CORRECTION OF THE FUNCTIONAL STATE OF THE OPERATED LIMB IN ELDERLY PATIENTS WITH THE CONSEQUENCES OF TOTAL HIP ARTHROPLASTY AND OBESITY USING PHYSICAL THERAPY

КОРЕКЦІЯ ФУНКЦІОНАЛЬНОГО СТАНУ ОПЕРОВАНОЇ КІНЦІВКИ У ПАЦІЄНТІВ ПОХИЛОГО ВІКУ З НАСЛІДКАМИ ТОТАЛЬНОЇ АРТРОПЛАСТИКИ КУЛЬШОВОГО СУГЛОБУ ТА ОЖИРІННЯМ ЗАСОБАМИ ФІЗИЧНОЇ ТЕРАПІЇ

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DOI https://doi.org/10.32782/2522-1795.2025.19.2.5

Purpose: to assess the effectiveness of the developed physical therapy program for elderly patients with the consequences of total hip arthroplasty and obesity in the long-term after endoprosthetics on the dynamics of the functional ability of the hip joint and motor capabilities during walking.

Material. During the study, 99 elderly people were examined. The control group consisted of 34 people who had no history of total lower limb arthroplasty and were of normal body weight. The comparison group consisted of 33 people who had undergone total hip arthroplasty and were of normal body weight. The main group consisted of 32 people who had undergone arthroplasty and were obese. A three-month physical therapy program was developed and implemented for them, using therapeutic exercises on the Redcord NEURAC suspension system to improve strength, flexibility, gait training, balance exercises on BOSU platforms, massage of the operated lower limb, Proprioceptive Neuromuscular Facilitation, and an educational component (diet modification). The effectiveness was assessed by the results of the visual analogue pain scale, Modified Harris Hip Score, Forgotten Joint Score-12, Functional Gait Assessment.

Results. Elderly patients with consequences of total hip arthroplasty and obesity were found to have a deterioration in the functioning of the hip joints in the form of pain syndrome (according to the visual analogue scale), deterioration in the functional activity of the operated limb and difficulties in performing activities of daily living (according to the Modified Harris Hip Score, Forgotten Joint Score-12), and disturbances during various types of gait (according to the Functional Gait Assessment). The studied functional capabilities of elderly patients with hip joint endoprosthesis and obesity in the long-term period of endoprosthesis (more than 1 year) were worse ($p<0.05$) compared to a similar contingent of

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patients, but with normal body weight. The approved comprehensive physical therapy program revealed an improvement in the patients' condition due to the impact on the components of hip joint dysfunction by reducing pain, expanding motor functional capabilities when performing various activities compared to baseline indicators for all studied parameters ($p<0.05$).

Conclusions. Physical therapy is advisable to prescribe for the comprehensive correction of signs of motor dysfunction of the operated limb and improving gait in elderly patients with hip joint endoprosthesis and obesity.

Key words: physical therapy, hip joint, lower limb, endoprosthesis, geriatric syndromes, obesity.

Анотації

Мета: оцінити ефективність розробленої програми фізичної терапії для пацієнтів похилого віку з наслідками тотальної артропластики кульшового суглоба та ожирінням у віддаленому періоді після ендопротезування за динамікою функціональної здатності кульшового суглоба та рухових можливостей під час ходи**.**

Матеріал. У ході дослідження було обстежено 99 осіб похилого віку. Контрольну групу становили 34 особи, у яких в анамнезі не визначалося виконаної операції тотальної артропластики суглобів нижніх кінцівок, із нормальною масою тіла. Групу порівняння становили 33 особи з перенесеною тотальною артропластикою кульшового суглоба та з нормальною масою тіла. Основну групу становили 32 особи з перенесеною артропластикою та ожирінням. Для них було розроблено та впроваджено програму фізичної терапії тривалістю три місяці із застосуванням терапевтичних вправ на підвісній системі Redcord NEURAC для покращення сили, гнучкості, тренування ходи, вправ для рівноваги на платформах BOSU, масаж оперованої нижньої кінцівки, Proprioceptive Neuromuscular Facilitation, освітній компонент (модифікація харчування). Ефективність оцінювали за результатами візуальної аналогової шкали болю, Modified Harris Hip Score, Forgotten Joint Score-12, Functional Gait Assessment.

Результати. У пацієнтів похилого віку з наслідками тотальної артропластики кульшового суглоба та ожирінням визначено погіршення функціонування кульшових суглобів у вигляді больового синдрому (за візуальною аналоговою шкалою), погіршення функціональної активності оперованої кінцівки та труднощі під час виконання активностей повсякденного життя (за Modified Harris Hip Score, Forgotten Joint Score-12), порушення під час різних видів ходи (за Functional Gait Assessment). Досліджувані функціональні можливості пацієнтів похилого віку з ендопротезом кульшового суглоба та ожирінням у віддаленому періоді ендопротезування (більше 1 року) були гіршими ($p<0,05$) порівняно з аналогічним контингентом пацієнтів, але з нормальною масою тіла. Апробована комплексна програма фізичної терапії виявила покращення стану пацієнтів через вплив на компоненти дисфункції кульшового суглоба за рахунок зменшення болю, розширення рухових функціональних можливостей під час виконання різних активностей порівняно з вихідними показниками за всіма досліджуваними параметрами ($p<0,05$).

