

INTEGRATED APPLICATION OF HEALTH IMPROVING METHODS OF PILATES AND BODYFLEX FOR IMPROVING PSYCHOPHYSIOLOGICAL POSSIBILITIES OF STUDENTS

Kozina Zh.L.¹, Ilnitskaya A.S.¹, Paschenko N.A.², Koval M.V.²

Kharkov National Pedagogical University¹

Kharkov State Academy of Physical Culture²

Annotation. *Purpose:* to determine the effect of complex application procedures Bodyflex and Pilates using information and communication technology on the level of psycho-physiological capabilities of students. *Material:* the study involved 46 university students. Research methods - physiological (speed detection of simple and complex reactions in different modes of testing, the level of functional mobility and strength of the nervous system), pedagogical experiment, methods of mathematical statistics. *Results:* the positive effect on the level of the developed technique psychophysiological capacities of students. The application of the developed technique in the experimental group showed a significant decrease in the latency time of a simple visual-motor reaction time latent complex visual-motor reaction time test run "level of functional mobility of nervous processes" in feedback mode. Found that the use of Bodyflex and Pilates promotes strength of nervous processes. *Conclusions:* the recommended use in the learning process of students of complex techniques of Pilates Bodyflex using information and communication technologies, increased levels of psychophysiological features, mobility and strength of the nervous processes.

Key words: students, preparedness, information, communication, education, culture, health, technology, Bodyflex, Pilates, strength, mobility, nervous system, psychophysiology, capabilities, speed, reaction, rhythm.

Introduction

Results of modern scientific researches [4, 5, 6, 9, 12, 14] prove that system-formation factor of students' healthy life style if health related motion functioning. That is why involving of students in regular physical exercises, increasing of rising generation's motivation to health related motion functioning and healthy life style has become very urgent [15, 17, 20, 21, 25, 26, 27]. Demand in solution of this task is amplified by the fact that formation of children's, teenagers' and youth's habit of regular motion functioning is main strategy of prophylaxis of chronic diseases in mature age [12, 18, 19, 28, 29, 30, 31].

It is known that long term limitation of motion functioning results in hypodynamia that in itself is a dangerous factor [22, 23, 24, 31]. It ruins organism and leads to early disability and if disorders, caused by hypodynamia in adult organism, are reversible (i.e, they can be eliminated with the help of timely started physical training), then growing organism cannot compensate at all effect of hypodynamia. Hypodynamia is especially dangerous at early stages of ontogeny and in period, when functional formation of young organism takes place. It results in significant reduction of growth's rates and organism's development as well as in disordering of bio chemical processes, including genetic apparatus of cells. With it significant functional deviations in development of brain cortex, are observed as disorders of nervous system and low workability of brain [8].

Meanwhile, hypodynamia has becoming a prevailing among students: regime of studying and progress of civilization, creating comfort, doom young man for constant "muscular hanger", deprive him of motion functioning [12, 18, 19].

In this connection implementation of new health related methodic in students' physical education with application of modern information-communicative technologies is urgent and timely, while research of these methods' influence on students' psycho-physiological abilities is a required condition of scientific foundation of this application's effectiveness.

The research has been fulfilled in compliance with combined plan of scientific-research works for 2011-2014 by topic 2.4 "Theoretical-methodic principles of individualization in physical education and sports" (state registration number 0112U002001) and in compliance with scientific works, financed by Ministry of education and science for 2013-2014 "Theoretical-methodic principles of application of information, pedagogic and medical-biological technologies for formation of healthy life-style" (state registration number 0113U002003).

Purpose, tasks of the work, material and methods

The purpose of the research is to determine influence of complex application of body flex and pilates methodic in combination with information-communicative technologies on students' psycho-physiological abilities at higher educational establishments.

The methods of the research: psycho-physiological methods (determination of speed of simple and complex responses in different modes of testing, of nervous system's functional mobility and strength [1, 10, 11, 14]), which were fulfilled with the help of program "Psycho-diagnostic"[1]; pedagogic experiment; methods of mathematical statistic.

