

BREATHING EXERCISES INFLUENCE ON FUNCTIONAL CAPABILITIES OF CHILDREN HAVING PSYCHO-NEUROLOGICAL DISORDERS

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Abstract

Children are constantly growing and evolving. Physical activity forms an integral daily part of a child's life, at home and school. Its practice is natural and spontaneous, and it is considered synonymous with good health. Physical activity is necessary to children's general, staturponderal, motor, psychological and social development. Increased motor activity observed children with psycho-neurological disorders indicates one of the exhaustion phases. In order to suggest a correct amount and intensity of physical activities, it is required to determine the level of the functional abilities of an organism. The purpose of this research was to evaluate the functional abilities in pupils with psycho-neurological disturbances, aged 13±2, after the individual biofeedback breathing program had been used. We used the method of heart rhythm variability (HRV) analysis. This method is used to analyse and assess the regulatory system of the physiological functions of a human body. We also used a heart rhythm analysing computer software Omega-S as a diagnostic tool which was developed in the Dinamika laboratory.

Results: the indicators of the physical conditions of the pupils before and after the application of individual breathing program were compared. The comparison showed that normal and high levels decreased by 20%.

Conclusion: The results indicated that for children with psycho-neurological disorders the program had been ineffective.

Keywords: *children with psycho-neurological disturbances, functional abilities, OMEGA-S.*

Introduction

A basic component of every society is a healthy and happy family which has healthy and both mentally and physically developed children. Unfortunately due to various factors there are an increasing number of children born with impaired development. Children with psycho-neurological disturbances study in special boarding schools or in other schools according to the specially designed and designated programmes of general comprehensive education. Usually such children have suffered from different somatic illnesses, traumas, infectious diseases; they may possess cerebrum-associated disturbances, epilepsy, as well as pathologic behavioural tendencies such as pathologic sexual behaviours, pyromania and kleptomania. It is normally ensured that an individual approach is provided to every one of such children in order to avoid mental overload as well as to ensure the required conditions for a recovery process are met and appropriate working and resting patterns are provided.

At present, when the number of factors negatively affecting child's organism are rising, the problem of maintaining the health of the growing generation is becoming increasingly important. The influence of various factors, such as the low levels of socio-economic conditions, deterioration of ecology worldwide, the sudden increased tendency in people to watch more television, play videogames, the overall mass computerization, an increased mental and educational load on people along with a decline in the overall physical activity of people, increased susceptibility to diseases and lower immunity, climate, temperature and atmospheric pressure changes, all of these factors have an equally negative effect on the processes of growth and overall development of a child and are manifested in a generally decreased ability of a young organism to adapt to any environmental changes one might encounter (Kostenko, 2009). The link between the adaptive capabilities and the health of a person has been shown by many researchers and they claim that even the slightest alterations made to the adaptive potential of an individual can cause a diverse range of health problems and lower the quality of life of a person (Moskovchenko, 2003).

The foundations of good health and development of physical skills are set a school age, which are required to be able to partake efficiently in the various different forms of motor activities, which, in turn, all create the ideal conditions for an active and directed way of forming and developing mental and intellectual characteristics and abilities in a child. In order to intentionally and directionally influence the development of a child's personality by involving the child in various complex forms of motor physical activities, one needs to be sure that the child has a suitable level of fitness and is in reasonably good health. Physical development and physical fitness, i.e. preparedness to perform physically active work or tasks, which is determined by the development of the energetic mechanisms of an organism and its gaseous exchange capabilities as well as the body's level of somatic health, the two components, are classed as crucially important constituents of a reasonable physical state. The physical working ability and fitness levels are highly correlated with good health and are also believed to be interdependent (Kostenko, 2009).

Material and methods

Participants

To complete the research we monitored the students of a special boarding school. Data on the nature of violations in health and behavior of children were obtained through the study of test cards and results of medical examinations made in Children Clinical University Hospital "Gaiļezers". The results of medical examinations were provided by the parents of the children.