Висновки. Засоби фізичної терапії доцільно призначати для комплексної корекції ознак рухових дисфункцій оперованої кінцівки та покращення ходи у пацієнтів похилого віку з ендопротезом кульшового суглоба та ожирінням.

Ключові слова: фізична терапія, кульшовий суглоб, нижня кінцівка, ендопротезування, геріатричні синдроми, ожиріння.

Introduction. The beginning of the 21st century was marked by a rapid increase in the number of people suffering from excessive fat deposition in the body, and this trend is characteristic, first of all, for highly developed countries. Overweight and obesity have 1.5 billion people in the world. In addition to numerous problems with the state of the cardiovascular and endocrine systems, etc., the relationship between this pathology and the development of arthrosis of large joints attracts attention [1, 10].

Due to overweight and obesity, the age category of patients is “rejuvenated”; excess body weight contributes to the accelerated development of arthrosis stages, significantly reduces the possibilities of conservative treatment and leads young patients to the irreversibility of joint replacement [3]. All this characterizes obesity as an important factor that has a significant negative impact on the course and results of total arthroplasty (TA) [4]. A number of medical institutions limit the planned performance of this intervention to patients with high stages of obesity until their body mass index is adjusted to an acceptable value [5, 6].

Surgical performance of TA in obese patients requires significantly more time, which is asso-

ciated with greater expenditure of effort and time required for positioning the patient, greater length and depth of the surgical wound, the presence of certain problems with the installation of prosthetic elements, etc. [3]. With an increase in the duration of the total hip arthroplasty operation, obese patients are more likely to develop infections, high intra– and postoperative blood loss, and deep vein thrombosis of the lower extremities [4]. A comparative analysis of the incidence of postoperative complications in patients undergoing hip arthroplasty revealed that the risk of complications is 25% for patients with a body mass index (BMI) <30 kg/m2, 31% for those with a BMI of 30–40 kg/m2, and 38% for those with a BMI of >40 kg/m2 [3].

The high rate of complications in obese patients may be due to difficulties in surgical access to the joint due to the large amount of adipose and muscle tissue in the hip region. This can make the operation more difficult and time-consuming, especially due to the incision and prosthesis insertion [5]. Obese patients not only experience increased soft tissue trauma and prolonged surgery time, but also increased stress on the prosthesis, which can lead to premature wear, loosening, and dislocation [4]. Researchers have determined that blood loss during total hip arthroplasty is the cause of subsequent anemia in patients, which negatively affects postoperative clinical and functional recovery [12].

At the same time, rehabilitation after total hip arthroplasty in obese patients is a period that is extremely important for the patient's quality of life in the postoperative period. Despite the differentiated described principles and methods of rehabilitation in obese patients [1, 7] and after hip arthroplasty [5, 8], their combination in the elderly has not been studied. Limited functional capacity of the hip in obese patients forces them to lead a sedentary lifestyle and increases the pathological value of the body mass index. Limited joint movement and muscle atrophy lead to a deterioration in the geriatric condition of these patients.

The lack of works that highlight the role of physical therapy in the rehabilitation process of elderly patients with obesity after total hip arthroplasty made the presented work relevant.

The aim of the study is to assess the effectiveness of the developed physical therapy program for elderly patients with the consequences of total hip arthroplasty and obesity in the long-term after endoprosthetics in terms of the dynamics of hip functional ability and motor capabilities during gait.

Material and methods. During the study, 99 people were examined.

The control group consisted of 34 people aged 68.1±0.5 years (16 men, 18 women), who had no history of total arthroplasty of the lower limb joints, with normal body weight (according to the results of calculating the body mass index).

The comparison group (CG) consisted of 33 people aged 70.0±0.8 years (14 men, 19 women) who had undergone total hip arthroplasty and had normal body weight. The presence of this group was due to the feasibility of testing the assumption of the negative impact of obesity on the functional state of the elderly with the consequences of total hip arthroplasty.

The main group (MG) consisted of 32 people aged 66.9±0.9 years (14 men, 18 women) with total hip arthroplasty and obesity. A comprehensive physical therapy program was developed and implemented for them, the effectiveness of which is presented in our study.

Inclusion criteria in the study:

– advanced age according to the criteria of the World Health Organization (60-75 years);

– at least 1 year after the operation of the primary total hip arthroplasty;

– indications for total hip arthroplasty – changes associated with hip osteoarthritis;

– total hip arthroplasty was performed after reaching the lower age limit of old age (not younger than 60 years);

– obesity, determined by body mass index – more than 30;

– consent to actively participate in the implementation of recommended restorative interventions and / or examinations.

