ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

General improvement of children with Down syndrome by means of regular soccer lessons.

Makhov AS, and Medvedev IN*

Russian State Social University, st. V. Pika, 4, Moscow, Russia, 129226.

ABSTRACT

A very affordable option for general rehabilitation of children with Down's syndrome is regular soccer practice during their leisure activities. In this connection, the goal is to assess the overall health effect of regular football training in children with Down syndrome. Conducted recreational activities by the author's method allowed to achieve more preferable results than in the control. After 6 months, observations in the experimental group achieved a balance of sympathetic and parasympathetic influences, close to the state of vegetative equilibrium. As a result of the use of the author's method of playing soccer in observed children with Down syndrome, it was possible to normalize the weight-to-growth ratio, reducing it by 10.4%. This was accompanied in the persons of the experimental group by a decrease in the intensity of adaptation of the circulatory system (by 16.9%) to the level of satisfactory adaptation. As a result of a comprehensive assessment of overall physical development in the experimental group, it was possible to establish its output at a high level against the background of the author's method of teaching football. Taking into account the results of the influence of the developed training scheme on the dynamics of the recorded integral indices, one can speak of its advantage in children with Down's syndrome before a frequent, but unsystematic visit to the football section.

Keywords: children, Down's syndrome, physical activity, football, health improvement, prevention.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

One of the most important indicators of the welfare of society in economically developed countries is the level of health of its citizens with Down syndrome [1,2]. It is known that it depends not only on their medical care, but also on the level of their motor activity [3]. The complexity of this issue is related to the fact that Down syndrome is often burdened by many chronic diseases [4]. Their course often has a progressive character and is difficult to compensate [5]. A prominent place is occupied by cardiovascular pathology, which very often leads to the early death of this category of persons [6,7]. The leading direction of comprehensive health promotion in Down's syndrome should be considered the use of physical exercises of a different nature [8,9]. It is recognized that the dosed regular ordered muscular activity within the framework of rational physical exercises can provide, including in Down's syndrome, a preventive and health-improving effect in relation to many variants of pathology [10].

Modern medicine has an acute need to continue improving the complexes of physical exercises and programs aimed at a comprehensive recovery in Down's syndrome [11,12]. An accessible option for correcting the condition of children with Down's syndrome is in the football section as part of leisure activities. In this connection, the goal is to assess the overall health effect of regular football training in children with Down syndrome.

MATERIALS AND METHODS

The study was approved by the local ethics committee of the Russian State Social University on September 15, 2016 (protocol No. 9). The study was conducted on the basis of the Russian State Social University in Moscow. The study took 63 children with Down syndrome 9-12 years old, who had not systematically engaged in football. Of these, control and experimental groups were formed, which were observed for six months.

The control group consisted of 32 children (boys). Their average age was 10.5 ± 0.3 years. This group was formed from children with Down syndrome, who had the opportunity to attend classes in sports groups on football once or twice a week, but could not adhere to the proposed scheme in the author's methodology. The experimental group included 31 children (boys). The mean age in the experimental group was 10.7 ± 0.4 years. Children of the experimental group attended classes in sports groups on football strictly three times a week. Training in playing football in the experimental group was carried out in two stages, each lasting 3 months. with the observance of nine rules: visual demonstration, game form of training, the clarity of the training zone, the softness of discipline, the clarity of the prohibition, from simple to complex, providing opportunities for imitation and analysis of training with the development of techniques for playing mini-football. At the first stage, the methods of playing football were taught in the following order: blows on the ball (kick inside the foot, kick in the middle of the rise, kick with the toe, kick from the outside of the foot, kick from the half-flight, strike from the summer, keep the ball, kick at the goal) and stop ball. At the second stage they repeated the tricks learned at the first stage and consistently mastered the running of the ball with a snake, transfer of the ball, selection of the ball, movement without the ball, defending the defender, passing and striking, striking from the spot and the process of playing mini-football [13].

