ABSTRACT

Abstract: The presence of trisomy in chromosome 21 cause a whole range of internals’ pathology. These internal’s pathology could cause abnormal motor development that can lead to inadequacy of physical activity. One way to rehabilitate children with Down syndrome is by giving them adequate physical activity in the form of physical training or sports. It is necessary to conduct some organizational arrangements in Russia intended for groups of persons with limited health possibilities into athletic activity.

Aim: The aim of the research was to show the impact of athletic activity in Down syndrome children and to determine modern problems of its wide application to the given groups in Russia.

Methods: Questioning and the method of mathematical statistics. Interviewing the parents of children with Down syndrome was conducted in some regions of Russia during November 2016. A total of 300 families having children with Down syndrome was included in this study.

Results: It was found that lack of popular information and diversified scientific researchers in the field of athletic activity in children with Down syndrome is a great problem for trainers and parents. Many parents can’t find a qualified trainer. On the other hands, specialists who are ready to train children with Down syndrome, have no opportunity to get full information to conduct an effective training process with such children and often work instinctively.

Conclusion. It is clear that with the right approach and competently worked out program of available sports, children with Down syndrome can become sportsmen who can not only compete at different levels but also represent Russia with dignity at great international competitions.

Keywords: Down syndrome, children, athletic activity, problems of organization, Russia

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The existence of a rather large number of persons with Down syndrome in Russia makes Russian society pay attention to the rehabilitation of muscular activity through physical exercises and sports. At the same time, the given problem is still very far from its solving in Russia. Nowadays, the main trend of adaptive sport for people with Down syndrome is Special Olympics – socially adapted program of sports training all year round. At present, Russian sportsmen with Down syndrome are registered and take part in swimming and gymnastics competitions. Such category of sportsmen can take part in competitions within the framework of activity of All-Russian Sports Federation of persons with intellectual disturbances. However, such sportsmen aren’t singled out as a separate sports classification of persons with intellectual disturbances and means aren’t assigned to their participation in sporting events. At the same time, at constant physical training, young people with Down syndrome can achieve good results. It makes the problem of sports’ development for children with Down syndrome in Russia rather urgent and rises the necessity of its solving in parents. We put the following aim in the research - to show the impact of athletic activity in children with Down syndrome and to determine modern problems of its wide application to the given groups in Russia.

**Characteristics of children with Down syndrome**

Children with Down syndrome are characterized by lowered growth rate at its maximally low indices in infancy and youth. The final stature of women is equal on average to 145 cm and men – 157 cm. It is possible that following factors – congenital heart disease, malabsorption syndrome, celiac disease, and lowered level of somatotropic hormone and insulin-like growth factors in plasma - lie in the basis of it.

The musculoskeletal system at Down syndrome is characterized by muscle and connective tissue's weakness that leads to dysplasia of hip joints with luxation and subluxation in them, instability of patella, scoliosis, and platypodia. Development of bones in the middle part of the face slightly retards compare to the development of other cranial bones, making an apllanation jaw. The upper jaw is often small, therefore the mouth opening is of small sizes and nasal sinuses are feebly marked.

The state of analyzers at this pathology is often disturbed. Hyperopia and myopia are often observed at Down syndrome. The hearing function is often lowered because of infectious diseases in the ear and congenital hearing loss. The skin is less elastic, drier, and rougher, hence it is subjected to fissures and decreased sensitivity. Many children with Down syndrome have hypofunction of the thyroid gland and different pathology is often found in the gastrointestinal tract. Such children often have impaired cardiac function because of various heart diseases. Myelinization of nerve trunks is also disturbed at Down syndrome and caused a slightly delays in the passage of signal along nerve fibers. Such children can sometimes have a deeply evident intellectual deficiency. It can show itself in several degrees: some children never speak, but most of them can learn to read and write. Practically all of them are loving, friendly, and behave well with their nearest people. Even the most evident form of mental retardation in optimal care and early rehabilitation doesn't block mastering the skills of communicability, self-service, and others. Bradygenesis is an important problem of children with Down syndrome. They begin to hold the head and move around very late. In comparison with other children, they require more time to start smiling and speaking. They also need more time to master the skills of self-service.

