both social and emotional support in educational and therapeutic institutions [4,9,6].

A therapy dog may be involved in a wide field of rehabilitation activities. Canine assisted therapy has been applied in physical activity classes. The participation of dogs in physical activity sessions with obese children resulted in a greater motivation to exercise and more efficient performance of exercises [20].

Objective, material, methods

Being aware of the extensive positive effects of canine assisted therapeutic activities, we planned to ascertain their emotional and motivational advantages in a group of children with locomotor disabilities.

We selected six children aged 5 years for the sessions – 5 boys and 1 girl with reduced mobility, i.e. dysfunctions in upper and lower limbs. Their parents were informed about the course of the project and agreed for their children's

http://dx.doi.org/10.15561/18189172.2015.0511

participation. The number of participating children had to be limited due to the nature of the classes. A small group allowed the proper organization of classes and optimum contact with a dog. The small size of the study group was also important for the dogs' psychological and physical well-being. The intensity of the dog's work during the classes is usually so large that the increased size of the group or extended time of activities would have adversely affected the dogs' health.

Well-documented tests (Thomas, Lasègue and Dega) [11,12] were carried out with the children and showed muscle contractures and a limited range of motion in the shoulder joint. Nevertheless, the children were classified as fit for physical activities. The problem was that the children did not want to participate in the classes. They felt inferior and less efficient than their peers.

The parents of the children were interviewed before and after the course. The interview included questions about the attitudes of children towards physical activity, as well as about their well-being and mood. The interview conducted before the start of classes showed that the children did not want to participate in any physical activity classes. Performing exercises resulted in aversion, shame in front of other more agile children, fear and anxiety. All these emotions were so strong that it often drove them to tears. The children reacted by resisting, crying and negating the class. Analysis of such behaviours revealed that the manifestation of these emotions gave the children a sense of relief, because in the end they could avoid participating in the activities. From the perspective of a child, this strategy proved to be effective as it allowed them to avoid the exercises, so the children started to use them repeatedly.

Evaluation of children's well-being was based only on observations and information obtained from interviews with their parents, since the emotional sphere of children cannot be analyzed statistically. Children's feelings during during classes with the dog cannot be interpreted numerically. Other authors show similar approach and base their analysis on interviews with parents [13]. In analysis of the child's emotions, the occurrence of feelings such as anger, fear, fear, relief or joy, may be represented graphically as in the Figure below [Fig. 1]. Children's emotions are frustration and anger, which turn into relief when the child manages to avoid participation in the classes.

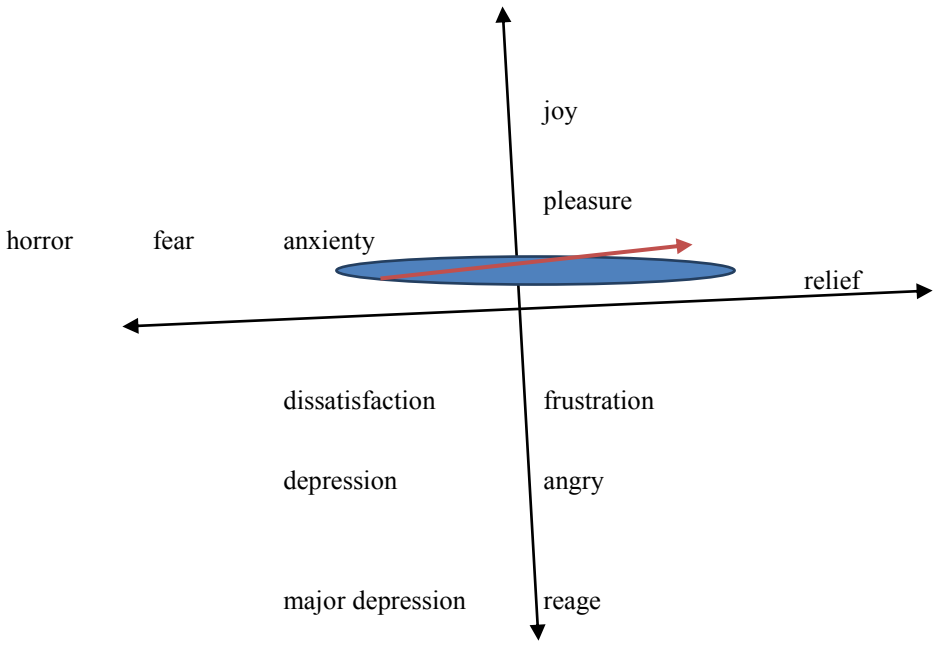

Fig. 1. Emotions of children in reaction to physical activity classes.

The aim of our canine assisted therapy sessions was to encourage children to exercise; to evoke appropriate emotions concerning physical workout and to build motivation for doing the exercises. The active participation of a dog was to improve self-perception in the social group and increase the sense of self-confidence.

Classes were conducted in a nursery school in Szczecin-Załom once a week for two months. During the course the children had contact with a dog. It could be stroked, rewarded and cuddled. Two Border Collie females participated in the therapy.

List of activities:

1. The child throws a ball using the right and left hand. After each throw the dog retrieves the ball and brings it back to the child.

2. Hitting a target using a right and left hand throw. After each throw the dog retrieves the ball.

3. Kicked a ball into a goal using the right and left foot. The dog stands in the goal, playing the role of a goalkeeper.

4. Jumping through low obstacles. The dog performs the same exercises as the children.

5. Passing a simple obstacle course (hurdles and tunnels to be cleared by moving upwards or downwards), bypassing cones in slalom. The dog as a member of the group clears the obstacle course along with the children.

6. Various "tags" (running, on all fours) were also played with the dog involved in the activities.

Results

The introduction of a dog to the classes brought a sense of great joy and interest. The children smiled and stroked the dog. These interactions made their barriers of inaccessibility disappear. They became more communicative and started to talk about their homes and problems.

The activities gave children satisfaction and they were much more likely to perform the assigned tasks. Their motivation for doing exercises was increasing as the assigned tasks were performed with better accuracy.

