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Functional Features Of Young Football Players With Down Syndrome.

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ABSTRACT

The high effectiveness of the effects of regular muscle loads is associated with their pronounced training and stimulating effect on the body. As a result, a regular, properly constructed muscle activity can provide a gradual increase in the level of viability of the body, which has not even a removable pathology. This effect allows the use of regular physical training as a healing factor for various genetic disorders, including Down's syndrome. This can happen especially successfully in the game situation, including when playing soccer. Taking this into account, we monitored physically active children with Down syndrome. Learning to play soccer games according to the author's method turned out to be more physiologically advantageous for children with Down's syndrome in comparison with systematic increase of their activity in family conditions. This was proved by the dynamics in the observed children of physical endurance, resistance to hypoxia and hemodynamic parameters. The effect is based on physiologically beneficial changes in the entire body of the examined. It becomes clear that to carry out a comprehensive rehabilitation of children with Down's syndrome, preferably increasing their physical activity and adaptive abilities of the body through regular training in playing football according to the author's method.

Keywords: children, Down's syndrome, physical activity, football, functional tests.

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INTRODUCTION

The presence of chromosomal pathology in the body always adversely affects many morphological and functional indicators of the body. A vivid example of this is Down syndrome [1,2]. Children with this disease have a very diverse pathology affecting many systems of organs, including those providing adaptation and socialization [3]. In this connection, these processes are somewhat difficult for them and often additional active, external corrective actions are needed for their formation [4]. Modern medicine has already a fairly large arsenal of medical effects that can revitalize and enhance the functional capabilities of vital organs and systems [5]. At the same time, as before, the urgency of application for therapeutic and tonic purposes retains regular physical activity. Their use is justified in many complex pathological conditions, including Down's syndrome [6,7]. High effectiveness of the effects of regular muscle loads is associated with their pronounced training and stimulating effect on the body [8]. These effects occur due to the activation of blood flow, intensification of respiratory and anabolic processes throughout the body [9]. As a result, regular, correctly constructed muscle activity can provide a gradual increase in the level of viability of the organism, which has not even a removable pathology [10]. This effect allows the use of regular physical training as a healing factor for various genetic disorders, including Down's syndrome [11,12]. However, in this state there are difficulties in involving such children in the process of regular regular muscular activity. In this regard, it is necessary to use the game situation, for which the role of football is perfectly suitable [13]. In order to prove the advantages of this type of muscular activity in children with Down's syndrome, it was decided to conduct a special observation among physically active children with this pathology. It seemed that the results obtained could help improve the approaches to improving the functionality of children with Down syndrome.

Purpose: to compare the functional characteristics of children with Down's syndrome, who learn by the author's method the elements of the game of football and lead an active lifestyle in the family.

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, Russia. The study involved 2 groups of children with Down syndrome 11-12 years. Each group consisted of 17 boys. In the first group, children began to visit the football team 3 times a week, where they learned how to play football according to the author's method [13]. The second group consisted of children with Down's syndrome, who began to lead a physically active lifestyle in the family under the control of parents and close relatives. They daily walked about 1 km, twice a week visited the pool for 20-30 minutes, in the summer, cycling for at least 20 minutes. Per day, and in winter skating for at least 20 minutes in a day. Given a good state of health and optimal weather conditions, parents went with the children of this group for weekend hikes.

Both groups of children had a diet with a full-fledged diet, rich in vitamins and all the necessary substances. Breakfast for children of both groups consisted of cereals with nuts and fruits, eggs and freshly squeezed juices, as well as muesli, cottage cheese and cheese. Lunch included soups, salads, steam cutlets, and dinner - fish or boiled chicken with garnish (cereals or vegetables). To determine the endurance of the examined and their resistance to hypoxia, the Cooper test, BEER (number of cuts per minute), push-up from the ground, pull-up on the crossbar were applied. Assessment of the physical fitness of a child using a Cooper test - a 12-minute running test. Estimated distance in meters, which the child is able to overcome by running (or step) in 12 minutes. BEER-test - 20-meter continuous shuttle run on the sound signal. The initial running speed of the subjects was 8.0 km / h and increased by 0.5 km / h every minute. The test was terminated only if the subject could not reach the line within 2 meters for two consecutive signals. In tests of pull-up on the crossbar and push-ups from the ground, the indicators for one minute were estimated. The Stange test was carried out, which was characterized by the duration of the retention of breath on inspiration after the maximum inspiration. The test was conducted while sitting. Evaluation criteria in this sample: excellent -> 60 s; well - 45-60 s; satisfactory - 30-45 sec [14].