Children with mosaic form of Down syndrome show higher intellectual level, better speech development, and less quantity of somatic pathology. As a result, the existence of Down syndrome disturbs many physical and psychic that demands more efforts from the side of rehabilitation-specialist to compensate.

**Characteristics of motor development in children with Down syndrome**

Motor functions in children with Down syndrome develop rather slowly, with a long formation of skills. Down syndrome is characterized by not only lagging in terms of motor development but also a special profile of motor skills’ development.

There are four reasons for motor development disturbances:

1. Most children with Down syndrome have lowered muscular tonus which is partially eliminated in time.
2. Deficiency and monotony of equilibrium reactions develop longer than usual, therefore the movements can be monotonous and constrained. Movements which demand rotation, lateroflexion, and torsion of a body are often inaccessible to them.
3. Management of muscles’ tension and weakening around joints is decreased in Down syndrome, hence stabilization of joints in the right position is disturbed. It is aggravated by the existence of surplus elastic ligaments.

4. Ref. to the state of the musculoskeletal system at Down syndrome.
result, the movements of children with Down syndrome seem uncertain and awkward.

4. Muscular hypotonia distorts proprioceptive information and caused worsens motor development. The proprioceptors constantly inform the brain about muscular relaxations, contractions, and body position in space, so it can manage the body. In case of children with Down syndrome, muscular hypotonia distorts the information, thus it becomes more difficult for them to orientate in space and manage the body.

These motor disturbances Down can be corrected with the help of competently planned athletic activity.

**Estimation of problems of athletic state correction of children with Down syndrome in Russia**

Earlier, one of the authors of the article conducted a wide questioning to the parents of children with Down syndrome. Participants of the questioning were 300 families, having children with Down syndrome, from some regions of Russia: Moscow, Rostov, Nizhniy Novgorod, Saratov, Sverdlovsk, Bryansk, Leningrad, Novosibirsk, Kaliningrad, Belgorod, Amur, Tomsk, Aktyubinsk, Kirou, Penza, Kursk, Astrakhan, Irkutsk, Lipetsk, Ivanovo, Ryazan, Volgograd, Tyumen, Voronezh, Tula, Kemerovo, Omsk, Kaluga, Samara, Chelyabinsk, Ulyanovsk, Sakhalin regions; Perm, Altay, Krasnoyarsk, Stavropol territories; republics of North Ossetia, Komi, Adygei, Bashkortostan, Chuvashia, Udmurtia, Chechnya, Mari El, and the Nenets autonomous area. The participants of the research were given a set of questions to estimate the signification of six basic problems of sports’ development for children with Down syndrome (Table 1). To determine the signification of these problems, the respondents were offered to specify the degree of importance according to 10-points’ scale (1 point – minimum, 10 points – maximum). Depending on the urgency degree of the problem (expressed in points), the responses were subdivided into several groups: 9-10 points – “absolutely urgent”, 7-8 points – “urgent”, 5-6 points – “it’s difficult to say”, 3-4 points – “not urgent”, 1-2 points – “not urgent at all”.

From the questionnaire, we found that none of the problems from the given list was “not urgent” (3-4 points) and “not urgent at all” (1-2 points). All the problems got into the groups “absolutely urgent” (9-10 points) and “urgent” (7-8 points). Therefore, it speaks about the high degree of their signification and the state of being unsolved. The average point of estimation of the given questions’ urgency range from 7.97 (absence of competitions on the levels of cities, regions, and Federation for children with Down syndrome) till 9.08 (absence or insufficient

