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The Influence of Aerial Acrobatics and Pylon Sports on The Health Level of Primary School Pupils

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Abstract. Classes in aerial acrobatics and pylon sports have a positive effect not only on the development of the performers' physical qualities, their technical, choreographic and acrobatic training, but also on the level of health. Apanasenko's test was conducted before the beginning of the pedagogical experiment and after its end to determine the impact of classes in these directions on the physical condition of the performers. During the experiment, the performers were measured such parameters as height, weight, heart rate, hand strength, volume of air exhaled by the performer. After conducting the experiment, repeated testing was carried out, thanks to which it was determined how much the indicators for determining the level of health of the wards had changed. 30 performers were involved in the study, 15 of whom worked according to the experimental program, which was based on a comprehensive program of physical and technical training of performers in aerial acrobatics and pole sports, another 15 wards were part of the control group, where children trained according to the standard program for the development of technical skills work on the projectile. The purpose of our study is to determine the impact of acrobatics and pole sports on the health of the wards. Changes in the level of health in experimental group (EG) and control group (CG) occurred during the experiment. In EG the indicators changed from 5.0±0.5 to 9.07±0.76, the change in the indicator is 4.07, the changes are significant at $p<0.001$, in CG the indicators changed from 4.13±0.62 to 6,67±0.72, the difference is significant at $p<0.05$. In other words, it can be stated that aerial acrobatics and pole sports have a positive effect on the health of the performers. In addition, the indicators in the EG group changed more, which can be considered, as well as the effectiveness of the experimental program. In addition to acquiring technical skills on the projectile, elementary school students also receive choreographic and acrobatic training. In CG, indicators have also improved, but the changes are less significant.

Key words: pylon sports, aerial acrobatics, younger schoolchildren, health level, Apanasenko G.L. test.

I. Introduction.

Aerial acrobatics and pylon sports are new modern directions that are being admired by more and more young performers. Nevertheless, in addition to physical training, these directions also affect the level of health of the performers, what exactly is this effect and whether it has a positive or negative effect on the health of the wards, we decided to determine with the help of the G.L. Apanasenko test. An experimental program was implemented, during which preliminary measurements were made with children, and after half a year of classes according to the experimental program, repeated measurements were carried out, which made it possible to determine changes in the level of health in the experimental and control groups.

Analysis of the latest research and publications. The influence of physical activity on the health level of primary school pupils was considered by such scientists as Balabanov O. (2022), Volkov V.L., Kutsenko O.V. (2017), GolenkovaYu. V.,PalchukN. I.(2014), Dedelyuk N., Pekalyuk T.,Nazaruk A. (2021), etc.

Pole sports and methodical features of mastering this direction were considered in the works by Hanna Oleynyk "Pole dance" (2017) and Iryna Kartali in the book "Pole dance fitness" (2018). Aerial silks and features of this direction were discussed in the book Steven Santos (2013).

However, the question of the influence of pylon sports and aerial acrobatics on the health of the performers has not yet been considered by modern scientists.

Highlighting previously unresolved parts of the overall problem. Aerial silks and pylon sports appeared as directions relatively recently. Many people are interested in these areas, among which there are primary school pupils. It is important to investigate the impact of such classes on the health level of younger schoolchildren, because classes in these areas should not only bring technical excellence to the performers, but also have a positive effect on their health.

Therefore, **the purpose** of our study was to determine the impact of aerial acrobatics and pole sports on the health of the wards.

Presentation of the main research material. In order to determine the influence of aerial acrobatics and pylon sports on the health level of performers, testing was conducted according to G.L. Apanasenko. Before the beginning of the pedagogical experiment and after its end. Two groups of performers were created: experimental and control. The experimental group was engaged in a complex program of physical and technical training in aerial acrobatics and pylon sports.

This program included choreographic training, technical training on the instruments and acrobatic training. The control group was engaged in standard technical training on the instrument, which involves the development of the performers' physical qualities and technical abilities in performing elements on aerial silks and pylons.

30 performers of primary school age, who work on aerial silks and pylons, took part in the experiment. In order to determine the level of health of the wards, the G.L. Apanasenko test was conducted with them at the beginning of the pedagogical experiment, and half a year after its end.

In the biological and medical aspect, the "Health level" corresponds to the body's energy potential. In other words, how many units of energy per unit of time per unit of body mass can be produced by this organism from a unit of compound [4, p. 25].

In practice, the energy potential on a straight line can be measured in several publicly available ways in special laboratories with the help of special equipment and reagents. And also by indirect methods, examining the test subject's endurance on a bicycle ergometer, etc. The result is approximately the same (total) maximum oxygen consumption (MOC) and anaerobic metabolism threshold (AMT) [4, p. 26].

Everyone has their own threshold. But there is a general pattern: starting from a certain level of energy productivity, the body is not prone to the development of diseases and is maximally resistant to risk factors. This level is called a safe level of health [4, p. 27].

There is a reliable and accessible method of measuring the level of health - the method of professor G.V. Apanasenko. The score obtained by this method is fully correlated with aerobic performance.

