

Development of flexibility in children of primary school age with the use of original means of physical education

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Abstract. The article presents the results of a study of the flexibility of children of primary school age in rural areas on the example of a municipal school in the city of Yakutsk. Many children experience the lack of physical training and are to be trained in a certain way in order to receive better results. The methodology of training proposed by the authors and experimentally tested in the the Municipal Educational Institution “Zarechnaya MGES” of the Republic of Sakha (Yakutia) in the city of Yakutsk, Russia in the classes on general physical training demonstrates excellent results and is highly recommended to be used by the trainers in the Republic and the whole country.

1 Introduction

It's no secret that the fewer years a child, the faster it develops. The peculiarity of the child's organism lies in the fact that during the growth and development the structure and functions of all its organs and systems are continuously improved. Although growth and development throughout childhood are uneven, yet the general pattern of growth persists [1, 4].

The study of the problem of physical education of children, the lack of physical development, and the lack of physical fitness make special demands for the organization of gymnastics classes, the insufficient provision of today's schools with methodical literature, equipment and specialists create the need for new tools, forms and methods to improve their effectiveness [2]. Protecting and strengthening the health of children is the primary task of the educational and educational process. Social and environmental factors have an increasing impact on the health of children [3, 4]. All of the above factors require educational organizations to create the necessary conditions for the organization of physical and health work. Our attention was drawn to the methodology of using non-traditional means of physical education.

2 Research design

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Objective of the research is to analyze of the methodology of education of flexibility in children of primary school age with the use of original means of physical education.

The research was organized in the following way. We focused on the development of the flexibility of primary school children on the basis of the Municipal Educational Institution “Zarechnaya MGES” of the Republic of Sakha (Yakutia) in the city of Yakutsk, Russia in the classes on general physical training for the period from September 1, 2017 to March 1, 2018 (the total of six calendar months).

The pedagogical experiment was attended by children of primary school age (1st grade), amounting to the total of 34 children. We divided them into 2 groups, the experimental and control groups.

The experimental group used original physical education (see Table 1) 3 times a week for 45 minutes during the physical training lesson; the control group was engaged in the traditional method with the same load. “v”

Table 1. Original means of physical education for developing the flexibility in children of primary school age. The author is A. L. Maryukhnic, a physical culture instructor of the Municipal Educational Institution “Zarechnaya MGES” of the Republic of Sakha (Yakutia).