1. Throws made with the right and left hand. The children tried to throw a ball as far as possible. They enjoyed the fact that the dog was always catching the ball and bringing it back to them. Good throws were rewarded with points. Children rewarded the dog by giving him treats.

2. Hitting the target. At first it was a difficult task. The children were rewarded with points for accurate throws.

3. Shooting into the goal with the right and left foot. This exercise was performed with great commitment and caused intense excitement. The dog standing in the goal defended well, which made the children even happier, despite the fact that they could not score a goal. The children rewarded the dog for each successful save.

4. Clearing the obstacle courses. The children had forgotten about their mobility problems. Their involvement and attention were directed at the dog and his ability to clear the obstacle course with or without any mistake.

5. The introduction of running games and those with hands and knees on the ground created a relaxed atmosphere, allowing close contact with the dog.

Carrying out the aforementioned tasks by the children completely changed the emotions they experienced during the physical exercises. They started to find joy and satisfaction in performing them. They stopped being afraid of difficulties. Sometimes the children experienced satisfaction from completing a difficult task.

It can be concluded that the participation of the dog significantly influenced the emotions of the children and positively changed their attitude toward physical activity. Improved contact between the children was also observed. Children became more talkative; they were less likely to be annoyed, became open to new tasks and were glad to carry them out. After the completion of the series of classes, parents reported that the children smiled more often and seemed happier. They showed much less of the aggressive behavior and anger. The children's emotions are shown in the Figure below [Fig. 2].

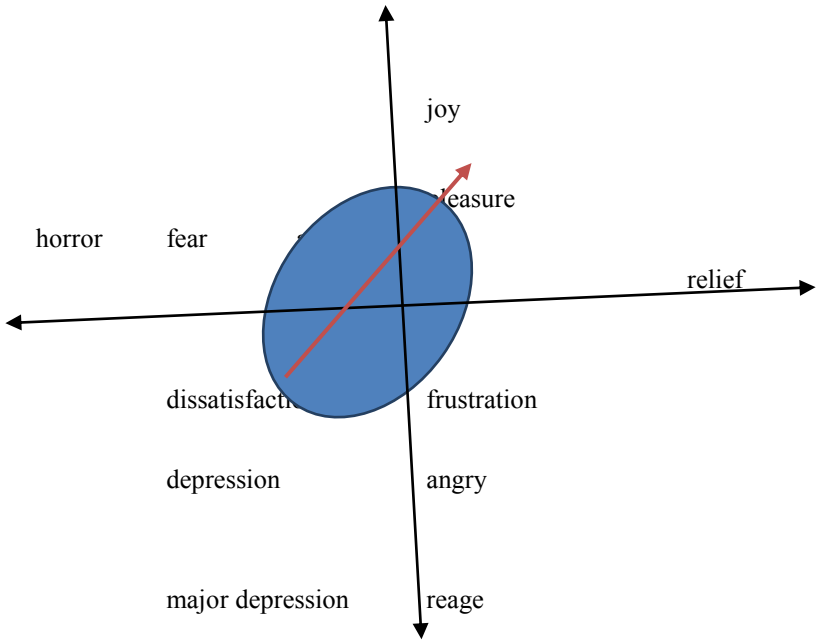

Fig. 2. Emotions of children in reaction to physical activity in the classroom dogotherapy.

Discussion

Dog therapy classes have a huge impact on the psychology of children. Not only can they improve the child's motivation for activities but also evoke a deep empathy. Children are more sensitive to the suffering of others. They are more focused on helping and are kinder to each other.

During the dog assisted activities in our study group, as well as in the research by Prothmann et al., a non-verbal communication between the child and the dog could be observed. Although it could not be measured or assessed using scientific methods, its positive impact on the psychology of the child was indisputable [7].

Other authors have also reported the change of emotions in the children who were reluctant to undertake physical activity. Wohlfarth et al. organised canine assisted physical activities for obese children. The obtained results clearly indicate an increased physical activity of the children performing exercises with the dog [20].

Currently there are many scientific reports and evidence on the beneficial effects of animals on increasing motivation in humans. However, very little attention is paid to this issue on a wider scale. The managers of educational and medical institutions often ignore dog therapy classes. An increasing number of people recognize the need to create educational programs with dogs, in support of their beneficial effects [4].

The presence of a dog helps children of preschool age focus better on tasks and improves the quality of their performance [2,7]. A similar result was obtained in our study group. By redirecting the emotions of the children and improving their motivation to exercise, children performed better.

The application of canine assisted therapy is still in development and constantly takes on new and elaborate forms. It is increasingly often used with children of different ages [21]. There is no perfect dog for every kind of medical condition or age of the patient, therefore a lot of attention should be paid to the adequate training of dogs and the choice of the right breed and temperament in order to bring the therapy to a success [3].

References:

1. Beetz A.; Julius H., Turner D., Kotrschal K. Effects of social support by a dog on stress modulation in male children with insecure attachment. *Psychology*, 2012, vol.3, pp. 352-354.
2. Black Susan. For struggling students, therapy animals can provide the comfort and support that boosts learning. *American School Board*, 2009, vol.196(12), pp. 36-37.
3. Brown L. *Training for Speer Agility*, Human Kinetics, 2005, pp. 25-87.
4. Cipriani Joseph, Cooper Marisa, DiGiovanni Nicole M., Litchkofski Alexandria, Nichols Andrea Lynn, Ramsey Ashleigh. Dog-assisted therapy for residents of long-term care facilities: An evidence-based review with implications for occupational therapy. *Physical & Occupational Therapy in Geriatrics*. 2013, vol.31(3), pp. 214-240.
5. Dega W., Milanowska K. *Medical rehabilitation* [Rehabilitacja medyczna], PZWL, Warsaw, 1998, pp. 9-33.
6. Dudka M. *Involving psycho -therapy dog. Selected issues*. [Terapia psychopedagogiczna udziałem psa. Wybrane zagadnienia], Ostróda, 2006, pp. 52-87.
7. Friesen Lori. Exploring Animal-Assisted Programs with Children in School and Therapeutic Contexts. *Early Childhood Education Journal*. 2010, vol.37(4), pp. 261-267.
8. Gee Nancy R., Gould Jared K. Preschoolers Categorize Animate Objects Better in the Presence of a Dog. *Anthrozoos*. 2012, vol.25(2), pp. 187-198.
9. Hawryluk S., Akhmatova N. *The integration of dynamic and postularnych reflexes to movement of the whole body* [Integracja odruchów dynamicznych i postularnych z układem ruchowym całego ciała], Warsaw, 2006, pp. 9-31.
10. Hunt Melissa G., Chizkov Rachel R. Are Therapy Dogs Like Xanax? Does Animal- Assisted Therapy Impact Processes Relevant to Cognitive Behavioral Psychotherapy? *Anthrozoos*. 2014, vol.27(3), pp. 457-469.
11. Kasperczyk T. *Body posture diagnosis and treatment* [Wady postawy ciała diagnostyka i leczenie], Kasper, Krakow, 1998, pp. 21-87.
12. Kila J.Z., Lizis P. *Treatment of movement* [Leczenie ruchem], Kasper, Krakow 1996, pp. 55-92.
13. Kroger E., Slettebo Å., Fossum M. Agility activities for children in a municipality in norway. *Journal of Community Health Nursing*. 2015, vol.32(1), pp. 53-67.
14. Niewiadomska Monika. Agility as a modern form of recreation. *Physical Education of Students*, 2013, vol.3, pp. 84-86. doi:10.6084/m9.figshare.663633.
15. Niewiadomska M., Radziejewska M., Horodnicka-Józwa A. Petriczko E. Use of agility in treating children with type I diabetes. *Pediatric Endocrinology, Diabetes and Metabolizm*. 2010, vol.16(2), pp. 89-93.
16. Obrusnikova Iva, Cavalier Albert R., Bibik Janice M., Manley Kyle. Integrating Therapy Dog Teams in a Physical Activity Program for Children with Autism Spectrum Disorders. *The Journal of Physical Education, Recreation & Dance*. 2012, vol. 83(6), pp. 37-48.
17. Prothmann Anke, Aibrech, Konstanze, Dietrich Sandra, Hornfeck Ulrike, Stieber Saskia, Ettrich Christine. Analysis of child-dog play behavior in child psychiatry. *Anthrozoos*. 2005, vol.18(1), pp. 43-58.
18. Silva K., Correia R., Lima M., Magalhães A., de Sousa L. Can dogs prime autistic children for therapy? Evidence from a single case study. *Journal Of Alternative And Complementary Medicine*, 2012, vol.17(7), pp. 655-659.
19. Silva Karine, Correia Rita, Lima Mariely, Magalhães Ana, de Sous Liliana, Can Dogs Prime Autistic Children for Therapy? Evidence from a Single Case Study. *Journal of Alternative & Complementary Medicine*. 2011, vol.17(7), pp. 655-659.
20. Somervill John W., Swanson Ashley M., Robertson Renee L., Arnett Marissa A., MacLin Otto H. North *American Journal of Psychology.* 2009, vol.11(1), pp. 111-119.

21. Wohlfarth R., Mutschler B., Beetz A., Kreuser F., Korsten-Reck U. Dogs motivate obese children for physical activity: key elements of a motivational theory of animal-assisted interventions. *Psychology*, 2013, vol.29(4), pp. 796-798.
22. Wojciechowska H., Masgutowa-Hawryluk S. *Kynotherapy in integration reflexes*. [Kynoterapia w intergracji odruchów], Mink, Warsaw 2006, pp. 42-90.

Information about the authors:

Niewiadomska Monika: http://orcid.org/0000-0002-1435-9183; monikaniewiadomska@wp.pl; University of Szczecin; Al. Jana Pawła II 22A, Szczecin, Poland.

Makris Maria: http://orcid.org/0000-0003-4350-8114; makris.maria48@gmail.com; University of Szczecin; Al. Jana Pawła II 22A, Szczecin, Poland.

Cite this article as: Niewiadomska Monika, Makris Maria. Impact of canine assisted therapy on emotions and motivation level in children with reduced mobility in physical activity classes. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 62-66. http://dx.doi.org/10.15561/18189172.2015.0511

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

Received: 09.04.2015
Accepted: 23.04.2015; Published: 30.04.2015

LEVEL OF SELF-RESPECT AND ASSERTIVENESS SKILLS AND TEACHERS' EDUCATIONAL COMPETENCES

Romanowska-Tołłoczko Anna, Nowak Agata, Gnitecka Jolanta
University School of Physical Education in Wrocław

Abstract. *Purpose:* determining of self-respect level and assertiveness of teachers. Verification of whether there is a relationship between the measured trait and the correlation of educational competence. *Material and methods:* the study used three tools: Polish adaptation of SES M.Rosenberg's Self Esteem Scale, a questionnaire to determine the levels of assertiveness - P.Majewicz's Scale "I and others" and a questionnaire to examine the professional competence of teachers by A.Romanowska-Tołłoczko. The study examined 275 primary school teachers of different subjects. *Results:* after the statement of the research's results in the field of self-respect and assertiveness, it turns out that there is some regularity in relation to the level of the studied traits. People with high self-respect also receive higher scores assertive skills compared with those of average and low self-respect. This pattern is seen in all groups of teachers. *Conclusions:* although the observed differences are not great and statistically significant, they show some evidence of the occurrence trend of interdependence in a range of predispositions. Moreover, a positive correlation between the level of self-respect and assertiveness and parental perception of their competence was noted.
Keywords: teachers, assertiveness, self-respect, sense of self-worth, educational competences.

Introduction

Assertiveness and self-respect are predictors of job performance among teaching predispositions, especially in terms of educational impact Self-respect and the ability to behave assertively enable teacher to create partnerships with students [1, 2], allow to cope with difficult situations, allow the use of the negotiating strategy, based on effective communication [3].