To calculate the level of health, you need to measure several indicators of the body:body weight (kg); height (m), systolic blood pressure ("upper"), VCL - vital capacity of the lungs (ml), force (dynamometry) of the hand (kg), heart rate - heart rate (pulse), time (in minutes) of pulse recovery after a standardized load (20 squats in 30 seconds).

A stopwatch was used to measure heart rate and pulse. The number of strokes per 60 seconds was counted.

The vital capacity of the lungs is the maximum amount of air that a person can exhale. VCL is one of the main indicators of the state of the external respiratory system used in medicine. During physical exertion, the

respiratory volume increases due to the use of inhalation and exhalation reserves. Inspiratory and expiratory lung capacity can be increased through exercise. Therefore, for example, in trained persons, the VCL can reach 6000-7000 ml. The vital capacity of the lungs is determined using a spirometer [3,c.39].

To determine hand strength (hand strength), a hand dynamometer is used, which consists of an oval steel spring, inside which is attached a scale with divisions and an arrow showing muscle strength in kilograms. Hand strength is measured as follows. Take the dynamometer comfortably in your hand, then extend your hand to the side and squeeze the dynamometer as hard as possible. The research is repeated 3 times for each hand separately. The largest dynamometer reading is recorded.

The muscle strength of the hands depends on height, body weight, chest circumference, etc. Since the weight of the body can change, it is necessary to determine the index of the hand compression force - the relative force of the hand. To do this, you need to multiply the number that shows the grip strength of the stronger hand by 100 and divide the resulting number by your body weight.

Express assessment of the level of physical health of recipients according to G.L. Apanasenko was developed in two versions: for school-age children and for representatives of the adult contingent of the population [3, c.41].

The results obtained during the initial examination are compared with tabular data (separately for girls and for boys), based on which a certain number of points is awarded for the real value of each of the specified parameters.The assessment of the integral indicator - the level of physical health (RFZ, points) is carried out taking into account the total number of points obtained and the gradation of RFZ into the following functional classes: "low", "below average", "average", "above average", "high" .

When registering according to the method of G.L. Apanasenko of the level of physical health of school-aged children, the same functional indicators are registered, only the ratio of body mass and length is calculated according to special tables, and instead of the heart rate recovery time after 20 squats in 30 seconds, the index of their physical performance is calculated according to the Ruffier-Dixon formula.

The main task of such testing is to determine the reserve capabilities of the child's cardiovascular system. The Ruffier test is a test used to measure short-term aerobic endurance and the ability of the heart to recover, thus helping to determine a child's level of physical fitness.

According to the tables for determining the level of health for boys and girls, you can independently calculate the level of health get a score for each indicator and summarize for all indicators.

In addition, it is possible to analyze low scores in the resulting calculation of the result and understand which parameter of the body's work worsens health reserves.After the points have been calculated, the child's health level can be determined using the table of the ratio of the obtained health level points.

A safe level of health corresponds to 9 or more points (that is, an "average" level of health and above).

So, thanks to the calculations to determine the level of health of the wards who are engaged in aerial acrobatics and pylon sports, the following results were obtained. Before the start of the experiment, the constant experiment (see Table 1).

Table 1.

Changes in the level of health in EG and CG according to the Apanasenko test during the experiment, the number of points

Participants of the experiment	Before experiment	After experiment	Indicator change	Student's t-test	p,level of significance
EG (n=15)	5,0±0,5	9,07±0,76	4,07	4,481	p<0,001
CG(n=15)	4,13±0,62	6,67±0,72	2,54	2,656	p<0,05

Source: developed by the author.

According to the results of testing during the constant experiment, the groups are homogeneous, and the groups are heterogeneous in the formative experiment. Significant improvements were achieved by EG, its

indicators changed by 4.07, and in CG - by 2.54. This suggests that the experimental program has a positive effect on the level of health of performers more (see Table 2).

Table 2.

Comparison of health level assessments between EG and CG (number of points)

Groups	Before experiment	t	p	After experiment	t	p
EG(n=15)	5,0± 0,5	1,086	p>0,05	9,07±0,76	2,292	
CG(n=15)	4,13±0,62			6,67±0,72		p<0,05

Source: developed by the author.

We see significant changes in the results of determining the level of health both in EG and in CG, which indicates the positive impact of aerial acrobatics and pylon sports on the level of health of performers.

Conclusions from the conducted research. Changes in the level of health in EG and CG occurred during the experiment. In EG the indicators changed from 5.0± 0.5 to 9.07±0.76, the change in the indicator is 4.07, the changes are significant at $p<0.001$, in CG the indicators changed from 4.13±0.62 to 6, 67±0.72, the difference is significant at $p<0.05$. In other words, it can be said that aerial acrobatics and pole sports have a positive effect on the health of the performers.In addition, the indicators in the EG group changed more, which can be considered as a confirmation of the effectiveness of the experimental program. In addition to acquiring technical skills on a projectile, elementary school students also receive choreographic and acrobatic training. In CG, indicators have also improved, but the changes are less significant.

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