46 students of Kharkov national pedagogic university, named after G.S. Skovoroda took part in the research; from them 24 students were in control group, 22 – in experimental one. During 2 semesters in experimental group we

applied complex methodic of body flex and pilates with using of authors' internet-blog for information of students about principles of physical culture.

Results of the research

Mental workability and mental endurance are indicators of general endurance. As indicators of mental workability psycho-physiological indicators are used. As it is known [7, 8, 10, 11, 14], it is difficult to change psycho-physiological indicators and just owing to this fact receiving of statistically significant differences between indicators, obtained before experiment and after experiment witness about positive influence of worked out by us methodic not only on functional fitness but also on level of psych-physiological abilities. For determination of influence of this methodic on level of speed of simple and complex visual-motor responses, strength and mobility of nervous system we chose psycho-physiological testing of control and experimental groups' students and received data were analyzed for statistically confident changes in the course of experiment.

As far as it is difficult to change psycho-physiological indicators [10, 11, 14], and just owing to this fact receiving of statistically significant differences between indicators, obtained before experiment and after experiment witness about positive influence of worked out by us methodic not only on functional fitness but also on level of psych-physiological abilities.

In our case nervous system's strength shall be understood, as per commonly accepted definitions, as ability of nervous system to work for long period of time with high intensity of demonstrate great strength in limited time.

In our research properties of nervous system were determined with the help of program "Psycho-diagnostic" [1, 14]. With it, as indicators of nervous system's strength we used values of quantity of mistakes in tests, oriented on determination of latent time of complex response in feedback mode and forced rhythm (mistakes in first stage ($p < 0.001$), from 2.96 to 0 at second stage ($p < 0.05$), from 3.56 to 0.23 at third stage ($p < 0.05$), from 3.88 to 0.32 at fourth stage ($p < 0.05$), from 10.45 to 4.52 at fifth stage ($p < 0.001$) (see table 3.4, fig. 3.15). In control group such changes were not confident ($p > 0.05$). test "level of functional mobility of nervous processes", in feedback mode and in mode of forced rhythm). As of indicators of nervous system's mobility we used results of tests "Time of fulfillment of tests "level of functional mobility of nervous processes, sec." And "Time of coming to minimal exposure in test " level of functional mobility of nervous processes" in feedback mode, sec."

As a result of experiment, in experimental group we registered confident reducing of latent time of simple visual-motor response (from 325.76 ± 45.09 msec. to 270.89 ± 41.23 msec. $p < 0.05$) (see table 3.4), of latent time of complex visual-motor response (from 566.87 ± 54.43 msec. to 456.44 ± 51.45 msec., $p < 0.05$), time of fulfillment of test " level of functional mobility of nervous processes" in feedback mode, sec." (from 425.12 ± 56.51 msec. to 392.1 ± 47.65 msec. $p < 0.001$), time of coming to minimal exposure in test " level of functional mobility of nervous processes" in feedback mode, (from 74.54 ± 15.43 msec. to 58.21 ± 12.55 m.sec., $p < 0.001$). In control group such changes were not confident $p > 0.05$).

In our research in experimental group we observed confident reduction of quantity of mistakes in tests " level of functional mobility of nervous processes" in feedback mode and " level of functional mobility of nervous processes" in mode of forced rhythm: from 2.78 to 0 at first stage ($p < 0.001$), from 2.96 to 0 at second stage ($p < 0.05$), from 3.56 to 0.23 at third stage ($p < 0.05$), from 3.88 to 0.32 at fourth stage ($p < 0.05$), from 10.45 to 4.52 at fifth stage ($p < 0.001$) (see table 3.4, fig. 3.15). In control group such changes were not confident ($p > 0.05$).

Besides, confident reduction of values in tests "time of fulfillment of test " level of functional mobility of nervous processes" in feedback mode" and time of coming to minimal exposure in test " level of functional mobility of nervous processes" ($p < 0,001$) in feedback mode, sec. witness about increasing of nervous processes' mobility, resulted from body flex and pilates trainings.