Assertiveness is strongly related with self-respect, constituting the core of self-image and an important component of consciousness [4]. The conviction of respect is fundamental to man, because self-respect affects the well-being and quality of activities undertaken [5]. Association of self-assertiveness is seen by many psychologists who argue that assertiveness is closely connected with the sense of personal dignity [6].

Assertive attitude of looking at oneself and other people as value demands respect and proper protection of the dignity and rights. Assertive attitude is striving to ensure that relationships with people are based on trust and truthfulness [7]. Assertive behavior represents a direct, honest and firm expression of ones feeling towards others, as well as opinions or desires in a way that respects the feelings, attitudes, opinions and desires of the other person. It differs from aggressive behavior, as it uses personal rights without violating the rights of others. It also differs from the submissive behavior, as it presupposes acting in accordance with one's own interests and firm defense of oneself and one's rights [8].

There is also an approach to assertiveness, which goes beyond the category of learned behaviors, recognizing that assertiveness is closely related to self-acceptance. Assertive man strives to be true to himself. He is honest, his behavior is appropriate to situation and everything in order that gives him sense of personal dignity. Thus, the strength and security of an assertive person is rooted in respect for oneself. This respect enables individuals to formulate their own needs and expectations of other people, as well as the conviction of the need to build respect the rights of others to express their needs [9].

Self-respect is an attitude towards oneself, ones qualities, capabilities, abilities and drawbacks, which is a component of emotional self-image, understood as a group of diverse judgments and opinions that a person applies to himself (herself). They relate to physical, mental, and social characteristics of a human being. Related concepts that are closely linked with self-respect are self-esteem and self-acceptance [10].

Self-respect is determined by the manner and level of self-evaluation in respect to those values which person considers the most important. Depending on the values, self-respect may be positive or negative. The value of self-respect depends on how far the actual self-image is consistent with the image of the ideal, because the level can be defined as high or low self. The amount of self-respect depends on whether the entity assesses its own value and capabilities as large or as small.

Due to the criterion of sustainability, we are talking about stable and unstable self-respect. Self-assessment is a relatively stable permanent system of opinions and judgments of a person, which don't change too rapidly. People with self-respect instability are characterized by frequent changes of views about themselves [11]. On the basis of the criterion of consistency and accuracy of self-assessment of the actual capabilities of the unit stands out adequate and inadequate self-respect. When man properly evaluates your options, then his self-respect is adequate, and it involves taking actions that are appropriate to its own conditions. Accurate self-assessment is therefore one of the conditions for the effective functioning of the human being and is a key factor in its proper adaptation to the environment. Inadequate self-respect takes place when not responding the actual capabilities of the individual and may be understated or

http://dx.doi.org/10.15561/18189172.2015.0512

overstated. Taking into account the certainty of opinion about the man himself we can speak of firm and threatened self-assessment [4].

Purpose

The aim of the study was to determine the levels of self-respect and assertiveness of teachers and determine whether there is a relationship between the studied traits. It was attempted to demonstrate the differences in a range of aptitudes in teachers of different subjects, as well as to determine whether there is a correlation between self-respect and assertiveness and the perception of their educational competences.

Material and methods

The study was conducted among primary school teachers in Wroclaw. Only questionnaires filled by women were qualified for the analysis, as among the respondents, men constituted a small percentage. Four subgroups were created in accordance to specificity of the subjects taught. The study examined 61 physical education teachers, 67 teachers of early childhood education, 72 teachers of humanities and 75 science teachers.

The study used three tools: Polish adaptation of SES M.Rosenberg's Self Esteem Scale [12], a questionnaire to determine the levels of assertiveness - P.Majewicz's Scale "I and others" [13] and authorial questionnaire by A. Romanowska-Tołłoczko to study teachers' professional levels.

Results

According to by H. Sęk [14], assertive behavior can be divided into the following categories:

- Expressive behavior (expressing desires and feelings of positive and negative)
- Interpersonal behavior (communication, defense of their position, denying, requests for help)
- Task behavior (asserting one's rights, overcoming obstacles).

In a study of assertive skills of teachers, similar results across all treatment groups were obtained. Although differences in the number of persons having a certain level of assertiveness were small, it was noted that a slightly lower level of assertiveness skills were typical for early childhood education teachers and physical education. The highest average raw results were found in the humanities teachers, among whom there were many people with high levels of assertiveness (table 1).

Table 1

Assertiveness of teachers

Study group	Assertiveness level			Arithmetic mean of the raw results
	LOW %	AVARAGE %	HIGH %	
teachers of early childhood education	20,5	61,2	18,3	63,16
teachers of humanities	14,7	51,1	34,2	66,11
teachers of science	16,5	58,0	25,5	65,59
physical education teachers	19,1	57,7	23,2	64,11

In terms of self-respect, there were more differences between the two groups of teachers. Teachers of science subjects were at the top, then the humanities. Slightly lower level of self respect was manifested by physical education teachers, and the lowest level of the selected features are characterized by early childhood education teachers (table 2).

Table 2

Self-respect of teachers

Study group	Self-respect level			Arithmetic mean of the raw results
	LOW %	AVARAGE %	HIGH %	
teachers of early childhood education	23,2	55,3	21,5	28,34
teachers of humanities	13,4	56,8	29,8	31,35
teachers of science	12,5	57,1	30,4	32,14
physical education teachers	17,2	55,5	27,3	29,82

After the statement of the results of research in the field of self-respect and assertiveness, it turns out that there is some regularity in relation to the level of the studied traits. People with high self-respect also receive higher scores assertive skills compared to those of average and low self-esteem. This pattern is seen in all groups of teachers (table 3). Although the observed differences are small and not statistically significant, they show some evidence of the occurrence trend of interdependence in a range of predispositions.