The threshold of anaerobic metabolism (concentration in the blood of lactic acid) was determined. The objective indicators were assessed: heart rate (heart rate), blood pressure before and after the load. According to the obtained data, the Curdo Index was calculated = D/P, where D is the diastolic pressure, P is the pulse, which is normally close to 1. The blood circulation economization coefficient was also calculated,

which reflects the blood outflow in 1 minute = (systolic blood pressure, diastolic blood pressure) × pulse. Normally, it is about 2600. Its increase indicates a poor performance in the cardiovascular system [14].

To determine the dynamics of the condition of the subjects surveyed and the possibility of comparing the results obtained in both groups of the examined, the measured indicators were determined at the end, at 3 and 6 months of follow-up. The results were compared in groups in dynamics and between groups at different periods of rehabilitation activities.

The results were processed by Student's criterion (t). Statistical processing of received information was made with the help of a program package “Statistics for Windows v. 6.0”, “Microsoft Excel”. Differences in data were considered reliable in case of $p<0.05$.

RESULTS AND DISCUSSION

The results obtained in the course of the study are listed in the table. When assessing the baseline in both groups, no statistically significant differences were observed for all the indicators considered. In both groups, the low endurance of the subjects surveyed, their inadequate resistance to hypoxia, a small threshold of anaerobic metabolism, and a weak functional readiness of their cardiovascular system were initially noted. During the increase in physical activity in both groups, a positive dynamics of the parameters was revealed, more pronounced in the first group.

The first group examined after 6 months of rehabilitation measures noted improvement in overall well-being and mood enhancement. Sleep and appetite were normal, no feeling of fatigue, muscle aches and pains in the knee joints also did not bother. In the 2nd group surveyed, sleep and appetite were also normal. Subjective feeling of vivacity in them was less pronounced. They often noted pains in the throat, diffuse muscular pains, and pains in the extremities and in the knee joints, which periodically interfered, keeping the activity.

If we compare the endurance and resistance to hypoxia in the 1 and 2 groups examined as a result of an increase in their physical activity, we can note the increase in these indicators throughout the entire observation. At the same time, the achieved level of results in the first group was more preferable. This proves the high effectiveness of the author's method of teaching the methods of playing football in maintaining the physical form and in the processes of adaptation with increasing the physical data of children [15]. This was also confirmed by comparing the endurance and hypoxia resistance of the examined both groups at different periods of the survey [16,17]. It becomes clear that the set of techniques developed and applied by the authors to teaching football games can provide a more pronounced improvement in the physical condition of children with Down's syndrome, allowing them to achieve good physical performance, and thus higher sports results.

This was also confirmed by the increase in their level of physical activity by the values of hemodynamic parameters and the values of the Kerdo index and the coefficient of circulatory economy (Table). Based on the data obtained in the course of the study, it can be concluded that against the background of the use of the author's version of teaching children with Down's syndrome the method of playing football has a marked improvement in hemodynamic parameters, a decrease in the concentration of lactic acid, and, consequently, pronounced resistance to hypoxia [18]. The second group surveyed showed a more modest improvement in hemodynamic parameters with their achievement of a sub physiological level, as well as the preservation of a somewhat excessive concentration of lactic acid in their blood [19]. The obtained data speak about the advantages of the author's method of increasing the physical activity of children with Down's syndrome, applied in the first group of the examined. This opinion is based on a more pronounced increase with its help of the adaptive capabilities of their body as a whole [20,21].

