

UDC 796.015.52:378.018.43

DOI [https://doi.org/10.12958/2227-2844-2023-1\(355\)-130-135](https://doi.org/10.12958/2227-2844-2023-1(355)-130-135)

Martynova Nataliia Petrivna,

Candidate of Pedagogical Sciences,

Associate Professor at the Department of Physical Education and Sports

Oles Honchar Dnipro National University,

Dnipro, Ukraine.

natalyamartynova1412@gmail.com

<https://orcid.org/0000-0002-8234-3968>

Khotiienko Svitlana Viktorivna,

Senior Teacher at the Department of Physical Education and Sports

Oles Honchar Dnipro National University,

Dnipro, Ukraine.

svetahotienko@gmail.com

<https://orcid.org/0000-0001-7210-9206>

Prysiazhna Maria Kostiantynivna,

Teacher at the Department of Physical Education and Sports

Oles Honchar Dnipro National University,

Dnipro, Ukraine.

liodtron@gmail.com

<https://orcid.org/0000-0002-0652-6439>

**STRENGTH TRAINING AS A MEANS OF INCREASING MOTOR ACTIVITY
OF FEMALE STUDENTS OF HIGHER EDUCATION INSTITUTIONS
DURING DISTANCE LEARNING**

For three years now, distance learning has been part of the education system in the country and has become an integral part of the education of both schoolchildren and students of colleges and higher education institutions. First, the pandemic, and then the martial law prompted education representatives to adjust to a different teaching format. This did not go unnoticed by physical education teachers. We see that the process of physical education was quite difficult to implement in a distance format, because the practical discipline was always taught face-to-face by a teacher-student, and the traditional form of teaching to the fullest extent as it is could not be integrated into the distance form in any way. However, the work programs were reviewed and adapted by the scientific and pedagogical staff of the physical education departments. Online formats for the organization of mandatory classes became necessary, and various methods, programs and technologies were adapted for their use at home.

At the same time, the prospects for physical education and sports specialists can be seen in the development of computer textbooks and methodical materials, computer training systems, multimedia products, etc., which would reflect the essence of the information component of the field (Петренко, 2022).

As we can see, during the period of self-isolation and during the martial law, the need of student youth for physical activity increased. If during the pandemic, motor activity affected the increase of the body's immune system, then with the nervous and emotional stress that a person feels in the face

of constant danger, the need for motor activity became urgent. After all, in addition to the academic load, student youth experience fear, mental pain and depression.

Physical activity has been shown to have a protective effect against depression in young people (Schuch et al., 2018). The key biological and psychosocial mechanisms by which physical activity has antidepressant effects are also explored, with a particular focus on exercise. Experts state the fact that physical exercises, which are usually performed in free time, are more beneficial for mental health, in contrast to activity during work. Experts also determined that low cardiorespiratory endurance (CRF) is an indicator of lack of physical activity and is associated with a 64% higher risk of depression (Kandola et al., 2019).

In the National strategy for healthy physical activity in Ukraine for the period until 2025 “Physical activity – healthy lifestyle – healthy nation” it was emphasized that physical activity is a generating and stimulating factor in the system of a healthy lifestyle, is important for improving physical development and personal fitness, prevention of excess body weight and obesity, and also contributes to reducing the risk of cardiovascular diseases, diabetes, osteoporosis, certain oncological diseases and depression (Президент України, 2016).

It is generally known that leading a healthy lifestyle by the population to preserve and strengthen health is five times more effective than medical and diagnostic procedures. Numerous scientific studies have proven that physical activity significantly contributes to a person’s adherence to a healthy lifestyle, as well as in some cases reducing the negative impact of harmful habits on the human body, increasing stress resistance and distracting from antisocial behavior (Президент України, 2016).

Based on the above, a strength training program was developed for female students, which could be performed at home. Such a program was aimed at all major muscle groups: muscles of the arms, legs, back and abdomen. For female students, in addition to the main lesson (1 per week), 2 independent ones were offered, which increased their weekly motor activity to the level of the body’s needs. In the main session, female students performed strength exercises and received the necessary knowledge and tasks for independent classes. In each class, antagonist muscles received a load in a certain mode, which made it possible to load not only the muscles, but also their cardiovascular system.

The purpose of the study was to determine the effectiveness of the developed strength training program for distance learning for female students of Oles Honchar Dnipro National University.

To solve the set goal, the dynamics of the studied indicators among female students of the 2nd year during the period of using strength training was investigated. To determine the effectiveness of strength training, the strength indicators of three main muscle groups were studied: muscles of the arms, legs, and press.