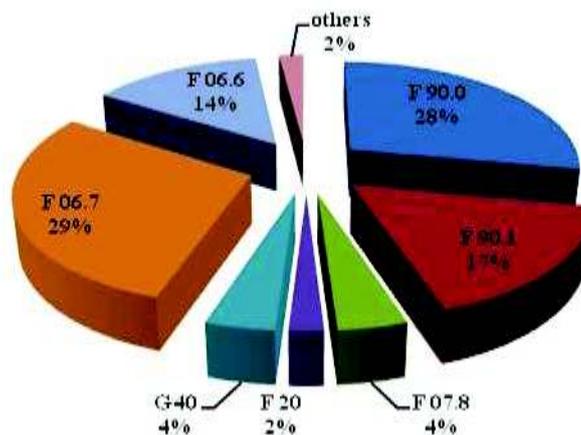


Figure 1. Pupils' diagnosis

We can see in figure nr. 1 that the students have the following disorders:

- 29 % of students of the special boarding school are with mild cognitive disorders
- 28 % with hyperkinetic disorder
- 17 % hyperactivity disorder
- 14 % emotional lability
- 6 % schizophrenia and epilepsy
- 4 % organic disorders of personality and behavior
- (Tredgold. 1937) observed signs of impulsivity, aggression and social disorders in behavior of mentally retarded children. (Still. 1902) pointed out that the same features can be met in children with "normal" intellect with 3:1 ratio comparing boys vs. girls.

(Teeter. 1998) described these signs as the result of inability of the child to learn the rules and norms of behavior because of inattention, hyperactivity, and restless behavior.

Students who took part in the survey were tested by clinical psychologists and school psychologist to determine the level of intelligence. (See fig.2).

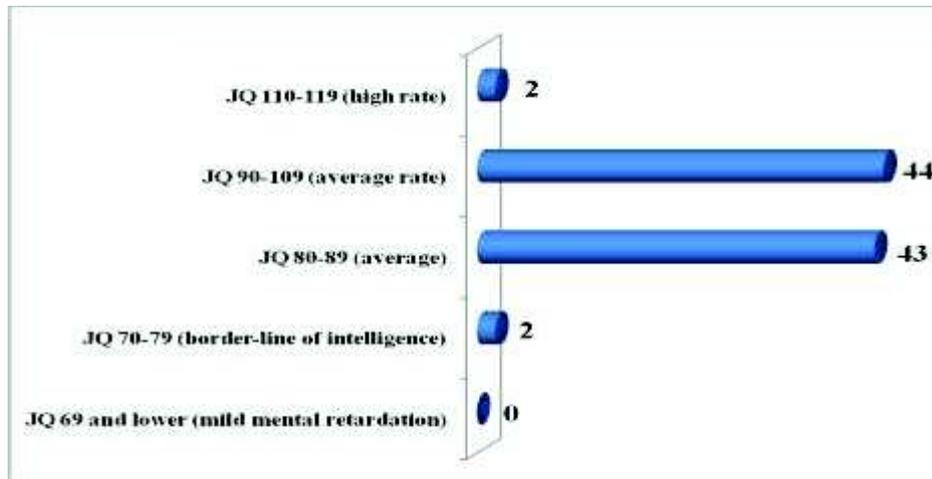


Figure 2. Pupils' IQ levels

Test results showed that 51% of the pupils of the school had average and high intelligence, 47% below normal. This corresponds to the theory of G.F. Steel.

OMEGA-S

In our work we used the method of heart rate variability analysis with the help of hardware-software diagnostic tool "Omega-S".

We used "Omega-S" to control dynamically the parameters of physical and mental health of the students.