Table 3

Level of self-respect and arithmetic mean of raw results in terms of assertiveness in the studied groups of teachers

Study group	Self-respect level	Arithmetic mean of raw results in assertiveness
teachers of early childhood education	HIGH	67.20
	AVARAGE	62.15
	LOW	60.13
	HIGH	68.90

teachers of humanities	AVARAGE	66.57
	LOW	62.87
teachers of science	HIGH	68.67
	AVARAGE	65.12
	LOW	63.00
physical education teachers	HIGH	67.90
	AVARAGE	62.57
	LOW	61.87

The next step of the research was to determine whether there is a link between perception of their educational competences and the level of self-respect and assertiveness. Positive correlation was found in a range of properties in cases of almost all teachers (Table 4). Persons describing themselves as more educationally competent and better coping with interpersonal situations with students, had higher self-respect and assertiveness skills.

Table 4

Levels of educational competences declared by teachers and arithmetic mean of the results in terms of strict self-respect and assertiveness

Levels of educational competences	Self-respect - arithmetic mean	Assertiveness - arithmetic mean
HIGH	31.28	67.82
AVARAGE	29.15	64.23
LOW	27.36	61.14

Discussion

Many researchers of teachers' competences deal with assertiveness issues and recognize it as a necessary skill in teaching [15]. It was found that besides having an impact on relationships with students, assertiveness is also important regulator. It plays an important role in mechanism regulating responses to the strain resulting from teaching, and its relationship to health and burnout was demonstrated [3].

The results obtained in the study are confirmed in the literature signaled a positive correlation of assertiveness with self-respect and self-acceptance of a person [16]. It was found that the tendency to manifest assertive behavior increases with the level of self-respect and self-acceptance, and the intensity of the feeling of competence in collaboration with others. But decreases with increasing docility and submission [13]. Also determined the relationship assertiveness of the so-called "self-confidence" [17], because it is usually a confident person with high self-respect and belief in their own abilities

The way in which a man sees oneself, has a direct impact on self-respect, which has a significant impact on its function [18]. Assertive behavior strengthens ability to self-respect and promotes maintaining normal interpersonal relationships, which are very important in the teaching profession [19]. It is necessary to remember that assertiveness is not innate. It results from learning in a variety of situations in a particular way of experiencing and reacting. It contains a lot of skills to be developed during the course of students' interpersonal skills education teacher education institutions [9], as well as organize workshops and assertiveness training for teachers who are already working.

Through the development of these skills, you can also help a person to build a positive and stable self-image, which affects not only the professional success but determines the quality of all areas of life [20]. Enhancing self-respect in this occupational group is indeed essential, because the teaching profession does not enjoy social recognition, so be sure to allow the widest possible involvement of teachers in training programs and psycho-social skills.

Conclusions

Based on the survey it was found that there are different levels of assertiveness and self-respect among separate groups of teachers depending on the subject taught. Early childhood education teachers and physical education are characterized by lower levels of the studied traits, compared to teachers of other subjects. Furthermore, in each group a positive correlation between the defined dispositions was noted, it can be assumed that the resulting distribution of results is due to several reasons and, between the levels of the studied traits and level of educational competences. One of the reasons is probably the specificity of the subject taught, which largely determines the kind of relationship with the students, which requires the teacher to a particular type of conduct. Interpersonal behavior in professional situations may favor or hinder the development of assertive skills, which is also reflected in the other life situations. Type the subject taught also locates the subject at the specified position in the unwritten hierarchy of school subjects. Physical education and early childhood education occupy the lower levels of the hierarchy, which may also have some effect on the self-respect of teachers in these subjects. However, this hypothesis should be further verified in the course more in-depth and detailed research.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest in respect to the research, authorship, and publication of this article.

References

1. Dziewięcki M. *Psychology of communication*, Kielce, 2000, p.108.
2. Zubrzycka- Maciąg T. *Assertiveness training in pedagogical education*, Lublin, 2007, p. 10.
3. Kwiatkowski P. Between violence and helplessness, or about some of the educational aspects of assertiveness. In: M. Jabłońska (ed.), *A teacher in constantly changing social reality*, Wroclaw, 2000, pp. 99-124.
4. Wosik- Kawala D. *Correction of middle school students' self-esteem*, Lublin, 2007, p. 15.
5. Wegscheider-Crouse S. *Sense of self-worth*, Gdansk, 2007, p. 8.
6. Król-Fijewska M. *Assertiveness training,* Warsaw, 1992, p. 84.
7. Król- Fijewska M. *Firmly, gently, without fear,* Warsaw, 1992, p. 9.
8. Gaś Z. Assertiveness and agressiveness training. *Educational Psychology* [Psychologia Wychowawcza], 1984, vol. 4, pp. 432-439.
9. Alberti R., Emmonos M. *Assertiveness,* Gdansk 2007, pp. 54-56.
10. Niebrzydowski L. *The psychology of human's needs, aspirations and possibilities*, Lodz, 1999, p. 125.
11. Niebrzydowski L. Educational *psychology. Self-consciousness, activity, interpersonal relations,* Warsaw, 1989, pp.27-28.
12. Dzwonkowska I., Lachowicz-Tabaczek K., Łaguna M. *Self-esteem and its measurement. Polish adaptation of M.Rosenberg's SES scale. Textbook.* Warsaw, 2008, pp. 61-63.
13. Majewicz P. "I and others" – a scale for research on assertive behavior. *Educational Psychology* [Psychologia Wychowawcza], 1998, vol. 5, pp. 448-454.
14. Sęk H. The role of assertiveness in development of mental health. Theoretical and methodological findings. *Psychological Review* [Przegląd Psychologiczny] 1988, vol. 3, pp. 787-808.
15. Tchórzewski A. The teacher and the challenges of democratic education. In: H. Kwiatkowska, T. Lewowicki (ed), *The teacher and the challenges of democratic education*, Warsaw, 1997, p. 118.
16. Poprawa R. How to understand assertiveness? Outline of cognitive-behavioral-phenomenological concept of assertiveness. *Psychological Review* [Przegląd Psychologiczny], 1998, vol. 41(3-4), pp. 217-238.
17. Mączyński J. Behavioral, cognitive, and behavioral and cognitive assertiveness training. *Psychological Review* [Przegląd Psychologiczny], 1991, vol. 34(4), pp. 619-629.
18. Niebrzydowski L. *About self-knowledge and self-esteem*, Warsaw, 1976, p. 26.
19. Hartley M. *Assertiveness - the art of skillful firmness,* Lodz, 2009, p. 9.
20. Branden N. *6 pillars of sense of self-worth,* Lodz, 2009, p. 3.