Exercises for arms and shoulders – 17 exercises	<ol style="list-style-type: none"> 1. “Play the trumpet.” Standing position (S.p.) – standing, legs together, bent hands at the level of the mouth (as if holding a pipe). Do small movements with your fingers, simulating pressing on the keys, saying <i>Tu! Tu! Tu!</i>. Perform 15-20 s. 2. “Wash your laundry.” Standing-up, leaning forward slightly, feet shoulder-width apart, arms slightly bent. Squeeze and unclench your fingers, simulating the washing of clothes. Perform an average pace of 20-30 s. 3. “Squeeze the laundry.” S.p. – the same, the arms are bent before the breast. Clutching fingers into a fist, doing movements that simulate the squeezing of clothes. Perform an average pace of 20-40 s. 4. “Shake your clothes.” S.p. Standing, feet shoulder-width apart, arms lowered. Raising their hands forward, making them move as if shaking clothes. Repeat at a fast pace of 5 to 8 times. 5. “Turn the handle of the meat grinder.” S.p. – the same, the right hand bend in front of the chest. Circular movements of the hand, simulating the rotation of the grinder handle. The same with your left hand. Repeat at an average pace of 8-10 times with each hand. 6. “Pump.” S.p. – standing, slightly bending forward, legs slightly apart, arms bent, fingers clenched into fists. Move your hands up and down, like when pumping a car tire. Repeat the average tempo, 8-10 times. 7. “Shake the apple tree.” S.p. Standing, feet shoulder-width apart, arms raised forward-up, fingers clenched into fists. Quick movements of the hands, as if shaking the branch of the tree. Repeat 10-12 times. 8. “Adjust the movement of the car.” S.p. – standing, legs together, arms down. Simulate the movement of the hands of a policeman regulating the flow of transport. Perform an average pace of 15-20 s. 9. “They drank firewood.” S.p. – standing, slightly bending forward, one leg a step ahead of the other, arms bent in front of (at the level of the belt). Move your hands back and forth, imitating a file of firewood. Perform an average pace of 20-30 s. 10. “The clapper.” S.p. – standing, legs together, hands are lowered. Cotton hands over his head and behind his back. Repeat at an average pace, 8-10 times. 11. “Warm up.” S.p. – standing, feet shoulder-width apart, arms outstretched. Quickly cross arms in front of the chest, slapping the palms over the shoulders and spreading to the sides (back). Repeat 8-10 times. 12. “Fly like a bird.” S.p. – standing, legs together, straight arms to the sides. Walking on your toes around the room, dropping your hands down and lifting
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	<p>them to the sides. Repeat 30-40 s.</p> <p>13. "Strong arms." S.p. - standing, legs slightly apart, arms lowered. Raising hands to the level of shoulders, squeeze fingers into fists; lowering hands, unclench fingers. Repeat at an average pace, from 4 to 6 times.</p> <p>14. "Boxing." S.p. - the same, arms bent before the chest, fingers clenched into a fist. Turning the arms one by one, simulating the boxer's blows. Perform 10 to 15 s.</p> <p>15. "Raise the bar." S.p. - standing, feet shoulder-width apart, arms bent to the shoulders, fingers clenched into fists (palms forward). Straighten your hands up and again bend to your shoulders, simulating the lifting of the bar. Repeat at a slow tempo 4 to 6 times.</p> <p>16. "Mill." S.p. - the same, hands are raised upwards (palms outwards). Circular motion with straight arms, crossing them in front of you. Repeat 4-6 times.</p> <p>17. "Swimming." S.p. - lying on the chest (on the floor or bench), bent hands under the chin (palms down). Unbend hands forward, spread out to the sides, not tearing off the floor (bench), and again bend, imitating the movements of the swimmer. Repeat at a slow tempo from 4 to 6 times.</p>
Exercises for the torso – 14 exercises	<p>1. "Collect the berries." Walking around the room; leaning forward, making movements with your hands, like picking berries. Perform an average pace of 20 - 30 s.</p> <p>2. "Swallow." S.p. Standing, feet shoulder-width apart, arms lowered. Take your right leg back, while tilting your body slightly forward and spreading your arms to the sides; return to it. The same with the left foot. Repeat 2 to 3 times with each foot.</p> <p>3. "Mower." S.p. - the same, slightly bent arms are extended forward, fingers are compressed into fists. Turn left and right, making wide, sweeping movements with your hands (imitating the movement of the mower). Repeat 5-8 times at an average pace.</p> <p>4. "Wash the floor." S.p. - standing, feet shoulder-width apart, arms lowered. Leaning forward and lowering his hands, make them a few movements to the right and left, imitating the washing of the floor; then return to S.p. Repeat at an average pace 3 to 4 times.</p> <p>5. "The flower bloomed and closed." S.p. - sitting on the floor, cross-legged, arms lowered. Raise your arms to the sides (palms up), bend; then bend forward, hands lower. Repeat 3-4 times.</p> <p>6. "The Duck." S.p. - kneeling, legs together, hands on waist. Without changing the position of the legs, sit down on the floor on the right; return to it. The same to the left. Repeat at an average pace from 3 to 4 times in each direction.</p> <p>7. "Aircraft." S.p. - lie on my chest, legs together, arms are bent at the elbows, the brushes lie one on top of the other under the chin. Raise head and shoulders, arms spread apart; return. Repeat at an average pace, 3-4 times.</p> <p>8. "Pick up the bag." S.p. - standing, feet shoulder-width apart, arms lowered. Lean forward; straightening up, imitating the lifting of a heavy bag on his shoulder. Repeat at an average pace, 3 to 4 times.</p> <p>9. "Woodcutter." S.p. standing, legs wider than shoulders, arms raised, fingers linked over head. Quickly lean forward, imitating the movements of the woodcutter; lowering his arms between his legs, do not uncouple his fingers. Repeat 5-8 times.</p> <p>10. "Cyclist." S.p. - lying on the back, legs slightly bent and raised, arms stretched along the trunk. Alternately bend and unbend legs, simulating the movements of the cyclist. Perform 10 to 15 s.</p> <p>11. "Tumbleweed." S.p. - lying on his back. Riffs on the floor with the help of hands and feet, turning on his side, then on his stomach, on the other side and again on his back. Perform 10 to 15 s.</p> <p>12. "Get the cube." S.p. - standing, legs together, holding a cube in hands.</p>