The diagnostic tool is based on a new information technology that analyses biorhythmic processes in the human body. The system uses the latest developments in physiology and sports medicine. "Omega-S" uses new highly informative indicators for assessment of physical and mental state of a person. Methodology of the system is based upon research of intervalography and rhythmical cardiographical correlation. It investigates the activities of main body systems: cardiovascular and central nervous system. Accordingly, the information obtained in the survey is the result of direct gaging, opposite to indirect gaging of many other systems. "Omega-S" express-control mode allows rapid monitoring to determine:

- A - level of adaptation to physical loads;
- B - extent of a body training and fitness level;
- C - levels and state of the energetic supplies of an organism;
- D – psycho emotional levels;
- H - integral index of the physical status.

Results obtained are graded on a scale of 1 to 5: **1** (0-20%), **2** (20-40%), **3** (40-60%), **4** (60-80%), **5** (80-100%).

Results

A survey of the functionality of children with psycho-neurological disorders was made in late October 2012. The survey was conducted after the school holidays. 29 boys were examined.

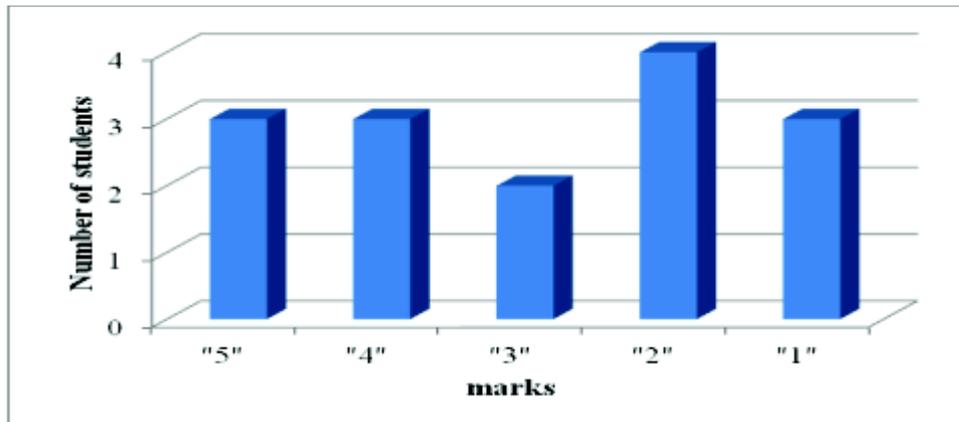


Figure 3. An integral component of the experimental group of children (October 2012)

Analysis of the metrics of physical condition showed, that in the experimental group (See fig.3):

- 40% of the students have high and normal level of physical condition. Physical condition is satisfactory. All body systems are working optimally;
- 13% have an average level of physical condition. The systems of the body work intensively, the reserves of the body are not being spent effectively;
- 47% of students have a low level of physical condition - poor condition. Body reserves are reduced, the body is definitely under pressure, the failure of adaptation is possible.

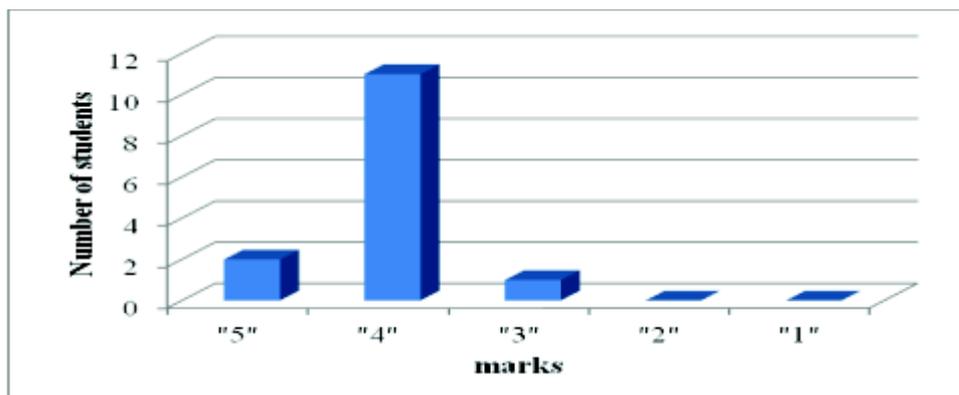


Figure 4. Integral indicator of the control group (October 2012)