Information about the authors:

Romanowska-Tołłoczko Anna: http://orcid.org/000-0003-2236-7519; Anna.Romanowska-Tolloczko@awf.wroc.pl; University School of Physical Education in Wrocław; Paderewskiego 35, 51-612 Wrocław, Poland.

Nowak Agata: http://orcid.org/0000-0001-7924-0944; Agata.Nowak@awf.wroc.pl; University School of Physical Education in Wrocław; Paderewskiego 35, 51-612 Wrocław, Poland.

Gnitecka Jolanta: http://orcid.org/0000-0001-5855-1057; Jolanta.Gnitecka@awf.wroc.pl; University School of Physical Education in Wrocław; Paderewskiego 35, 51-612 Wrocław, Poland.

Cite this article as: Romanowska-Tołłoczko Anna, Nowak Agata, Gnitecka Jolanta. Level of self-respect and assertiveness skills and teachers' educational competences. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 67-70. http://dx.doi.org/10.15561/18189172.2015.0512

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

Received: 31.03.2015
Accepted: 20.04.2015; Published: 30.04.2015

INFLUENCE OF TRADITIONAL DANCE TRAINING PROGRAMS ON DYNAMIC BALANCE OF PEOPLE WITH INTELLECTUAL DISABILITY: A SHORT REVIEW

Vasileios K. Tsimaras
Aristotle University of Thessaloniki

Abstract. Traditional dance is gaining popularity as an intervention choice for improving poor balance ability of people with intellectual disability (ID). Balance improvement for individuals with ID through dance provides opportunities for participation in sport activities and promotes independent living. This short review provides in brief research evidence of dynamic balance improvement as measured by means of a balance deck in duration of 30, 45, and 60 sec intervals, highlighting the need to incorporate traditional dance programs in Physical Education (PE) lessons applied on participants with ID. Overall, traditional dances provide emotional and cognitive interaction that has a direct positive effect on quality of life and successful motor performance of individuals with ID.
Key words: intellectual disability, traditional dance, physical activity, balance.

Introduction

Learning and execution of new skills is considered a basic success feature for all sport activities that is influenced by balance ability (McGuine, Greene, Best, & Leverson, 2000; Meinel, & Schnabel, 1998) which in turn constitutes a reliable predicting factor concerning the development of basic motor skills such as walking, running and throwing (Butterfield, & Loovis, 1994). However, in the case of individuals with intellectual disability (ID) balance represents one of the most incomplete motor skill areas (Tsimaras, & Fotiadou, 2004) that is considerably lower when compared to individuals with typical IQ (Cratty, 1980). In general, individuals with ID demonstrate poor balance ability (Sage, 1977) due to insufficient perception ability treatment of environmental stimuli which in turn results to frequent falls and risk of athletic injuries.

Therefore, balance improvement for individuals with ID is considered as most important issue that provides the opportunity to walk and move within living environment promoting independence. In fact, participation of individuals with ID in appropriate intervention programs provides central nervous system adaptations through exercise that in turn leads individuals with ID to exhibit balance performance that is equal to the performance of their peers with typical IQ (Kanode & Payne, 1989).

Traditional dances uses simple teaching methods that allows the participation of individuals with disabilities. Furthermore, as a music-kinetic activity can be easily applied in almost every setting since no additional equipment is needed. Dance is already known to positively influence static and dynamic balance ability to such a great extent that is considered as the ideal physical activity for children (Loeffler, 2007) and adults (Federici, Bellagamaba, & Rocchi, 2005) with disabilities suffering from lack of balance due to kinaesthetic difficulties and hearing loss (Reber, & Sherill, 1981).

As for individuals with ID, it is generally evident that dance improves their balance and enhances creativity, sensitivity and expression (Sherrill, & Delaney, 1986) although rhythm difficulties of individuals with ID are often present. This often leads to contradictory research findings that report (Boswell, 1993; Neofotistou, 2006) or may not report (Thomas, 1984; Roswall, Sherrill, & Roswall, 1988) balance improvement of individuals with ID following dance practice, whereas a lack of research is noted concerning the effectiveness of traditional dance programs on improving balance skills of individuals with ID.

Purpose

We have conducted several studies (Tsimaras & Fotiadou, 2004; Tsimaras, Angelopoulou, Tsorbatzoudis, Abatzidis, & Mandroukas, 2000) throughout the years leading to balance improvement of individuals with ID due to their participation in appropriate intervention programs and in this regard a short presentation of our research effort (Tsimaras, Giamouridou, Kokaridas, Sidiropoulou, & Patsiaouras, 2012) is presented here.

Material

The participants of this study were seventeen individuals assigned to two -control (ID-C) and intervention (ID-I)- groups including individuals with mild ID living independently in the community, aged 16-20 years, all students of the Center of Professional Learning.

Dynamic balance measures by means of a balance deck in duration of 30, 45, and 60 sec intervals were applied for all participants of both groups prior and after the application of a 16-week traditional dance program only for ID-I individuals who also did not participate in other training programs during the study, at a frequency of 3 training sessions per week, for 45 minutes each session. No ID-I individual was absent for more than 10% of the total number (48) of sessions.

Each session included a five minutes warm-up period with stretching exercises so as to avoid possible ankle strain and gastrocnemius muscle injuries, followed by the main part of the traditional dance program, with a short rest period between dances and a five minutes rest period in the middle of each session. Each session concluded with a five minutes cool down period. Overall, ten Greek traditional dances were practiced throughout the whole program, with continuous verbal and visual feedback provided in each session.

http://dx.doi.org/10.15561/18189172.2015.0513

Results

Initial results revealed that no-significant differences between ID-I and ID-C group in each condition prior intervention. However, post training results showed significant differences in 30 sec ($p<.008$), 45 sec ($p<.005$), and 60 sec ($p<.005$) concerning the ID-I group. Statistically significant differences were also noticed in the ID-C group in 60 sec condition ($p<.034$), with ID-C group demonstrating a decreased performance as regards to the number of seconds ID-C participants performed standing on the stabilometer.