	<p>To squat; leaning hands on the floor, kneel. Put the cube away from yourself; straighten up. Lean forward and take a cube; straighten up. Repeat at a slow pace 1 to 3 times.</p> <p>13. "Rocking chair." S.p. – lying on the chest, legs straight, arms stretched along the trunk. Bend your legs and, bending over, grab them with your arms extended over your lower legs. Repeat 2-3 times.</p> <p>14. "A rollover." S.p. squatting, palms resting on the floor. To lower the head to the knees, then move the body forward, transfer the weight of the body to the hands; and, slightly touching the back of the head, make a somersault ahead. Repeat 2-3 times.</p>
<p>Exercises for the feet – 11 exercises</p>	<ol style="list-style-type: none"> 1. "Walk down the line." Draw a straight line on the floor with chalk and invite the child to walk along it. Repeat 2-3 times. 2. "Crane on the swamp." Walking around the room, stopping and raising a leg high, strongly bent at the knee. Perform 15 to 20 s. 3. "Skater." S.p. – standing, feet shoulder width apart, arms behind. Bending that right, then the left leg, tilt the body forward with a half-turn to the sides, imitating the movements of the skater. Repeat at an average pace 5-8 times. 4. "Get the heel out." S.p. – the same, hands are lowered. Bend the right leg back and, turning the trunk to the left, reach for the heel with his hand. The same left foot with a turn of the trunk to the right. Repeat at an average pace 3 to 5 times with each foot. 5. "The cotton under the knee." S.p. – standing, legs together, hands are lowered. Quickly lifting the straight right leg forward, make the cotton under the knee. The same with the left foot. Repeat 2 to 4 times with each foot. 6. "Cross over your hands." S.p. – standing, legs together, hands are lowered, fingers are linked. Slanting slightly forward, step over the linked fingers of the hands with the right or left foot. Repeat at an average pace 3 to 5 times with each foot. 7. "Footballer." S.p. – standing, legs slightly apart, arms lowered. Alternate mahi then right, then left foot forward, as if striking the ball. Repeat at a rapid pace for 5-7 times each foot. 8. "Skier." Walking around the room in broad strides, bending ahead the standing leg (making a lunging) and alternately raising the bent arms forward; imitate the movements of the skier. Perform an average pace of 30-40 s. 9. "Grouping." S.p. – sitting on the floor, stretching his legs and leaning hands behind. Bend your legs, pressing your hips with your hands to your chest (grouped), then straighten them. Repeat at a slow pace 2 to 3 times. 10. "Get down on your knee." S.p. – standing, legs together, hands are lowered. Slowly crouching, dropping onto both knees; then return to S.p. Repeat 2-3 times. 11. "Jump like a ball." S.p. – standing, legs together, hands are lowered. Move around the room with small jumps on your toes. Perform at a fast pace of 20 - 30 s.
<p>Exercises with a rubber ball – 7 exercises</p>	<ol style="list-style-type: none"> 1. "Throwing the ball." S.p. – standing, legs slightly apart, holding in the lowered hands the middle ball. Throw the ball up and catch it. Repeat 5-8 times. 2. "The ball on the floor." S.p. – the same. Hitting the ball in front of him on the floor, then catch him. Repeat 5-8 times. 3. "The ball in the wall." S.p. – standing facing the wall, legs slightly apart, holding in the lowered hands the middle ball. Throw the ball from below into the wall and catch it after the rebound. Repeat 5-8 times. 4. "Hit the basket." Put in 3-4 steps from the child a small basket and offer him/her to throw in it a middle ball with two hands. Repeat 5-8 times. 5. "Sit down and lie down." S.p. – sitting, legs stretched, holding the ball with straight hands in front of him. Lie on your back, raise your arms straight up, and touch the ball of the floor behind your head; return to it. Repeat at a slow tempo from 3 to 5 times.

