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Method of Developing Flexibility in Children with Hearing Loss

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ABSTRACT

There is a growing trend in the number of children with hearing loss worldwide (Reich & Lavay, 2009; Rajendran & Roy, 2011; Botova & Mullahmetova, 2017). One of the socio-pedagogical and biomedical challenges of our time is the task of harmonious development and education of these children (Mlay, 2010; Hartman et al., 2011; Demchenko, 2012; Vernosfaderani, 2014; Fiorini & Manzini, 2018). Physical education is an important factor in the learning process (Nikitushkin et al., 2012; Caglar et al., 2013; Vidranski & Brozovic, 2015; Barboza et al., 2019; Majoko, 2019). Children's auditory sensory system is important for the development of motion coordination. The presence of two ears (binaural hearing) shapes the child's spatial vision (Pajor & Jozefowicz-korczynsks, 2008). Children with hearing loss lag behind in the development of motion coordination and spatial orientation (Ellis et al., 2013; Malekabadizadeh, 2016). The method of developing the flexibility in children with hearing loss allows increasing of their level of flexibility. Higher flexibility determines high coordination and orientation in space. Consequently, those two factors help children with hearing loss feel confident in their abilities and facilitate adaptation.

In order to research the effectiveness of the method of developing flexibility in children with hearing loss, we set two groups of children aged 7-9: a control group and an experimental group of 12 children each. The control group trainings were conducted according to the standard program. The experimental group trainings were conducted according to the program of the method of developing flexibility. At the beginning and at the end of the research experiment both groups were tested. After the experiment, the results of the experimental group outperformed the results of the control group.

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Adapted physical education, hearing-impaired children, children with hearing loss, physical activities, method.

INTRODUCTION

Flexibility is the ability to make motions with amplitude. The term "maximum flexibility" is used if the motions are performed with maximum amplitude, "high flexibility" -if the motions are performed with a large amplitude, and, finally, "low flexibility" - when the motions are performed with low amplitude. The level of flexibility is determined by the mobility of joints and the elasticity of muscles and ligaments (Barrett & Smerdely, 2002; Nikitushkin et al., 2012).

Flexibility is subdivided into active and passive. In case of active flexibility the motions with amplitude are made at the expense of actions of the person's own muscles. In case of passive flexibility the motions with amplitude are made at the expense of actions of external factors (actions of another person, weights, devices, weight of own body, etc.). Passive flexibility always outperforms active flexibility (Rine, 2009; Stathokostas et al., 2012).

Physical culture uses the following terms: overall flexibility, special flexibility, dynamic flexibility and

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static flexibility. Overall flexibility is the amplitudes of all possible motions in all joints. Special flexibility is the amplitude of a certain motion or the amplitudes of a few certain motions. Dynamic flexibility is the amplitudes of motions of joints in motion. Statistical flexibility is the amplitudes of motions of joints in poses.

Active, passive and static exercises are used to form flexibility. Active exercises are performed under the actions of a person's own muscles. Passive exercises are performed under the actions of external factors. Static exercises comprise holding a person's body in a certain position for a certain amount of time due to the action of the person's own muscles or external factors. The following ratio of exercises is recommended to form flexibility: 40% active, 40% passive and 20% static. All exercises are performed in sets, without pain, at a slow speed. The number of times in the set increases gradually and is brought to 20-50 times. The amplitude of the exercises and the degree of action of external factors increase gradually. The trainings are held on a regular basis at least three times a week. Breaks in trainings more than two weeks are not allowed.

The following external factors influence the level of human flexibility:

– time of day (in the morning, the level of flexibility is less than in the afternoon or evening);
– air temperature (the level of flexibility is higher at 25°C than at 10°C);

and the internal human factors:

– positive emotions and motivation increase flexibility;
– tiredness reduces active flexibility, but increases passive flexibility;
– heating the body (warm bath) increases flexibility;
– physical warm-up increases flexibility.

The following tests are used to determine the level of human flexibility:

– forwards tilt from the gymnastics bench;
– knee joints straightening;
– forwards tilt, hands on shin;
– gymnastic stick transfer;
– swinging lying on the back;
– back bending backwards from lying on the stomach;
– bridge;
– cross and straight splits;
– holding the leg forwards, backwards, sideways.

Aim of the research

Practical effectiveness testing of the method of developing flexibility in children with hearing loss.