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Table: The dynamics of the indicators taken into account in the surveyed (M ± m)

№ group	Rehabilitation Month	Total endurance (BEER - Test), km/h	Speed endurance (Cooper test), m	Strength endurance, number of push-ups from the ground for 1 min.	Strength (pull-up on the crossbar), number	Stability to hypoxia (Stanger assay), s	Heart rate before exercise, number	Heart rate after exercise, number	Systolicblood dpressure, mmHg	Diastolicblood dpressure, mmHg	Concentrationoflactate, mg%	Kerdoindex, points	Coefficient of economic circulation, points
1 n=17	0	6.2±0.19	1670.0±24.72	10.1±0.12	4.1±0.31	49.7±0.33	83.2±0.47	192.0±0.70	101.3±0.80	61.8±0.75	27.4±0.19	0.72±0.009	3216.2±1.85
	3	8.6±0.22 p<0.01	2100.0±18.50 p<0.05	16.3±0.25 p<0.01	7.5±0.39 p<0.01	55.7±0.45 p<0.05	74.6±0.54 p<0.05	171.2±0.54 p<0.01	108.9±0.75 p<0.05	68.9±0.62 p<0.05	21.3±0.20 p<0.05	0.92±0.010 p<0.05	3010.6±1.62 p<0.05
	6	11.0±0.15 p<0.01	2370.0±31.63 p<0.05	19.5±0.29 p<0.01	12.2±0.27 p<0.01	64.0±0.40 p<0.05	62.5±0.30 p<0.05	153.8±0.82 p<0.01	121.7±0.69 p<0.01	76.0±0.54 p<0.05	12.9±0.27 p<0.01	1.16±0.017 p<0.05	2601.4±2.07 p<0.01
2 n=17	0	6.1±0.17	1710.0±29.19	11.2±0.17	3.9±0.30	48.9±0.38	81.8±0.51	190.6±0.67	102.0±0.75	62.0±0.71	27.0±0.21	0.74±0.012	3195.8±2.15
	3	7.2±0.31 p<0.05 p_1<0.05	1850.0±27.41 p_1<0.05	14.6±0.30 p<0.01	6.0±0.34 p<0.05 p_1<0.05	51.3±0.39	78.4±0.64 p_1<0.05	185.2±0.83 p<0.05 p_1<0.01	104.1±0.48	64.2±0.69 p_1<0.05	23.2±0.37	0.85±0.018	3112.0±1.73
	6	8.7±0.39 p<0.05 p_1<0.01	2020.0±24.45 p<0.05 p_1<0.01	17.2±0.37 p<0.05 p_1<0.05	7.6±0.29 p<0.05 p_1<0.01	58.2±0.29 p<0.05 p_1<0.05	74.2±0.68 p<0.05 p_1<0.01	177.0±0.75 p<0.05 p_1<0.01	112.7±0.62 p<0.05 p_1<0.01	70.1±0.82 p<0.05 p_1<0.05	19.8±0.31 p<0.05 p_1<0.01	0.91±0.021 p_1<0.01	2817.5±1.30 p<0.05 p_1<0.05

Legend: p - reliability of the dynamics of the indicators considered, p_1 - reliability of differences between groups in terms of observation.
Reliability of differences in baseline indicators was not detected.

CONCLUSION

Training in football techniques according to the author's method turned out to be more physiologically advantageous for children with Down's syndrome in comparison with the planned increase in their activity in the family. This was demonstrated by comparing the physical endurance, hypoxia resistance and hemodynamic indicators in children with Down syndrome 11-12 years old, who had been tested against Down syndrome of the same age, who experienced an increase in physical activity under the conditions of the family . The effect is based on physiologically beneficial changes in the entire body of the examined [22,23]. It becomes clear that to carry out a comprehensive rehabilitation of children with Down's syndrome, preferably increasing their physical activity and adaptive abilities of the body through regular training in playing football according to the author's method.

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