Conclusions

Without a doubt, dance affects positively the balance ability of individuals of all ages with (Birkel, 1998; Vuillerme, Daninon, Martin, Boyadjlan, Prieur, Welse, & Nougler, 2001; Maurovouniotis, Argiriadou, Maurovouniotis, & Zaggelidis, 2007) and without typical IQ (Angelopoulou-Sakadami, Giangoudaki, Bouli-Kalahani, & Hajisevastory-Loukidou, 1995; Boswell, 1991; Roswall, & Frith, 1983; Smail, & Horvat, 2005).

Post-training results for the ID individuals of this study revealed a significant dynamic balance improvement for ID-I group individuals. This could be first attributed to the nature of Greek traditional dances that require participants holding hands while formatting and moving in a circle. The continuous hand support received on both (left and right) sides of each participant's body constitutes an ideal way to promote balance as in the case of the individuals with ID in this study. The different rhythm required for each dance further improves eye-hand and eye-foot co-ordination in different speed and circle formations, while at the same time fun, co-operation and friendship are promoted. Promoting dynamic balance leads to minimize the risk of falling while developing enjoyment and a sense of companionship towards a common goal of emotional expression and fulfillment through music and movement.

Balance improvement of ID-I participants is also attributed to the duration (16 weeks), frequency (3> training sessions per week) and steady participation with no absence of all ID-I individuals. Furthermore, worsening of performance for ID-C group highlights the importance for individuals with ID to participate in similar dance intervention programs that provide opportunities of learning, practicing, quality teaching, and motivation (Gallahue, & Ozmun, 1998). As the findings of the study showed, individuals with ID are indeed capable to learn adequately complex activities and technical movements (Eichstaedt & Lavay, 1992) such as traditional dances.

Moreover, recent researches showed a positive effect of traditional dance on dancing skills, rhythm and orientation abilities and on intrinsic motivation of individuals with hearing loss (Kaltsatou, Fotiadou, Tsimaras, Kokaridas, & Sidiropoulou, 2013) and on neuromuscular coordination of individuals with autism (Arzoglou, Tsimaras, Kotsikas, Fotiadou, Sidiropoulou, Proios, & Bassa, 2013) showing that dance programs represent an effective and safe mean for improving motor skills of such populations.

Consequently, exercise through traditional dance programs should be an integral part of PE lessons applied with simple processes on participants with ID and without the requirement of particular equipment. As a music kinetic activity, traditional dances have indeed the potential to provide social, emotional and cognitive interaction that has a direct positive effect on their quality of life and successful performance of basic motor skills.

References

Angelopoulou-Sakadami N., Giangoudaki F., Bouli-Kalahani A., Hajisevastory-Loukidou C. Motor skills in children with Down's syndrome. *Pediatric of Northern Greece,* 1995, vol.11, pp. 186-198.

Arzoglou D., Tsimaras V., Kotsikas G., Fotiadou E., Sidiropoulou M., Proios M., Bassa E. The effect of α traditional dance training program on neuromuscular coordination of individuals with autism. *Journal of Physical Education and Sport,* 2013, vol.13(4), pp. 563-569.

Birkel DAG, Aging Brain, Aging Mind. Activities for the older adult: Integration of the body and the mind. *Journal of Physical Education, Recreation and Dance,* 1998, vol.6, pp. 23-28.

Boswell B. Comparison of two methods of improving dynamic balance of mentally retarded children. *Perceptual and Motor Skills,* 1991, vol.73, pp. 759-764.

Boswell B. Effects of movement sequences and creative dance on balance of children with Mental Retardation. *Perceptual and Motor Skills,* 1993, vol.77, pp. 1290, 1993.

Butterfield S.A., Loovis E.M. Influence of age, sex, balance, and sport participation on development of kicking by children in grades K-8. *Perceptual and Motor Skills,* 1994, vol.79, pp. 691-697.

Cratty B. *Adapted physical education for the handicapped and youth.* Denver. 1980, 120 p.

Eichstaedt B.C., Lavay W.B. *Physical Activity for Individuals with Mental Retardation. Infancy through Adulthood.* Champaign, IL: Human Kinetics. 1992, 240 p.

Federici A., Bellagamaba S., Rocchi M.B. Does dance-based training improve balance in adult and young old subjects? A pilot randomized controlled. *Aging Clinical and Experimental Research,* 2005, vol.17, pp. 385-389.

Gallahue D., Ozmun J. *Understanding Motor Development. Infants, Children, Adolescents, Adults.* WC Brown Communications. 1998, 124 p.

Kaltsatou A., Fotiadou E., Tsimaras V., Kokaridas D., Sidiropoulou M. The effect of a traditional dance training program on dancing skills, rhythm and orientation abilities and on intrinsic motivation of individuals with hearing loss. *Journal of Physical Education and Sport,* 2013, vol.133, pp. 438-446.

Kanode J.O., Payne V.G. Effects of variable practice on retention and motor schema development in Down Syndrome subjects. *Perceptual and Motor Skills,* 1989, vol.69, pp. 211-218.

Loeffler G. Creative movement and dance in early childhood education. *Reston, VA: American Alliance of Health Physical Education and Dance.* 2007, Available at: http://www.cfc-efc.ca/docs/cccf/00013 en.htm (accessed 02.04.2015)

Mavrovouniotis F., Argiriadou E., Maurovouniotis C., Zaggelidis G. Effect of Greek traditional dances on the dynamic balance of children. *Stiinta Sportului Revista teoretico-metodica),* 2007, vol.59, pp. 17-31.

McGuine T., Greene J., Best T., Leverson G. Balance as a predictor of ankle injuries in high school basketball players. *Clinical Journal of Sport Medicine,* 2000, vol.104, pp. 239-244.

Meinel K., Schnabel G. *Bewegungslehre sportmotoric.* Berlin: Sportverlag. 1998, 160 p.