	<p>6. "The ball to itself is from itself." S.p. – the same, leaning hands behind. Put your feet on the ball. Bending legs and moving feet, roll the ball to yourself; then, straightening legs, return to the S.p. Repeat at an average tempo from 6 to 8 times.</p> <p>7. "Push the ball head." S.p. – standing on all fours, putting a big ball in front of yourself. Pushing the ball head, roll it forward, moving on all fours. Perform 10 to 15 times.</p>
<p>Exercises with a gymnastic stick (the stick length is 87 cm) – 15 exercises</p>	<p>1. "Sticks on the shoulder blades." S.p. – standing, feet shoulder-width apart, holding the stick by the ends in the lowered arms. Raise the stick up above your head and, bending your arms, lower it onto the shoulder blades. Repeat at a slow tempo from 4 to 6 times.</p> <p>2. "With a stick behind your back." Walking around the room, holding a stick behind your back at the level of the shoulder blades. Perform 40-60 s.</p> <p>3. "Turns with a stick on his chest." S.p. – the same, holding the stick in bent hands on the chest. Turn to the right, straighten your arms; return to it. The same with a turn to the left. Repeat at an average pace from 3 to 5 times in each direction.</p> <p>4. "Turns with a stick behind his back." S.p. – standing, feet shoulder-width apart, with a stick behind his back. Turn to the right; return to it. The same with a turn to the left. Repeat at an average pace from 3 to 5 times in each direction.</p> <p>5. "Slopes forward." S.p. – the same. Lean forward without lowering your head; return to it. Repeat at a slow tempo from 4 to 6 times.</p> <p>6. "Tilts to the sides." S.p. – standing, legs wider than shoulders, arms bent; Keep the stick behind your back at the angle of the shoulder blades. Lean right and left, keeping the torso right. Repeat at an average pace, 4 to 6 times.</p> <p>7. "Pick up the stick." S.p. – standing, feet on the width of the shoulders, arms lowered; the stick lies at the toe of the feet. Lean forward, take a stick; straighten up and, bending his arms, put a stick on his chest; return to it. Repeat at a slow pace 3 to 4 times.</p> <p>8. "Stick back." S.p. – the same. Holding the stick by the ends in the lowered hands. Raise the stick straight forward/up and lower back/down to the pelvis; return to it. Repeat at an average pace 2 to 3 times.</p> <p>9. "Torso rotations with a stick." S.p. – the same. Raise the stick up and rotate the trunk to the right, then to the left. Repeat at an average pace 2 to 3 times in each direction.</p> <p>10. "Overstepping through the stick." S.p. – sitting, legs stretched, holding a stick in front of him for the ends. Alternately, step over the stick; then return to the S.p. Repeat 3-5 times.</p> <p>11. "Hold the stick." S.p. – the same, the legs are bent, the stick lies at the toe of the feet. Grabbing a stick with your toes, raise it above the floor and try to hold it in this position. Repeat 2-3 times.</p> <p>12. "Walk on the stick sideways." S.p. – standing on a stick lying on the floor, legs together, arms lowered. Slowly move sideways stick sticking step. Perform 30 to 40 s.</p> <p>13. "Take your legs through the stick." S.p. – lying on his back, legs straight, holding a stick in his outstretched hands in front of him. Strongly bending the legs, try to simultaneously move them through the stick and return to the S.p. Repeat 2-3 times.</p> <p>14. "Bury your back." S.p. – lying on the chest, legs straight, arms bent; stick behind the back at the level of the angles of the blades. The adult holds the child by the feet. Raise the trunk above the floor, strongly bending and pulling your head back. Repeat at a slow pace 3 to 4 times.</p> <p>15. "Go near at hand." S.p. – standing, legs together, holding a stick vertically at the upper end with your right hand. Do not let go of the stick, bend over and pass at hand, while turning your left shoulder inside. The same, holding the stick with your left hand. Repeat at an average pace from 3 to 5</p>