Analysis of the indicators of physical conditions showed, that in the experimental group:

- 92% of the students have high and normal level of physical condition. Physical condition is satisfactory. All body systems work optimally;
- 8% have an average level of physical condition. The systems of the body work intensively, the reserves of the body are not being spent effectively. (See fig.4)

During November and December each member of the experimental group went through individually controlled breathing program (total = 15 times / person.) (See fig.5).



Figure 5. Individual breathing features visualization

"Omega-S" breathing control program is used as biofeedback to correct emotional and physiological state after physical and psycho-emotional pressure and in stressful situations. It is also used in case of fatigue occurrence signs to improve the effectiveness of medications and medical procedures. In December of 2013 we used "Omega-S" breathing control program again and conducted a new test of students' functional capabilities.

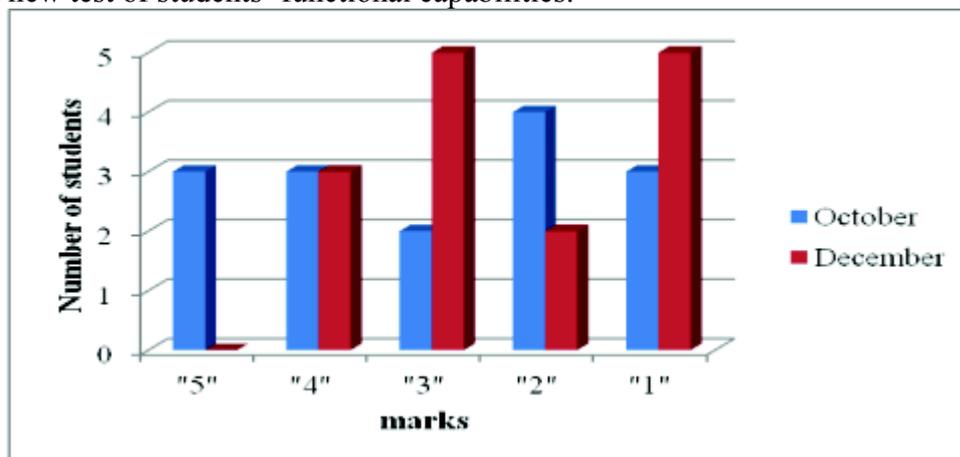


Figure 6. Comparison of the integral index of the experimental group (October-December 2012)

The testing showed the following data (See fig. 6):

- 20 % of students of the experimental group have high and normal level of physical condition;
- 33 % of students have an average level of physical condition.
- 47 % have a low level of physical condition.

Compared with the initial testing, the indicators of physical conditions significantly deteriorated.