Neofotistou K. *The effect of a rhythmic gymnastic program in adults with mental retardation.* Master's thesis, Aristotle University of Thessaloniki, 2006, 168 p.

Reber R., Sherill C. Creative thinking and dance/movement skills of hearing impaired youth: an experimental study. *American Annual of Deaf,* 1981, vol.126, pp. 1004-1009.

Roswall G.M., Frith G.H. The effect of development play program on the motor proficiency of mildly handicapped children. *American Corrective of Therapy Journal,* 1983, vol.37, pp. 105-108.

Roswall P.M., Sherrill C., Roswall G.M. A comparison of data based on creative dance pedagogies in teaching mentally retarded youth. *Adapted Physical Activity Quarterly,* 1988, vol.5, pp. 212-222.

Sage G. *Introduction to motor behavior: a neuropsychological approach.* Reading, M.A: Addison-Wesley. 1977 - 108 p.

Sherill C., Delaney W. Dance therapy and adapted dance. In *Adapted Physical Education and Recreation*. C. Sherill, ed. Dubuque, IA: Brown, 1986, pp. 354-373.

Smail K.M., Horvat M. Effects of balance training on individuals with mental retardation. Clinical report. *Journal of American Kinesiotherapy Association,* 2005, vol.22, pp. 1-6.

Thomas W. *Comparison of effects of two theoretically based constructs on the skill of balance for moderately mentally retarded students.* Doctoral dissertation, Indiana University. 1984, 172 p.

Tsimaras V. *The influence of an exercise training program on individuals with special needs mental retardation* Doctoral dissertation, Aristotle University of Thessaloniki. 2000, 168 p.

Tsimaras V., Angelopoulou N., Tsorbatzoudis C., Abatzidis G., Mandroukas K. The effect of an exercise training program on dynamic balance of individuals with mental retardation. *Galenus,* 2000, vol.42, pp. 179–187.

Tsimaras V., Fotiadou E. Effect of training on the muscle strength and dynamic balance ability of adults with Down syndrome. *Journal of Strength and Conditioning Research,* 2004, vol.182, pp. 343-347.

Tsimaras V.K., Giamouridou G.A., Kokaridas D.G., Sidiropoulou M.P., Patsiaouras A.I. The Effect of a Traditional Dance Training Program on Dynamic Balance of Individuals with Mental Retardation. *Journal of Strength and Conditioning Research,* 2012, vol.261, pp. 192-198.

Vuillerme N., Daninon F., Martin L., Boyadjlan A., Prieur J.M., Welse I., Nougler V. The effects of expertise in gymnastics on postural control. *Neuroscience Letters,* 2001, vol.303, pp. 83-86.

Information about the author:

Vasileios K. Tsimaras: http://orcid.org/0000-0003-3170-4417; tsimaras@phed.auth.gr; Aristotle University of Thessaloniki; University Campus, 54124 Thessaloniki, Greece.

Cite this article as: Vasileios K. Tsimaras. Influence of traditional dance training programs on dynamic balance of people with intellectual disability: a short review. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2015, vol.5, pp. 71-74. http://dx.doi.org/10.15561/18189172.2015.0513

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

Received: 05.04.2015
Accepted: 15.04.2015; Published: 30.04.2015

SUBMISSION OF MANUSCRIPTS
(For more detailed information see http://www.sportpedagogy.org.ua/html/trebovaniya-e.html)
Structure of article:

- title of an article;
- surname, full first name and patronymic;
- full name of organization (place of work or study);
- annotation in three language (Russian, Ukrainian, English). The scope of the annotation is to be 800-1000 symbols. Annotation must contain translate of surname, full first name and patronymic of authors, in Ukrainian (Russian) and English. Structure of annotation: aim, material, result. For authors from Russia, the translation in the Ukrainian language makes editorial board.
- Key words for the three languages: (1-2 lines of words. Do not use word combinations).
- Introduction (statement of a problem; analysis of the last researches and publications of this theme; to single out the open problem in the research article).
- Connection of the article with important scientific programs or practical tasks.
- Aim, tasks, material and methods.
- Results of the research (description of the main research material with full substantiation of the derived scientific results).
- Findings.
- Perspectives of future researches in this direction.
- Bibliographic references (more than 20) should be making up according to standard form.

REVIEW PROCEDURE FOR MANUSCRIPTS (For more detailed information see http://www.sportpedagogy.org.ua/html/recenzirovaniye-e.html)

All manuscripts submitted for publication must go through the review process.

TREATMENT OF MANUSCRIPTS (For more detailed information see http://www.sportpedagogy.org.ua/html/rassmotreniye-e.html)

Manuscripts are assessed by the Editorial Board within 1 month.
The Journal will acknowledge receipt of a manuscript within 2 days.

EDITORIAL ETHICS (For more detailed information see http://www.sportpedagogy.org.ua/html/ethics-e.html)

The journal is committed to a high standard of editorial ethics.
Editorial board is used the principles of ethics of scientific publications upon recommendations of International Committee of Medical Journal Editors.
Conflicts of interests of persons who have direct or indirect relation to the publication of an article or any information that the article consist are settled according to the law of Ukraine in the field of intellectual property.

CONTACT INFORMATION

box 11135, Kharkov-68, 61068, Ukraine
phone. (38057)755-73-58
http://www.sportpedagogy.org.ua
e-mail: sportart@gmail.com

Information Sponsors, Partners, Sponsorship:

- Belgorod State Shukhov Technological University,
- National Research University Belgorod State University,
- Olympic Academy of Ukraine - http://olympicedu.org
- Ukrainian Academy of Sciences.

SCIENTIFIC EDITION (journal)
Pedagogics, Psychology, Medical-Biological Problems of Physical Training and Sports. 2015, vol., 78 p.

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

———————————————————————

passed for printing 30.04.2015.
Format A4.

Red Banner str., 8, Kharkov, 61002, Ukraine.
PRINTHOUSE (B02 № 248 750, 13.09.2007).
61002, Kharkov, Girshman, 16a.