1. Assessment of the functional state of the circulatory system was carried out by the method of [14].

Measure the height and body weight, determine the pulse rate and the level of blood pressure. To quantify the level of the functional state (FS) of the circulatory system in points, the following formula is used:

PS = 0,011 (HR) + 0,014 (SBP) + 0,008 (DBP) + 0,014 (Rev.) + 0,009 (MT) - 0,009 (DT - 0,27), Rev. - age in years; SBP and DBP - systolic and diastolic blood pressure in mmHg; Heart rate - heart rate in bpm; MT - body weight in kg; DT - body length in cm. The evaluation of the level of adaptation of the circulatory system in the examined subjects was evaluated according to the scale below (Table 1).

ISSN: 0975-8585

Table 1: Scale for assessing the functional state of the circulatory system

№	Adaptation status	Values of FS in points
1	Satisfactory adaptation	to 2,60
2	The tension of adaptation mechanisms	2,60-3,09
3	Unsatisfactory adaptation	3,10-3,60
4	Disruption of adaptation	above 3,60

2. The functional state of the autonomic nervous system (vegetative Kerdo index) [14] was calculated using the formula: (1-DD / HR) x 100, where DD is the diastolic blood pressure; Heart rate - heart rate. The following criteria were used for evaluation. The magnitude of the vegetative index of Kerdin ranges from -15 to +15 indicates a balance of sympathetic and parasympathetic influences.

The value of vegetative index Kerdo above + 15 indicates the predominance of the sympathetic tone of the autonomic nervous system. The value of the vegetative index of Kerdo is less than - 15, indicating the predominance of the parasympathetic tone of the autonomic nervous system. With the value of the vegetative Kerdo index, there is a vegetative equilibrium.

3. Evaluation of the weight-growth index [14]. The weight-growth index is an integral characteristic of development and reflects the formed level of metabolic processes. The criteria for its evaluation are presented in Table 2.

Table 2: The scale of body weight by weight-growth index

Weight-growth index (g / cm)	Body weight estimation
<310	Deficit
310-369	Reduced
370-480	Norm
481 - 540	Increased
>540	Excess

4. Assessment of the level of general physical development (indicators of the vegetative-vascular system) [15]. A number of simple definitions of indicators were used, which were introduced into the following formula:

Y = -0,615 x X1 + 0,259 x X2 - 0,322 x X3 - 0,124 x X4 + 0,148 x X5 - 0,023 x X6 + 54,21 where Y is the general physical state; X1 - age, years; X2 - body length, cm; X3 - body weight, kg; X4 -Heart rate at rest, bpm; X5 - systolic blood pressure, mmHg; X6 - diastolic blood pressure, mm Hg. The evaluation criteria are presented in Table 3.

Table 3: Scale of assessment of general physical condition

The level of general physical development	Values in points
High	More than 51
average	38-51
Low	Less than 38

The results of the study were mathematically processed with the calculation of the arithmetic mean (M), the error of the arithmetic mean (m) and the level of reliability in the t-test of the Student ($p < 0.05$).

RESULTS OF THE STUDY

Data on the status of the indicators taken into consideration in the examined children with Down syndrome are systematized in Table 4.

ISSN: 0975-8585

Table 4: Results of the evaluation of the health status of children taken into the study

Indicators	Observation groups			
	Control group M±m, n=32		Experimental group, M±m, n=31	
	outcome	at the end of observation	outcome	at the end of observation
Autonomic Kerdo index, points	14.8±0.32	12.8±0.38 p<0.05	14.7±0.45	4.1±0.22 p<0.01 p_1<0.01
Weight-growth index, g/cm	522.7±0.24	502.2±0.65	519.1±0.65	470.2±0.35 p<0.05 p_1<0.05
Functional state of the circulatory system, points	2.99±0.20	2.82±0.13 p<0.05	2.97±0.30	2.54±0.19 p<0.01 p_1<0.05
General physical development, scores	39.6±0.38	42.6±0.26	38.2±0.33	52.6±0.28 p<0.01 p_1<0.05

Conventions: p - reliability of differences in baseline values and values at the end of the observation in both groups; p1 - reliability of differences in indicators at the end of observation between groups. The reliability of differences between groups in terms of outcomes was not obtained.

In the initial state, an increase in the weight-to-height ratio was noted in the examinees who made up the control and experimental group, which was aggravated by the initial manifestations of the unsatisfactory adaptation of the circulatory system in them. This was followed in all examined by the prevalence of sympathetic influences over parasympathetic ones. In addition, all the subjects surveyed at the time of the observation had an average, close to low, level of general physical development (in control 39.6 ± 0.38, in the experimental group 38.2 ± 0.33 points).