For this, standards were used that female students had to pass in order to receive points. 54 female students from different groups of different specialties of DNU took part in the experiment. The sample was formed among the data of the results of strength tests, which they performed at the beginning and at the end of the semester (see table 1, fig. 1).

Table 1

The results of the dynamics of the studied strength indicators (n=54)

<i>Tests</i>	<i>The period of the study</i>	\tilde{x}	σ	<i>m</i>	<i>t</i>	<i>p</i>
Flexion and extension of the arms in a supine position (number of times)	start	14,9	5,76	0,78	-13,62	<0,001
	end	20,0	3,70	0,50		
Squatting in 30 seconds (number of times)	start	21,7	6,04	0,82	-11,13	<0,001
	end	26,3	3,84	0,52		
Lifting the legs to an angle of 90° lying on the back (number of times)	start	26,9	7,89	1,07	-12,30	<0,001
	end	34,2	4,20	0,57		

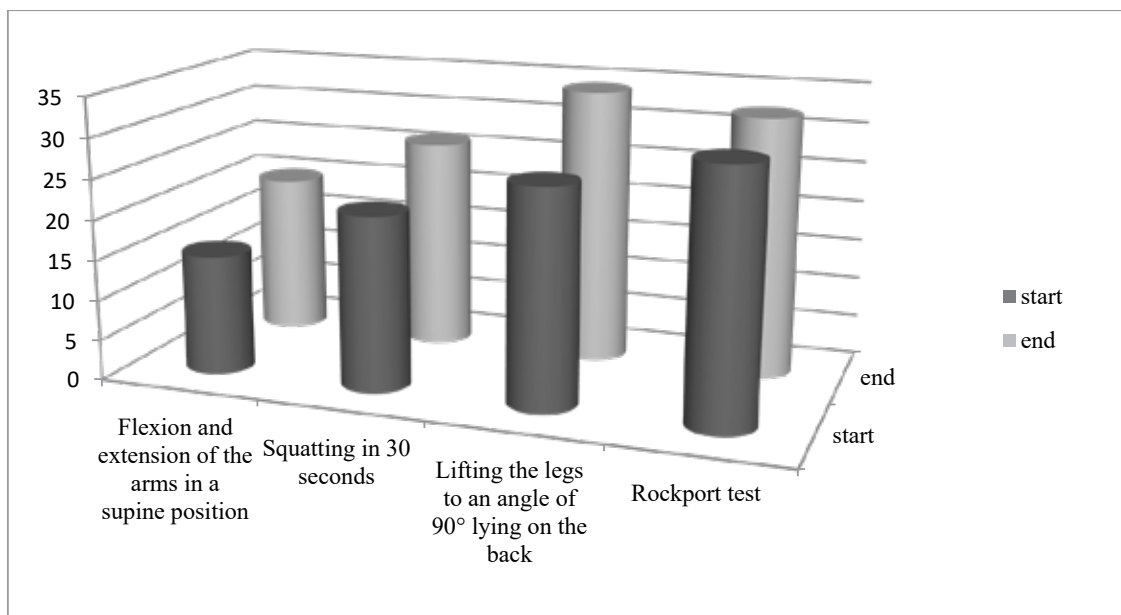


Fig. 1. Growth of the investigated indicators

Control of the strength of the muscles of the arms was carried out by the test “Flexion and extension of the arms in a supine position”. The analysis of the results showed significant differences between the final and initial indicators ($p < 0,001$). Therefore, the studied indicator increased in female students from $14,9 \pm 5,76$ times to $20,0 \pm 3,70$ times.

The strength of the leg muscles was studied by the “Squatting in 30 seconds” test. Statistically significant differences were obtained between the initial and final results of the studied indicator ($p < 0,001$). The initial result for female students was $21,7 \pm 6,04$ times, the final result was $26,3 \pm 3,84$ times.

The test “Lifting legs to an angle of 90° lying on the back” monitored the strength of the abdominal muscles of female students. It should be noted that this test also recorded significant differences between the final and initial results ($p < 0,001$). The results of female students increased from $26,9 \pm 7,89$ times to $34,2 \pm 4,20$ times.

As you can see, all three strength indicators had positive changes.

To determine the condition of the girls’ cardiovascular system, the maximum amount of oxygen VO_2 max, which the body can use during intense exercise, was measured. For this, the Rockport test was used (see table 2, fig. 1).

Table 2

Results of VO_2 max dynamics (n=54)

Test	The period of the study	\bar{x}	σ	<i>m</i>	<i>t</i>	<i>p</i>
Rockport test (ml/kg/min)	start	31,0	7,16	0,97	-5,88	<0,05
	end	32,3	6,63	0,90		

As you can see, the average values of this test are not very different – at the beginning of the experiment – $31,0 \pm 7,16$ ml/kg/min, at the end – $32,3 \pm 6,63$ ml/kg/min. But the calculation proved that the results of the VO_2 max indicators have significant differences ($p < 0,05$).