Thus, the conducted research showed purposefulness of application of our methodic for increasing quality of students' psycho-physiological processes. It was evident that one of main element of our methodic influence on psycho-physiological indicators was accent on conscious perception of elements of physical education process, in particular, activation of vivid perception of body flex's and pilates's elements in application of special breathing exercises, which require high concentration of attention, for activation of workability's restoration.

In this connection we can conclude that our methodic influences positively not only on level of physical fitness and students' functional abilities; it can be recommended for implementation in practice of students' physical education.

The presented by us results of scientific research on determination of students' psycho-physiological states permit to create theoretical methodic principles for harmonious physical and mental progressing of a person, which, at present, are rather promising for science and practice. It concerns psycho-physiology, physiology, pedagogic, psychology, cybernetic and etc. Physical education serves perfection of man. But, as most of specialists-evolutionists consider, development of a person as biological being has already been completed and further human progress is possible only at the account of perfection of psychic and intellectual qualities. This principles concern physical education as well, because physical and mental perfection are connected with development of psycho-physiological functions.

Forst of all it concerns kinds of functioning in variable circumstances, which, in modern life, are very important for adaptation of a person in society. For situational kinds of functioning constant change of situation is characteristic that requires instant response to it. Quantity and quality of researches, devoted to this direction, is constantly growing. It witnesses about high urgency and perspectiveness of this problem.

Formation of a personality on all stages of his (her) progressing has its peculiarities and are important because every stage is a step ahead in perfection of human psycho-motor functioning.

Specifying of psycho-physiological states' manifestations is especially important because modern physical education requires methodic, which would permit to optimize educational process. It is rather difficult task, as far as construction of physical education process requires seeking of not only new forms of organization but also new forms and means of physical education. That is why for harmonious building of educational process of students it is necessary to determine peculiarities of psycho-physiological states that has just been presented in our work.

Conclusions:

1. We have proved positive influence of worked out methodic on students' psycho-physiological abilities: as a result of experiment in experimental group we registered confident reduction of latent time of simple visual motor response (from 325.76 ± 45.09 msec. to 270.89 ± 41.23 msec., $p < 0.05$), of latent time of complex visual-motor response (from 566.87 ± 54.43 msec. to 456.44 ± 51.45 msec., $p < 0.05$), time of fulfillment of test " level of functional mobility of nervous processes" in feedback mode, (from 425.12 ± 56.51 msec. to 392.11 ± 47.65 msec., $p < 0.001$). It was found that increasing of nervous processes' mobility, resulted from application of our methodic: in experimental group time of coming to minimal exposure in test " level of functional mobility of nervous processes" in feedback mode, reduced (from 74.54 ± 15.43 msec. to 58.21 ± 12.55 msec., $p < 0.001$), also we registered confident reducing of values in tests "time of fulfillment of test " level of functional mobility of nervous processes" in feedback mode, sec." and "time of coming to minimal exposure in test " level of functional mobility of nervous processes" ($p < 0.001$) in feedback mode, sec."

2. We have established that application of body flex and pilates facilitates increasing of nervous processes' strength. In experimental group of students we registered confident reducing of mistakes in tests "level of functional mobility of nervous processes" in feedback mode" and " level of functional mobility of nervous processes" in mode of forced rhythm: from , 2.78 to 0 at first stage ($p < 0.001$), from 2.96 to 0 at second stage ($p < 0.05$), from 3.56 to 0.23 at third stage ($p < 0.05$), from 3.88 to 0.32 at forth stage ($p < 0.05$), from 10.45 to 4.52 at fifth stage ($p < 0.001$) (see table 3.4, fig. 3.15). In control group such changes were not confident ($p > 0.05$).

In the future it is planned to improve system of health related technologies for development of students' psycho-physiological abilities.