Organization of the research

The research was conducted during the six months on the basis of two special correctional schools of the second type for children with hearing loss in Chelyabinsk. The research involved 24 hearing impaired 7-9 years old children. In the course of the experimental work two groups of 12 children each were established: an experimental and a control group. Prior to the experiment, we set the following tasks:

1. To form the homogeneous groups based on the results of the flexibility level testing.
2. To apply the method of developing flexibility in the adaptive physical culture trainings with children of the experimental group.
3. Re-test the flexibility level of children in the control and experimental groups.

The children of the control and the experimental groups were trained under the state program of adaptive physical culture for correctional schools of the second type. At the experimental group trainings the complex of the exercises of the devised method of developing flexibility was additionally used. The trainings in the experimental and the control groups were held three times a week. Three months later, both groups had a break for two weeks. After the break, the trainings lasted for three months. The total duration of the trainings was 6 months.

The method of developing flexibility in children with hearing loss includes the following eleven exercises:

1. Starting position: standing with legs at shoulder width, arms with a jump rope down. Turn the arms forwards and backwards with the jump rope held in place. Two sets of ten times each.
2. Starting position: standing with legs at shoulder width, hands behind head. Tilts forwards, with the arms straightened out. Two sets of ten times each.
3. Starting position: standing with legs at shoulder width, hands behind head. Tilts backwards, with the arms straightened out. Two sets of ten times each.
4. Starting position: standing with legs at shoulder width, hands behind head. Tilts backwards, with the arms straightened out. Two sets of ten times each.
5. Starting position: standing with legs at shoulder width, hands behind head. Tilts to the right and left. Two sets of ten times each.
6. Starting position: standing with legs on the first lath of the gymnastic wall, arms on the waist. Stand up on half-toes. Two sets of fifteen times each.
7. Starting position: standing back to the gymnastic wall, hands on the rail above the waist. Squats. Two sets of eight times each.
8. Starting position: standing side by side to the gymnastic wall, left or right hand on the rail at

shoulder level. Swings forwards, backwards, sideways. Four sets of eight times each.

9. Starting position: sitting with legs apart on a shoulder and a half width. Lift the legs one by one and at the same time independently and with the help of another person. Two sets of eight times each.
10. Cross and straight splits on both legs. 20 seconds for each split, two sets.
11. Starting position: standing with legs at shoulder width, hands behind head. Slowly stand up on breath with hands up on half-toes. One set of five times.

The last exercise is intended to level all joints in a natural position after deflections and tilts.

RESULTS OF THE RESEARCH

The results of testing conducted for the period of formation of the homogeneous groups are presented in Table 1. The average value of the indicator for each group is calculated.

Table 1: The test results of children of the control and the experimental groups before the experiment

№	Test: indicator, unit of measure	Control group	Experimental group
1	Forwards tilt from gymnastic bench: the distance from the plane of the bench to the end of the finger; centimeters	17,0	17,5
2	Stick transfer: the distance between the hands; centimeters	31,0	30,0
3	Backwards tilt lying on stomach: distance from the head to the floor; centimeters	20,5	20,0
4	Bridge: distance from the heels to the end of the finger; centimeters	15,5	16,0
5	Cross split: distance from the floor to the symphysis; centimeters	16,5	16,5

According to the Table 1, the results of testing of children before the start of the pedagogical experiment in groups are almost the same and have no reliable differences.

After the experiment, the children were re-tested. The test results are presented in Table 2.

Table 2: The test results of children of the control and the experimental groups after the experiment

№	Test: indicator, unit of measure	Control group	Experimental group
1	Forwards tilt from gymnastic bench: the distance from the plane of the bench to the end of the finger; centimeters	17,0	19,5
2	Stick transfer: the distance between the hands; centimeters	30,5	26,5
3	Backwards tilt lying on stomach: distance from the head to the floor; centimeters	21,5	18,0
4	Bridge: distance from the heels to the end of the finger; centimeters	16,0	13,5
5	Cross split: distance from the floor to the symphysis; centimeters	16,5	15,0

According to the Table 2, after the pedagogical experiment, the results of the experimental group are better than the results of the control group.

DISCUSSION

We think that the method of developing flexibility is useful for physical education teachers in special correctional schools for children with hearing loss.

CONCLUSIONS

The carried out pedagogical experiment leads to a conclusion that application of the devised method of developing flexibility allows efficient increase of flexibility level and corrects the physical development of children with the impaired hearing.

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