| № | Basic problems of sports’ development in children with Down syndrome | X (points) | m (points) | Ex | As |
|---|---------------------------------------------------------------|------------|-----------|----|----|
| 1 | Absence or insufficient quantity of specially prepared trainers for children with Down syndrome | 9.08 | 0.119 | 4.98 | -2.89 |
| 2 | The absence of state support for the programs directed at the development of sports and physical training among people with Down syndrome | 9.01 | 0.115 | 3.73 | -1.97 |
| 3 | The absence of information about sports sections and clubs for people with Down syndrome in services of population social protection, city, and regional sports committees | 8.64 | 0.124 | 3.37 | -1.93 |
| 4 | The absence of structured and available information about the development of sports and physical training among children and young people with Down syndrome in mass media | 8.41 | 0.122 | 1.71 | -1.46 |
| 5 | Absence of state support for sportsmen with Down syndrome at competitions | 8.28 | 0.135 | 0.76 | -1.24 |
| 6 | The absence of competitions at the levels of cities, regions, and Federation for children with Down syndrome | 7.97 | 0.130 | 0.30 | -0.98 |

Legend: X - average, m - error of the mean, Ex - excess value, As - value of asymmetry.
quantity of specially prepared trainers for working with children with Down syndrome). Low values of the excess (Ex) and negative asymmetries (As) showed the fact that the parents Down are unanimous in their estimation of the problems’ urgency. A similarity of respondents’ opinions is also underlined by positive values of the excess (Ex) and negative asymmetry (As).

The first problem - absence (insufficient quantity) of specially prepared trainers for working with children with Down syndrome – is recognized to be the most urgent one together with the third and fourth problem. Lack of information about abilities of children with Down syndrome and techniques of their training in different sports aggravate the shortage of staff in this field. That’s why the work with people from the given category demands training intensification for competent specialists who have undergone some probations in special centers for children with Down syndrome. Their staff should include psychologists, medical workers, and correction pedagogues. Nowadays, modern Russia trainers and pedagogues were trying to go in for sports with children with Down syndrome and put this process into operation based on their own scarce experience. Sometimes it can repel the child from sports training.

The second problem – the absence of state support of the programs directed at the development of sports and physical training among people with Down syndrome – was the center of all the studied problem, therefore the other problems were directly depended on them. The presence of adequate sports sections, clubs’ trainer’s sportsmen, and competition’s system in Russia would only be possible with support from the state.

The third problem – the absence of information about sports sections and clubs for people with Down syndrome in services of population social protection, city, and regional sports committees - existed in all the regions of Russia. Even in the largest cities in Russia, it’s very difficult to find any information about sections and training for children with Down syndrome.

The fourth problem – the absence of structured and available information about the development of sports and physical training among children and young people with Down syndrome in mass media – was mostly a reflection of a stereotype that people with Down syndrome were unable to achieve serious results in sports.

The fifth and sixth problems - absence of state support for sportsmen with Down syndrome at competitions and absence of competitions at the levels of cities, regions, and Federation – were closely connected with each other and with the second problem. At this time, there is no official competition for children with Down syndrome in Russia, even though it is highly needed.

It became clear that insufficient information and diversified scientific researchers in the field of athletic training for children with Down syndrome was a great problem for trainers and parents. Even if children were willing to train, their parents can’t find a competent trainer. In turn, specialists who can train children with Down syndrome have no opportunity to get the necessary information to conduct an effective training with such children.

CONCLUSION

Planned application of complex muscular activity is necessary for children with Down syndrome to master the essential motor skills. Application of physical exercises and sports is the most rational way in this field. Children with Down syndrome need competent specialists, specialized clubs, and specialized sections as the provision of such help. The development of training techniques, Down programs for specialists’ training, and competition system are far from being completed. The answer of these problems will promote the development of the psychic-physical potential of people with Down syndrome and their involvement into active social life. People with Down syndrome can compensate well enough and become sportsmen who are able not only to compete at different levels but also present Russia with dignity with the right approach and a competently worked out program.

CONFLICT OF INTEREST:

No Conflict of interest to declare.

