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THE EFFICIENCY OF APPLYING THE EXERCISE THERAPY FOR THE ELDERLY WITH GRADE 1 COXARTHROSIS

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Annotation. The article demonstrates the results of applying exercise therapy for the elderly with grade 1 coxarthrosis. The effectiveness of the exercise therapy is represented by an increased range of motion in the affected joint according to goniometry, a decrease in joint dysfunction according to the Trendelenburg Test, and a reduced pain intensity in the affected lower limb according to the visual analogue scale. The data obtained can be implemented in the development of physical rehabilitation programs for grade 1 coxarthrosis and in the work of experts in adaptive physical culture with the examined contingent.
Keywords: grade 1 coxarthrosis, hip joint, exercise therapy.

Introduction. Coxarthrosis is a heterogenic group of diseases of various origin with similar biological, morphological, clinical signs and outcome, based on the lesion of all the joint's components: cartilage, subchondral bone, synovial membrane, ligaments, capsule and periarticular muscles [1].

The musculoskeletal system diseases in adults rank second in the category of temporary incapacity to work and third among causes of disability and death. According to literature references, in recent years not only increasing incidence of the hip joint pathology was noted, but also the disease occurs in younger ages, and in more complicated forms as well [2].

In case of more complicated forms, pain, impaired support function and reduced movement amplitude in the hip joint lead to an inability to work or its limitation, make self-care difficult, making quality of life worse and turning such patients into the disabled in 38-71% of cases [3].

This disease is characterized with a wide variety of clinical signs, accompanying symptoms, severity of motor disorders, compensation degrees, reasons that caused the diseases, which create complications for preserving skills needed in life [4].

The purpose of our study – to evaluate the efficiency of applying exercise therapy for the elderly with grade 1 coxarthrosis.

Methods and organization. The study took place in the Central Hospital of the Federal Customs Service in Moscow, from November 2022 to February 2023.

The study involved 9 people, including 4 men and 5 women aged 63 to 74 years with grade 1 coxarthrosis.

Goniometry was carried out to assess movement amplitude in the affected lower limb, as well as mobility in the hip joint. Extension, tension and retraction amplitude were also examined, the results were calculated in °.

The Trendelenburg test was used for identifying dysfunction of the hip joint in the affected limb. The pain intensity was assessed with the visual analogue scale. The obtained results were processed with statistical methods: we calculated the arithmetic mean and standard deviation. The significance of changes in the examined indices in parametric methods was evaluated with the Student's T-test (if $p \leq 0.05$), when applying non-parametric methods – with the Wilcoxon signed-rank test (if $p \geq 0.05$).

To correct motor disorders, the elderly passed an exercise therapy course, which was divided into 3 periods: sparing period – 3 weeks, sparing and practice period – 4 weeks and practice period – 6 weeks, including means and forms are described in the table 1.

Table 1

Content of the exercise therapy course for the elderly with the grade 1 coxarthrosis

Means and forms of the exercise therapy	Sparing period (3 weeks)	Sparing and practice period (4 weeks)	Practice period (6 weeks)
Morning hygienic gymnastics (MHG)	+	+	+
Therapeutic gymnastics (TG)	+	+	+
Therapeutic massage	+	+	+
Physiotherapy	+	+	-
Mechanotherapy	-	+	-
Controlled walking	-	+	+
Hydrokinesiotherapy	-	-	+
Independent classes	-	-	+

The sparing period took three weeks. Main methods and forms: MHG included calisthenics for all muscle groups, breathing static and dynamic exercises. MHG were done daily for 5-7 minutes. TG were done 3 times a week for 20-25 minutes and included exercises for strengthening muscles of the lower limbs and joints, exercises for increasing mobility in the hip joints, exercises on massage mats, exercises on a force plate, exercises with objects and gymnastic apparatus. Full extension in the hip joint was not allowed. The massage sessions took place after TG. The anterior and posterior surfaces of the thigh and the hip joint were massaged (stroking and rubbing). The shockwave therapy was used on the hip joint and surrounding muscles. The course consisted of 5-7 sessions for 10-15 minutes.