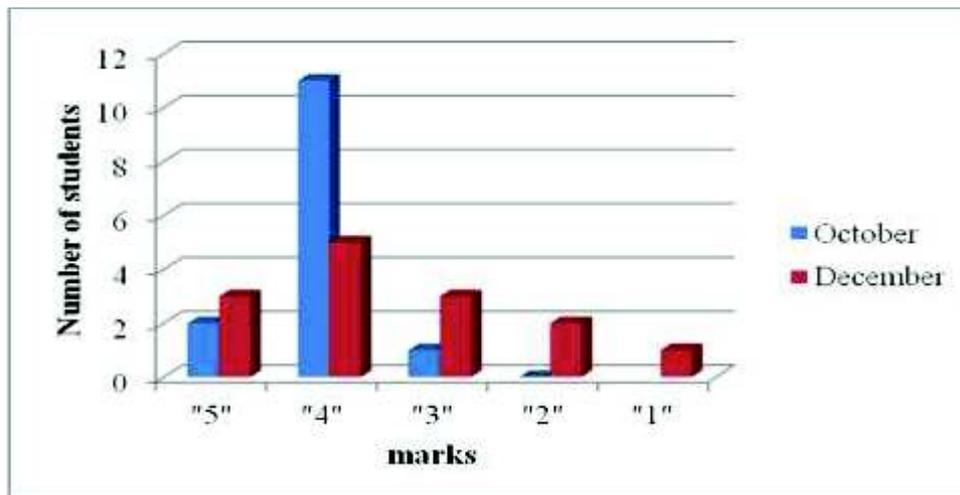


Figure 7. Comparison of the integral index of the control group (October-December 2012)

Analysis of the indicators of physical conditions showed, that in the control group:
 58 % of students of the control group have high and normal physical condition.
 21 % of students have an average level of physical condition.
 21 % of students have a low level of physical condition.
 Significant changes in the index of physical condition have not been noted.

Discussion

The breathing process is most likely the weakest among automatically controlled processes in our body. Most people do not receive the optimum amount of oxygen from lungs. This is due to the fact that there is the lack of oxygen in the atmospheric air. But it is because of the fact that reception of the optimal amount of oxygen from the air during normal automatic breathing is impossible. The body of most people cannot do it due to the difficult environment and the insufficient adjustment of self-regulatory abilities of human organism. Thereby the body automatically increases the rate and depth of breathing, if it helps to increase the reception of oxygen by our organs and tissues. It can also reduce the frequency and depth of breathing, if the increased rate and depth of breathing as well as normal one does not add sufficient oxygen to the organs and tissues.

There are a lot of breathing techniques and breathing exercises in the world, i.e. those of O.G. Lobanov, I. Muller, A.N. Streljnikova and surely "Hatha Yoga" doctrine. Regular usage of breathing exercises, whose author is O.G. Lobanova, dramatically improves the health, and the way you feel yourself. The exercises increase the amount of oxygen in the blood. The exercises by A.N. Streljnikova give the following results:

- "The depth of breathing has increased many times, the interchange of gases has been improved." -
- "The usage of the new breathing exercises showed that the exercises are universal. They help to treat stuttering, to resist colds, improve performance. "According to I. Muller, the system together with a small daily walk in the fresh air makes it possible not only to maintain the full performance, but even eliminates most of the common chronic diseases. "

Inactive lifestyle affects the functioning of many organ systems of the body, especially the cardiovascular and the pulmonary systems. Prolonged sitting the breathing pattern becomes more shallow, rate of metabolic reactions decreases, blood remains in the lower extremities for longer periods of time than normal, which all thus leads to a decrease in the working ability of the body and especially – the brain – resulting in a lack of attention, poor memory, impaired movement coordination and needing more time for cognitive processes. (K. Lebedinskaja, V. Lubovskij, I. Markovskaja).

This research tested the effectiveness of individual breathing program to improve the functionality of children with neuropsychiatric disorders. According to the authors of “Omega-C”, their individual breathing program had to improve all functional parameters of the people under control. However, this research has shown negative results. The reasons for negative results could be: a) insufficient number of breathing procedures, only 15 times per person. We can repeat the research with more number of breathing procedures and look at the dynamics. b) the program has had no effect because of irregularities in the health of children and we should consider the other methods of efficiency recovery, due to the fact that by the end of the semester efficiency indicators are falling caused by general fatigue.

Conclusions

Comparison the indicators of the physical conditions of the pupils of the experimental group before and after the application of individual breathing program showed the following results:

- High and normal levels decreased by 20%;
- Average level increased by 20%;
- Low levels of physical condition have not changed (47%).

According to the authors of regular breathing exercises the program can significantly improve health indicators and, above all, resources of energy supply of the body and the immunity rate. The results indicate that for children with psycho-neurological disorders the program was ineffective.

To determine the correlation coefficient between the results in the experimental group obtained in October and December we examined integral indicators.

There is a close tie between October and December results.

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