References:

1. Kozina Z. L., Baribina L.M., Korobiejnikov G.V., Mishchenko D. I., Cikunov O. A., Kozin O. V. *Avtors'ke pravo i sumizhni prava* [Copyright and Related Rights], 2002, vol.25, p. 15.
2. Iermakov S.S. Informacionnye aspekty zdorov'ia i zdorovogo obraza zhizni v elektronnom nauchnom prostranstve [Informational aspects of health and healthy lifestyles in electronic scientific space], *Valeologija: suchasnij stan, napriamki ta perspektivi rozvitku* [Valeology: current status, trends and prospects of development], Kharkov, KNU, 2006, vol.2, pp. 59-65.
3. Iermakov S.S. Informacionnoe obespechenie prepodavaniia lechebnoj fizicheskoy kul'tury v gumanitarnykh vuzakh [Dataware teaching therapeutic physical culture in liberal arts colleges], *Rol' fizicheskoy kul'tury, sporta i zdorov'ezberegaiushchikh tekhnologij v podgotovke specialistov* [Role of physical culture, sports and health saving technology training], Belgorod, BSTU, 2006, pp. 100-106.
4. Zajcev V.P., Prusik Kristof, Iermakov S.S. *Fiziceskoe vospitanie studentov* [Physical Education of Students], 2011, vol.1, pp. 68-77.
5. Kashuba V.A., Futornyj C.M., Andreeva E.V. *Fiziceskoe vospitanie studentov* [Physical Education of Students], 2012, vol.7, pp. 50-58.
6. Kozina Zh.L., Ashanin V.S. *Fiziceskoe vospitanie studentov* [Physical Education of Students], 2007, vol.1, pp. 152-156.
7. Kozina Zh.L. *Sistema individualizacii podgotovki sportsmenov v igrovykh vidakh sporta* [Customize system of training athletes in team sports], Lambert Academic Publishing Russia, 2011, 532 p.
8. Kozina Zh.L. *Fiziceskoe vospitanie studentov* [Physical Education of Students], 2012, vol.2, pp. 41-46.
9. Kozina Zh.L., Iermakov C.C., Bazyljuk T.A., Voloshina E.V. *Fiziceskoe vospitanie studentov* [Physical Education of Students], 2012, vol.1, pp. 42-47.
10. Lizogub V.S. *Fiziologichnij zhurnal* [Journal of Physiological], 2010, vol.1(56), pp. 148-151.
11. Makarenko N.V. *Fiziologichnij zhurnal* [Journal of Physiological], 1999, vol.4(45), pp. 125-131.
12. Nosko M.O., Iermakov S.S., Garkusha S.V. *Visnik Chernigivs'kogo derzhavnogo pedagogichnogo universitetu* [Bulletin of the Chernihiv State Pedagogical University], 2010, vol.76, pp. 243-247.
13. Prusik K., Kozina Zh.L., Iermakov S.S. *Fiziceskoe vospitanie studentov* [Physical Education of Students], 2013, vol.1, pp. 54-61.
14. Kozina Zh.L., Barybina L.N., Mishchenko D.I., Kozin A.V. *Fiziceskoe vospitanie studentov* [Physical Education of Students], 2011, vol.3, pp. 56-60.
15. Ruslanov D.V., Prusik Kristof, Iermakov S.S. *Fiziceskoe vospitanie studentov* [Physical Education of Students], 2011, vol.1, pp. 106-110.
16. Kozina Zh.L., Bludov A., Grigor'ev A., Iermakova T.S. *Slobozhans'kij nauково-sportivnij visnik* [Slobozhansky scientific and sport bulletin], 2007, vol.12, pp. 96-103.
17. Iermakov S.S. Apanasenko G.L., Bondarenko T.V., Prasol S.D. *Pedagogika, psihologia ta mediko-biologicni problemi fizicnogo vihovanna i sportu* [Pedagogics, psychology, medical-biological problems of physical training and sports], 2010, vol.11, pp. 31-33.
18. Erkollar Alptekin, Oberer B.J. Putting Google+ to the Test: Assessing Outcomes for Student Collaboration, Engagement and Success in Higher Education. *Procedia – Social and Behavioral Sciences*, 2013, vol.83, pp. 185-189.
19. Rocha Artur, Martins Angelo, José Celso Freire Junior et al. Innovations in health care services: The CAALYX system. *International Journal of Medical Informatics*, 2013, vol.82(11), pp. 307-320.
20. Chao-Chien Chen, Shih-Yen Lin. The impact of rope jumping exercise on physical fitness of visually impaired students. *Research in Developmental Disabilities*, 2011, vol.32(1), pp. 25-29.
21. Fernanda Teles Dias Vieira, Lucila Martins Faria, João Irineu Wittmann, et al. The influence of Pilates method in quality of life of practitioners. *Journal of Bodywork and Movement Therapies*, 2013, vol.17(4), pp. 483-487.
22. Frank Hookin Fu, Linxuan Guo, Yanpeng Zang. An overview of health fitness studies of Hong Kong residents from 2005 to 2011. *Journal of Exercise Science & Fitness*, 2012, vol.10(2), pp. 45-63.
23. Julie A., Gleason-Comstock, Alicia Streater et al. Consumer health information technology in an adult public health primary care clinic: A heart health education feasibility study. *Patient Education and Counseling*, 2013, vol.93(3), pp. 464-471.
24. Loren L. Toussaint, Mary O. Whipple, et al. A Mind-Body Technique for Symptoms Related to Fibromyalgia and Chronic Fatigue. *EXPLORE: The Journal of Science and Healing*, 2012, vol.8(2), pp. 92-98.
25. Mikael Bäckström, Mats Tinnsten, Andrey Koptug. Sports Technology Education at Mid Sweden University *Procedia Engineering*, 2013, vol.60, pp. 214-219.
26. Patrick Waterson. Health information technology and sociotechnical systems: A progress report on recent developments within the UK National Health Service (NHS). *Applied Ergonomics*, 2014, vol.45(2), pp. 150-161.
27. Paul R. Medwell, Laura A. Brooks, Barry S. Medwell. Analysis of the Lawn Bowl Trajectory as a teaching tool for Sports Engineering: development of a graphical user-interface. *Procedia Engineering*, 2011, vol.13, pp. 531-537.
28. Paul R. Medwell, Paul N. Grimshaw, Will S. Robertson, Richard M. Kelso. Developing sports engineering education in Australia. *Procedia Engineering*, 2012, vol.34, pp. 260-265.