Therefore, the use of the developed program of strength training shows a reliable effect on both the strength qualities and the cardiovascular system of the studied female students.

Thanks to the observation and questionnaire among the respondents, it was found that the subjective well-being of the respondents was: satisfactory in 25% of respondents, good in 75%. Most of the girls (68%) confirmed that their sleep improved and their emotional state became more stable during the day.

So, having analyzed the scientific and methodological literature on the topic in question and having received the statistical data of the study, we can draw the following conclusions.

Statistical calculations showed that the developed strength training has a positive effect on the physical fitness of female students, because during the period of its use, the studied indicators improved significantly. The emotional state of female students stabilized.

A characteristic feature of the training was its use three times a week, which increased the level of motor activity to the optimal level. From this, it can be concluded that the tendency to reduce hours for the discipline “Physical Culture” in institutions of higher education is inappropriate, and even contradicts the rules of health care.

It should be noted that the traditional system of physical education has undergone drastic changes. And she will not be the same as before. But such a concept as “motor activity” cannot remain on paper. Its increase should be fixed at the legislative level and supported by the state at the financial level and in the information space.

Bibliography

1. Петренко Н.В. Фізичне виховання : методичні рекомендації. Миколаїв, 2022. 34 с. URL: <http://dspace.mnau.edu.ua/jspui/bitstream/123456789/11608/1/petrenko-fiz-vih-072-bak-2022.pdf>.

2. Physical Activity and Incident Depression: A Meta-Analysis of Prospective Cohort Studies / F.B. Schuch, D. Vancampfort, J. Firth, S. Rosenbaum, P.B. Ward, E.S. Silva, M. Hallgren, A. Ponce De Leon, A.L. Dunn, A.C. Deslandes, M.P. Fleck, A.F. Carvalho, B. Stubbs. *American Journal of Psychiatry*. 2018. Vol. 175. Iss. 7. P. 631–648. DOI: <https://doi.org/10.1176/appi.ajp.2018.17111194>.

3. Physical activity and depression: towards understanding the antidepressant mechanisms of physical activity / A. Kandola, G. Ashdown-Franks, J. Hendrikse, C.M. Sabiston, B. Stubbs. *Neuroscience & Biobehavioral Reviews*. 2019. Vol. 107. P. 525–539. DOI: <https://doi.org/10.1016/j.neubiorev.2019.09.040>.

4. Про Національну стратегію з оздоровчої рухової активності в Україні на період до 2025 року «Рухова активність – здоровий спосіб життя – здорова нація» : Указ Президента України від 9 лютого 2016 р. № 42/2016 / Президент України. URL: https://ips.ligazakon.net/document/view/U042_16?an=1.

References

1. Petrenko, N.V. (2022). *Fizyczne vykhovannia: metodychni rekomendatsii [Physical education: methodical recommendations]*. Mykolaiv, 34 p. Retrieved from: <http://dspace.mnau.edu.ua/jspui/bitstream/123456789/11608/1/petrenko-fiz-vih-072-bak-2022.pdf> [in Ukrainian].

2. Schuch, F.B., Vancampfort, D., Firth, J., Rosenbaum, S., Ward, P.B., Silva, E.S., Hallgren, M., Ponce De Leon, A., Dunn, A.L., Deslandes, A.C., Fleck, M.P., Carvalho, A.F., & Stubbs, B. (2018). Physical Activity and Incident Depression: A Meta-Analysis of Prospective Cohort Studies. *American Journal of Psychiatry*, 175(7), 631–648. DOI: <https://doi.org/10.1176/appi.ajp.2018.17111194> [in English].

3. Kandola, A., Ashdown-Franks, G., Hendrikse, J., Sabiston, C.M., & Stubbs, B. (2019). Physical activity and depression: towards understanding the antidepressant mechanisms of physical activity. *Neuroscience & Biobehavioral Reviews*, 107, 525–539. DOI: <https://doi.org/10.1016/j.neubiorev.2019.09.040> [in English].

4. President of Ukraine (2016). Pro Natsionalnu stratehiu z ozdorovchoi rukhovoï aktyvnosti v Ukraini na period do 2025 roku “Rukhova aktyvnist – zdorovyï sposib zhyttia – zdorova natsiia”: Ukaz Prezydenta Ukrainy vid 9 liutoho 2016 r. № 42/2016 [On the National strategy for healthy physical activity in Ukraine for the period until 2025 “Physical activity – healthy lifestyle – healthy nation”: Decree of the President of Ukraine dated February 9, 2016 № 42/2016]. Retrieved from: https://ips.ligazakon.net/document/view/U042_16?an=1 [in Ukrainian].