REFERENCES

1. Nagornaya NV, Bordugova EV, Usenko NA. Dr. Down. The health of the child. 2013; 6(49): 159–162.
2. Semenova NA. The health status of children with down syndrome: dissertation ... of candidate of medical Sciences. Moscow, 2014;84.
3. Kozlova SI, Demikova NS. Hereditary syndromes and medical-genetic counseling. Moscow, 2007; 290–291.
4. Skoryatina IA, Zavalishina SYu. Ability to aggregation of basic regular blood elements of patients with hypertension anddyslipidemia receiving non-medication and simvastatin. Bali Medical Journal. 2017;6(3):514-520. doi:10.15562/bmj.v6i3.553
5. Kotova OV, Zavalishina SYu, Makurina ON, Kiperman YaV, Savchenko AP. Impact estimation of long regular exercise on hemostasis and blood rheological features of patients with incipient hypertension. Bali Medical Journal. 2017;6(3):514-520. doi:10.15562/bmj.v6i3.552
6. Zavalishina SYu, Vatnikov YuA, Kulikov EV, Yagnikov SA, Karamyan AS. Diagnostics of erythrocytes' microrheological features and early abnormalities of rats in the model of experimental hypertension development. Bali...
7. Glagoleva TI, Zavalishina SYu, Mal GS, Makurina ON, Skorjatina IA. Physiological Features Of Hemocoagulation In Sows During Sucking. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018;9(4):29–33.

8. Zavalishina SYu, Makurina ON, Vorobyeva NV, Mal GS, Glagoleva TI. Physiological Features Of Surface Properties Of The Erythrocyte Membrane In Newborn Piglets. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018;9(4):34–38.

9. Bikbulatova AA, Karplyuk AV. Professional And Labor Orientation Of Persons With Disabilities In The Resource Educational And Methodological Center Of The Russian State Social University. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018;9(4):1648–1655.

10. Bikbulatova AA. Bioregulatory Effects Of The Daily Wearing Of Medical And Preventive Pants On The Body Of Pregnant Women Suffering From Habitual Miscarriages Of The Fetus. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018;9(4):889–896.

11. Esipova TP, Kobyakov EA, Markovska AV. Integrated development of children with down syndrome an early age. Novosibirsk: GOOI “Society “Down Syndrome” , 2015; 34.

12. Aseel J Ibraheem, Aysar N Mohammed. Assessment of the effects of Alendronate treatment on clinical periodontal parameters in postmenopausal women with osteoporosis. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2017;8(6):199–206.

13. Magda SH Afifi. The Role of Quercetin on some Cardiovascular Parameters in Rats with Insulin Resistance Syndrome. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2017;8(5):460–469.

14. Pueschel SM. Clinical aspects of Down syndrome from infancy to adulthood. Issues Law Med. 1989;5(1):87–99.

15. Ranke MB. Disease specific growth charts, do we need them? Acta Paediatr Scand Suppl. 1989;336:17–25.

16. Mesilova NV. Analysis of the effectiveness of rehabilitation treatment of neurological manifestations in children with down syndrome: dissertation ... of candidate of medical Sciences. Moscow, 2006;128.

17. Mateescu LG. New approaches to problem-targeted education for families with a disabled child with down syndrome, as one of the methods to improve the quality of rehabilitation: dissertation... of candidate of medical Sciences. Samara, 2005;192.

18. Zhijanova PL, Field EV, Nechaeva TN. The formation of basic motor skills in children with down syndrome. Charity Fund “downside Up”. Mosco,2010;112.

19. Ogunwa TH, Adeyelu TT, Fasimoye RY. Exploring the molecular mechanism of interaction and inhibitory potential of Capparis spinosa L. phytoconstituents on diabetes-related targets. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2017;8(5):237–248.

20. Korolyov PYu. Social adaptation of persons with intellectual disabilities by means of sports gymnastics: thesis ... of candidate of pedagogical Sciences. Moscow, 2009;201.