29. Swagatam Das, Subhodip Biswas, Souvik Kundu. Synergizing fitness learning with proximity-based food source selection in artificial bee colony algorithm for numerical optimization. *Applied Soft Computing*, 2013, vol.13(12), pp. 4676-4694.

30. Tudor Iulian-Doru, Grigore Vasilica, Tudor Maria, Burcea Claudia-Camelia. Pilates Principles – Psychological Resources for Efficiency Increase of Fitness Programs for Adults. *Procedia - Social and Behavioral Sciences*, 2013, vol.84, pp. 658-662.

31. Susan Hollenbery. Anatomy of Hatha Yoga. *Physiotherapy*, 2002, vol.88(9), 571 p.

Information about the authors:

Kozina Zh. L.: ORCID: 0000-0001-5588-4825; Zhanneta.kozina@gmail.com; Kharkov National Pedagogical University; Artema str. 29, Kharkov, 61002, Ukraine

Ilnickaya A.S.: ORCID: 0000-0001-5835-8847; anita487@mail.ru; Kharkov National Pedagogical University; Artema str. 29, Kharkov, 61002, Ukraine

Paschenko N.A.: ORCID: 0000-0002-1110-0440; Zhaks_k@mail.ru; Kharkov State Academy of Physical Culture; Klochkovskaya str. 99, Kharkov, 61022, Ukraine.

Koval M.V.: ORCID: 0000-0003-0127-9667; Zhaks_k1@mail.ru; Kharkov State Academy of Physical Culture; Klochkovskaya str. 99, Kharkov, 61022, Ukraine.

Cite this article as: Kozina Zh.L., Ilnitskaya A.S., Paschenko N.A., Koval M.V. Integrated application of health improving methods of Pilates and Bodyflex for improving psychophysiological possibilities of students. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2014, vol.3, pp. 31-36. doi:10.6084/m9.figshare.936963

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>

This is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited (<http://creativecommons.org/licenses/by/3.0/deed.en>).

Received: 20.01.2014
Published: 28.01.2014