Martynova N., Khotiienko S., Prysiashna M. Strength training as a means of increasing motor activity of female students of higher education institutions during distance learning

The article deals with the problem of increasing the physical activity of female students of higher education institutions during distance learning. It was found that during the period of self-isolation and during the martial law, the need of student youth for physical activity increased. If during the pandemic, motor activity affected the increase of the body’s immune system, then with the nervous and emotional stress that a person feels in the face of constant danger, the need for motor activity became urgent. After all, in addition to the academic load, student youth experience fear, mental pain and depression.

Analysis of the scientific literature proved that physical activity has a protective effect against the onset of depression in young people. Key biological and psychosocial mechanisms through which physical activity has an antidepressant effect have been found. Physical exercise, which is usually done in your free time, is more beneficial for mental health than activity during work. Also, experts determined that low cardiorespiratory endurance (CRF) is an indicator of lack of physical activity and is associated with a 64% higher risk of depression. Strength training for female students was developed and offered, which affects the development of certain strength qualities and the cardiovascular system; increases the weekly level of motor activity.

Statistical calculations showed that the developed strength training has a positive effect on the physical fitness of female students, because during the period of its use, the studied indicators improved significantly. The emotional state of female students stabilized. A characteristic feature of the training was its use three times a week, which increased the level of motor activity to the optimal level. From this, it can be concluded that the tendency to reduce hours for the discipline “Physical Culture” in institutions of higher education is inappropriate, and even contradicts the rules of health care.

It should be noted that the traditional system of physical education has undergone drastic changes. And she will not be the same as before. But such a concept as “motor activity” cannot remain on paper. Its increase should be fixed at the legislative level and supported by the state at the financial level and in the information space.

Key words: physical education, female students, distance learning, strength exercises, physical fitness, emotional condition.

Мартінова Н. П., Хотієнко С. В., Присяжна М. К. Силовий тренінг як засіб підвищення рухової активності студенток закладів вищої освіти під час дистанційного навчання

У статті порушено проблему підвищення рухової активності студенток закладів вищої освіти під час дистанційного навчання. З’ясовано, що в період самоізоляції та під час воєнного стану збільшилася потреба студентської молоді в руховій активності. Якщо під час пандемії рухова активність впливала на підвищення імунної системи організму, то в разі нервового й емоційного напруження, яке відчуває людина в умовах постійної небезпеки, потреба в руховій активності стала нагальною. Адже, крім навчального навантаження, студентська молодь переживає страх, душевний біль та депресію.

Аналіз наукової літератури довів, що фізична активність чинить захисну дію проти виникнення депресії в молодих людей. Знайдено ключові біологічні та психосоціальні механізми, за допомогою яких фізична активність має антидепресивну дію. Фізичні вправи, які зазвичай виконуються у вільний час, більш корисні для психічного здоров'я, на відміну від активності під час роботи. Також фахівцями визначено, що низька кардіореспіраторна витривалість (CRF) є показником відсутності фізичної активності та в 64% випадків пов'язана з вищим ризиком депресії. Розроблено та запропоновано силовий тренінг для студенток, який впливає на розвиток певних силових якостей і серцево-судинну систему, підвищує тижневий рівень рухової активності.

Статистичні розрахунки показали, що розроблений силовий тренінг чинить позитивний вплив на фізичну підготовленість студенток, адже за період його використання досліджувані показники достовірно покращилися. Емоційний стан студенток стабілізувався. Характерною особливістю тренінгу було його використання тричі на тиждень, що підвищило рівень рухової активності до оптимального. Із цього можна зробити висновок, що тенденція скорочення годин для дисципліни «Фізична культура» в закладах вищої освіти є недоцільною та навіть суперечить правилам охорони здоров'я.

Зазначимо, що традиційна система фізичного виховання зазнала кардинальних змін. І вона вже не буде такою, як була раніше. Проте поняття «рухова активність» не може залишитися на папері. Її підвищення має бути закріплене на законодавчому рівні та підтримане державою у фінансовому плані й в інформаційному просторі.

Ключові слова: фізичне виховання, студентки, дистанційне навчання, силові вправи, фізична підготовленість, емоційний стан.

Creative Commons Attribution 4.0
International (CC BY 4.0)



Стаття надійшла до редакції 01.03.2023 р.
Прийнято до друку 25.03.2023 р.