The beginning of football in both observation groups led to a change in the level of indicators taken into account. As a result of playing football 1-2 times a week on a free schedule (control group), the value of the Kerdo index decreased by 15.6%, which indicated an equilibrium between sympathetic and parasympathetic influences in the body [16,17]. This was accompanied by a 4.1% decrease in the weight-to-weight ratio, which indicated their retention in the category of persons with increased body weight [18, 19]. Also in the children of the control group, after six months of visiting the football section, the value of the functional indicator of the circulatory system decreased by 6.2%. The dynamics found indicated the preservation of their circulatory system in the state of stress of adaptation mechanisms. After six months of observation, the control group noted an increase in the level of general physical development by only 7.6%. This indicated that the children who made up the control group remained at the average level of general physical development [20,21].

The conduct of football training by the author's method allowed to achieve better results in the experimental group than in the control. So, after 6 months, observations in the experimental group achieved a more stable balance of sympathetic and parasympathetic influences than in persons in the control group. After six months of classes in the experimental group, their balance approached the state of vegetative equilibrium (Kerdo index 4.1 ± 0.22 points). As a result of the use of the author's method in children with Down's syndrome, the experimental group managed to reduce the weight-growth ratio by 10.4%, thereby ensuring its normalization. This accompanied in these children a more pronounced decrease in the intensity of adaptation of the circulatory system (by 16.9%) than in control, which ensured its reaching a level of satisfactory adaptation [22,23], indicating a marked strengthening of their cardiovascular system [24,25] . A comprehensive assessment of the overall physical development made it possible to establish a more pronounced positive dynamics in the experimental group at the end of the observation [26, 27]. The achieved result prevailed over the control values by 23.5% and indicated the achievement by the experimental group of a high level of general physical development.

Thus, systematic and metered football training can provide children with Down syndrome a pronounced healing effect that surpasses the effectiveness of playing football on a free schedule.

CONCLUSION

The problem of preserving and restoring the health of children with Down syndrome is becoming more urgent in developed countries. For this contingent, the decrease in motor activity becomes common, which increases the number of dysfunctions and complex pathology in it. In this regard, it becomes necessary to further search for rational forms of treatment and prevention and health work in children with Down syndrome with the help of physical exercises. When assessing the impact of the football training scheme developed by the authors with the help of integral indices, its advantages over the haphazard football lessons were shown. After 6 months, observations in the experimental group achieved a more stable balance of sympathetic and parasympathetic influences and normalize the weight-to-height ratio. This was accompanied in the experimental group by the achievement of a satisfactory adaptation of the circulatory system and a high level of general physical development. Based on the conducted research, it can be said that systematic and metered exercises with physical exercises on the simulators can bring to children with Down's syndrome a pronounced healing effect that surpasses the effectiveness of playing football on a free schedule.

REFERENCES

[1] Makhov AS, Zubenko MB. (2017) Physical culture and sport system for children with Down syndrome: design issues. Theory and Practice of Physical Culture.4:3.

[2] Mikhaylova IV, Shmeleva SV, Makhov AS.(2015) Adaptive chess educational technology for disabled children. Theory and Practice of Physical Culture. 7:12.

[3] Semenova NA. (2014) The health status of children with down syndrome: dissertation ... of candidate of medical Sciences. Moscow, 84.

[4] Esipova TP, Kobyakov EA, Markovska AV. (2015) Integrated development of children with down syndrome an early age. Novosibirsk: GOOI "Society "Down Syndrome", 34.

[5] Babayan VV. (2013) Clinico-functional and metabolic characteristics of children with Down syndrome: the dissertation of the candidate of medical sciences. Moscow, 142.

[6] Skoryatina IA, ZavalishinaSYu.(2017) Ability to aggregation of basic regular blood elements of patients with hypertension anddyslipidemia receiving non-medication andsimvastatin.Bali Medical Journal.6(3):514-520. doi:10.15562/bmj.v6i3.552

[7] Kotova OV, ZavalishinaSYu, Makurina ON, KipermanYaV, Savchenko AP. (2017) Impact estimation of long regular exercise on hemostasis and blood rheological features of patients with incipient hypertension. Bali Medical Journal.6(3):514-520. doi:10.15562/bmj.v6i3.552

[8] Makhov AS, Stepanova ON.(2013) The program of development control of adaptive sport «Finnix» and resultsof its implementation. Theory and Practice of Physical Culture.8 : 21.