<p>Exercises with a hoop – 11 exercises</p>	<p>times in each direction.</p> <ol style="list-style-type: none"> 1. “Hoop is up.” S.p. – standing, legs shoulder-width apart, arms bent (brushes at shoulder level) and holding the hoop horizontally (head inside the hoop). Slowly, raise the hoop up above your head and look at it. Repeat at a slow tempo 3 to 5 times. 2. “Hoop behind the back.” S.p. – the same, hands are lifted up and hold the hoop horizontally above the head. Bending your arms and turning the hoop vertically, lower it behind your back. Repeat at a slow tempo from 4 to 6 times. 3. “Turns.” S.p. – the same, the arms are bent (brushes at shoulder level) and hold the hoop vertically behind the back. Torso turns to the right and to the left. Repeat at an average tempo 6-8 times. 4. “Tilts to the sides.” S.p. – the same. Torso bends to the right and to the left. Repeat at an average tempo, 6 to 8 times. 5. “Put a hoop on yourself.” S.p. – standing, legs together, arms lowered, and holding the hoop vertically. Lifting the hoop up and turning it horizontally, put it on over your head, lower it to the floor and step over it. Repeat at an average pace, 3 to 5 times. 6. “Get through the hoop.” S.p. – standing, legs slightly apart, holding the hoop vertically on the floor in front of you. Bending over, climb through the hoop and return to the S.p. Repeat 2-4 times. 7. “Walking through the hoop.” S.p. – sitting, legs bent, feet on the floor, leaning with hands behind (palms turned with fingers backwards). The adult puts the hoop vertically on the floor, at the feet of the child, and holds it in this position. The child, moving his legs and arms forward, “passes” through the hoop. Repeat 2-3 times. 8. “Transfer of the hoop.” S.p. – standing, legs together, feet in parallel, arms outstretched; hold the hoop horizontally with your right hand. Lower the straight arms, shift the hoop from the right to the left hand in front of you; return to it (hoop is in the left hand). The same, shifting the hoop from the left hand to the right. Repeat on average, 4-6 times. 9. “Raise the hoop.” S.p. – sitting on the floor inside the hoop, cross-legged. Taking the hoop with both hands, lift it up above your head, straightening your back. Repeat at a slow pace, 2-4 times. 10. “Bagel.” S.p. – the same, hands are stretched along the trunk and hold the hoop horizontally above the legs. Bending the legs, catch hold of the hoop by the hoop and strongly bend over, pulling your head back; return to it. Repeat at a slow pace 1-3 times. 11. “Pull the hoop down.” The exercise is performed in pairs. S.p. – lying on his chest opposite each other, capturing the hoop with both hands. Children try to pull the hoop each in their own way. Repeat 2-3 times.
<p>Exercises with a long rope – 4 exercises with options</p>	<ol style="list-style-type: none"> 1. “Running under the rope.” Rotate the rope in the middle tempo backwards (in relation to the child) so that it almost touches the floor. Run under the rope, as if catching it, at the moment when the rope rises. Repeat 6-8 times. 2. “Overstepping and jumping through a fixed rope” (the rope is stretched at a height of 3-5 cm). <i>Option 1:</i> standing near the rope, step over it forward and backward. Repeat 8-10 times. <i>Option 2:</i> run to the rope, step over it forward, then back. Repeat 8-10 times. <i>Option 3:</i> run to the rope, jump forward over it from one leg to the other, then go back. Repeat 6-8 times. 3. “Overstepping and jumping over the swinging rope” (the rope is rocked at a height of 3-4 cm). <i>Option 1:</i> standing near the rope, step over it forward, then back. Repeat 8-10 times. <i>Option 2:</i> run to the rope, step over it forward, then back. Repeat 6-8 times.

	<p><i>Option 3:</i> run to the rope, jump forward over it from one leg to the other, then go back. Repeat 6-8 times.</p> <p>4. “Jumping over a rotating rope” (the rope rotate back towards the child so that it almost touches the ground).</p> <p><i>Option 1:</i> Running to the rope, jump over it from one leg to the other. Perform a few jumps (1-2 to 10-15), trying not to touch the rope.</p> <p><i>Option 2:</i> jumping rope from one foot to the next, making two jumps on each leg. Repeat 6-8 times.</p> <p><i>Option 3:</i> jumping on both legs forwards and backwards. Repeat 4-6 times.</p> <p><i>Option 4:</i> jumps on both legs (with light intermediate jumps when the rope moves through the air) with turns around. Repeat 6-8 times.</p>
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3 Results and Discussion

Based on the results of our study, the following results were obtained (Table 2).

Table 2. Dynamics of developing the flexibility during pedagogical experiment.

Group, difference	Longitudinal twine (cm / deg.)		Bridge (cm)		Exercise with a gymnastic stick (cm)	
	Before	After	Before	After	Before	After
Control group	172±0,6	174±0,5	31±0,3	27±0,32	14±0,6	15±0,5
Difference in units	2,0		4,0		1,0	
Percentage difference (%)	1,15		14,81		6,67	
Experimental group	172±0,4	178±0,43	32±0,3	25±0,3	13±0,6	17±0,5
Difference in units	6,0		7,0		4,0	
Percentage difference (%)	3,37		28,00		23,53	

The results of the research are of particular importance when training the children of primary school age with the use of original means of physical education. The results obtain statistically prove that the complex of excersices being proposed by us positively influences the training of children.

4 Conclusion

Many children experience the lack of physical training and are to be trained in a certain way in order to receive better results. The metgodology of training proposed by us and experimentally tested in the the Municipal Educational Institution “Zarechnaya MGES” of the Republic of Sakha (Yakutia) in the city of Yakutsk, Russia in the classes on general physical training for the period from September 1, 2017 to March 1, 2018 (the total of six calendar months) demonstrates excellent results and is highly recommended to be used by the trainers in the Republic and the whole country.

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