The sparing and practice period took 4 weeks. Main methods and forms: MHG sessions daily, 5-7 minutes each. The TG took 3 times a week for 30-35 minutes. We also added exercises for coordination, active exercises for the distal regions of the lower limbs, isometric stress exercises for the gluteal muscles, exercises for the hip joint flexion and extension. During the therapeutic massage course, the thigh and lumbar muscles were massaged (stroking, rubbing and kneading). The magnet therapy was used on the hip joint, surrounding tissues and the lumbar spine in a form of bicycle ergometer sessions. They took 2 times a week for 10-12 minutes. The speed was 5-7 km/h. These sessions were conducted instead of TG sessions. The controlled walking sessions were carried out 4 times a week with a speed of 40-60 steps per minute and a distance of 1-1.5 km. It was recommended to conduct these sessions outdoors or on a training device (running machine).

The practice period took 6 weeks. Main methods and forms: MHG sessions daily for 10 minutes. TG took 4 times a week for 40-45 minutes, we also added exercises for strengthening muscles of the lower limbs and joints, exercises for increasing mobility of the hip joint, stretching exercises, exercises for relaxing spasmic muscles. During the therapeutic massage course all techniques were used.

Impact was made on the hip joint, surrounding tissues and the lumbar spine. Hydrokinesiotherapy sessions took 2 times a week for 40-45 minutes, including calisthenic exercises on the edge of the pool, breathing exercises, exercises with objects, exercises with imitation of swimming styles (front and back crawl, breast-stroke). Controlled walking sessions were carried out 4 times a week with a speed of 80-100 steps per minute. Distance – 2 km. Independent classes took place daily, 3 times a day for 15-20 minutes. These classes included exercises from TG sets.

Results and discussion. The goniometry study of joint mobility was carried out before and after the exercise therapy course, the received data is presented in table 2.

Table 2

Goniometry results of the affected lower limb during the course of rehabilitation measures among the elderly with grade 1 coxarthrosis

Test type	Results, °		Difference in a.u.	Difference in %	Student's T-test (T_{crit}=2.12)	P≤
	before	after				
	X_{mean}±σ	X_{mean}±σ				
Flexion	141.2±1.3	122.6±1.4	18.6	13.2	9.74	0.05
Extension	173.2±2.1	161.6±1.8	11.6	6.7	4.19	0.05
Retraction	21.7±1.5	26.5±1.4	4.8	18.1	2.34	0.05

After the course, dynamics of goniometry indices in the hip joint in flexion amounted to 13,2%, changing from 141.2±1.3° to 122.6±1.4°, in extension – from 173.2±2.1° to 161.6±1.8° with dynamics of 6.7%, in deviation – from 21.7±1.5° to 26.5±1.4° with dynamics of 18.1% (p≤0.05).

The goniometry data reflect increased joint mobility of the lower limb, which, in our opinion was supported by the use of specific TG exercises (correction of the main defect, stretching exercises, relaxation exercises), therapeutic massage and mechanotherapy.

Dynamics of the hip joint dysfunction indices after the course, assessed with the Trendelenburg test, are presented in table 3.

The hip joint's dysfunction degree, evaluated with the Trendelenburg test, has significantly reduced – the test's results changed by 28.2% (p≤0,05), from 21.4±1.2 to 29.8±0.8 s.

Table 3

Dynamics of the hip joint dysfunction indices after the course among the elderly with grade 1 coxarthrosis

Test	Results, s		Difference in a.u.	Difference in %	Student's T-test (T_{crit}=2.12)	P≤
	before	after				
	X_{mean}±σ	X_{mean}±σ				
Trendelenburg test	21.4±1.2	29.8±0.8	8.4	28.2	7.1	0.05

Table 4

Dynamics of pain intensity of the hip joint after the course among the elderly with grade 1 coxarthrosis

Index	Results, points		Difference in a.u.	Difference in %	Wilcoxon signed-rank test (T_{crit} =8)	P≥
	before	after				
	X_{mean}±σ	X_{mean}±σ				
Visual analogue scale (n=9)	7.7±0.9	2.1±1.2	5.6	72.7	0	0.05

Dynamics of pain intensity of the hip joint after the course, assessed with the visual analogue scale, is presented in table 4

The pain intensity degree, assessed with the visual analogue scale, has significantly reduced by 72.7% (p≥0.05), from 7.7±0.9 to 2.1±1.2 points.

Conclusion. As a result of the rehabilitation course with the exercise therapy measures, the movement amplitude has increased, dysfunction and intensity of paint in the hip joint have reduced, which indicates the efficiency of applying the exercise therapy measures for the elderly with grade 1 coxarthrosis.

Conflict of interest. The authors declare no conflict of interest.

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