[9] Korneva MA, Makhov AS, Stepanova ON. (2014)The peculiarities of motivation of handicapped athletes with spinal cord injuries to participation in russian press work-out sessions. Theory and Practice of Physical Culture.6 : 18.

[10] VatnikovYuA, ZavalishinaSYu, Kulikov EV, Vilkovysky IF, Nikishov AA.(2017) Correctional abilities of regular muscle activity in relation to erythrocytes' microrheological features of rats with experimentally developed hypertension.Bali Medical Journal. 6(3):449–456. doi:10.15562/bmj.v6i3.586

[11] BarashnevaYuI. (2011) Down Syndrome. Medico-genetic and socio-psychological portrait. Moscow: "Triad-X", 12.

[12] ZavalishinaSYu, Nagibina EV. (2012) Dynamics of microrheology characteristics of erythrocyte in children 7-8 years with scoliosis with therapeutic physical training and massage.Technologies of Living Systems. 9(4):29–34.

[13] Makhov AS, Zubenko MB. (2017) Mini-football with children with Down syndrome.Shuya: publishing house of the Shuya branch of the Ivanovo State University, 174.

[14] Abramova TF. (2001) Evaluation of the physical condition of the elderly. Moscow: Soviet Sport, 32.

[15] Chelnokov VA. (2001) Testing of the musculoskeletal system in elderly and elderly people when practicing recreational physical training. Moscow: Soviet Sport, 76.

[16] ZavalishinaSYu, VatnikovYuA, Kulikov EV, Yagnikov SA, Karamyan AS. (2017) Diagnostics of erythrocytes' microrheological features and early abnormalities of rats in the model of experimental hypertension development.Bali Medical Journal. 6(3):470–475. doi:10.15562/bmj.v6i3.589

[17] Kozlova SI, Demikova NS. (2007)Hereditary syndromes and medical-genetic counseling. Moscow, 290-291.
[18] Bikbulatova AA. (2018) The Impact of Daily Wearing of Medicinal-Prophylactic Clothes on The Evidence of Clinical Manifestations of Osteochondrosis Of The 2nd Degree and Platelet Activity in Persons Of The Second Mature Age. Research Journal of Pharmaceutical, Biological and Chemical Sciences.9(1) :677-683.
[19] Bikbulatova AA, Pochinok NB. (2017) Professional Skills Competitions for People with Disabilities as a Mechanism for Career Guidance and Promotion of Employment in People with Special Needs.Psikhologicheskayanaukaiobrazovanie. 22(1):81–87.
[20] VatnikovYuA, ZavalishinaSYu, Pliushchikov VG, Kuznetsov VI, Seleznev SB. (2017) Early-changes diagnostics of erythrocytes microrheological features in the model of dyslipidemia development in rats at the late stages of ontogenesis. Bali Medical Journal. 6(1): 216–222. doi:10.15562/bmj.v6i1.483
[21] Glagoleva TI. (2015) Vascular disaggregation control of major blood elements at calves on lacto-vegetable feeding. Zootekniya. 5 : 22-24.
[22] ZavalishinaSYu.(2012) Hemostatic activity of a vascular wall at newborn calfs.Russian Agricultural Sciences.1 : 37-39.
[23] ZavalishinaSYu.(2012) Dynamics of hemostasis system at newborn calves with iron defiviency by use ferroglucin and glicopin. Zootekhniya. 7:14-16.
[24] ZavalishinaSYu. (2011) Fibrinolysis blood activity at calves in the first year of life.Zootekhniya. 2 : 29-31.
[25] ZavalishinaSYu. (2010) Anticoagulative and fibrinolitic activity of plasma of blood at calves.Veterinariya. 11 : 41-43.
[26] Glagoleva TI. (2017) Physiological features of vascular control over aggregation processes in the blood of repair heifers on the growth. Zootekniya. 5 : 14-16.
[27] ZavalishinaSYu.(2012) Activity of a vascular hemostasis at calfs of a dairy food.Russian Agricultural Sciences.4:49-51.