Exclusion criteria:

– total hip arthroplasty performed in young or middle age;

– total hip arthroplasty due to trauma, rheumatoid arthritis, etc.;

– complicated course of the postoperative period (endoprosthesis infection, bone fracture, dislocation or instability of the endoprosthesis, etc.);

– revision hip endoprosthesis;

– presence of severe somatic concomitant pathology (in particular: oncological pathology, renal failure, severe heart failure, severe dementia);

– exacerbation of existing chronic pathology at the time of the study;

– presence of radiological signs of osteoarthritis of grade 3 and higher in the unoperated hip.

The purpose of the developed physical therapy program was: to improve balance, reduce the manifestations of functional limitations associated with dysfunction of the operated joint and obesity, reduce body weight, facilitate the performance of activities of daily living, improve the psycho-emotional state and reduce kinesiophobia, reduce the severity and prevent the progression of geriatric syndromes (risk of falling, senile asthenia, sarcopenia, social isolation, depression, etc.).

The physical therapy program was implemented for 3 months. The duration of the intervention was due to the need to gently increase the load due to the advanced age of patients, the slowness of the processes of functional restructuring and regeneration, metabolic processes and the obesity and sarcopenia associated with them, the need to overcome kinesiophobia.

The scheme of interventions within the framework of the developed comprehensive physical therapy program.

A feature of the developed physical therapy program was the use of the "Redcord NEURAC" system as the initial stage of improving the motor functional state of patients. Its advantages for the studied contingent of patients were: the ability to create gravitational load positions for weakened muscle groups, improving motor control, stimulating the vestibular apparatus and proprioception, reducing kinesiophobia. When performing therapeutic exercises, forward tilt movements were avoided; body turns with fixed legs; bending of the operated limb at the hip more than 90 degrees; crossing of legs; rotation at the hip.

The educational component included recommendations for a balanced diet – reducing daily calories mainly due to simple carbohydrates and increasing the amount of protein to prevent sarcopenia (1-1.2 grams per 1 kg of body weight); teaching strategies for motor limitations and preventing falls; informing about the role of physical therapy tools in further life activities.

Period	1 month	2 month	3 month
Intervention content	Therapeutic exercises using the Redcord NEURAC suspension system for all muscle groups (daily) to improve strength, flexibility Gait training Therapeutic exercises for balance on BOSU platforms, balance cushions Massage of the operated lower limb Proprioceptive Neuromuscular Facilitation for the lower limbs Educational component	Strength therapeutic exercises using dumbbells and weights weighing 0.75-1.5 kg, Thera-Band expanders with low and medium resistance Gait training Therapeutic exercises to improve balance BOSU Therapeutic exercises to improve joint flexibility Kinesiological taping of hip, lower back Educational component	Strength therapeutic exercises using dumbbells and weights weighing 1-2 kg, Thera-Band expanders with medium resistance Gait training Therapeutic exercises to improve balance Educational component Therapeutic exercises to improve joint flexibility Educational component
Frequency of intervention	Daily classes	Physical activities at least three times a week	Physical activities at least three times a week
Venue	Rehabilitation center	Rehabilitation center, self-study classes	Telerehabilitation, self-study classes

The definition and consistent achievement of individual rehabilitation goals contributed to the reduction of kinesiophobia and the improvement of the therapeutic alliance with patients.

The condition of the examined patients of the main group was assessed in dynamics before (pre-test) and after (post-test) the application of the developed physical therapy program according to indicators characterizing the functional capabilities of the hip.

To determine the subjective condition of the patients, their medical history was assessed.

The intensity of hip pain at rest and during movements was assessed using a ten-centimeter visual analog scale (VAS).

The functional state of the hip, limitations in performing activities of daily living were determined comprehensively using standard scales.

The Modified Harris Hip Score (mHHS) assessed subjective pain during activities, assessed functioning using the limping scale, need for mobility aids, distance walked, walking

up stairs, putting on socks or shoes, discomfort while sitting on different surfaces, and ability to use public transportation [11].

The Forgotten Joint Score-12 (FJS-12) for hip assessed the patient's ability to forget about the artificial joint in everyday life. The concept of the "forgotten joint" suggests that the more inconspicuous the joint becomes for the patient, the more successful the surgical treatment was. The FJS-12 allows for the assessment of not only physical functionality but also the patient's psychological comfort [2].

Assessment of gait as an integral indicator of lower limb function, its resistance in combination with the state of balance (which, in addition to assessing lower limb function, is independently relevant for the elderly, is an indicator of the risk of falling) was carried out using the Functional Gait Assessment (FGA), which includes the assessment of ten types of walking [13].

The study was conducted taking into account the principles of the Declaration of Helsinki of the World Medical Association "Ethical principles of medical research involving human subjects". Informed consent to participate in the study was obtained from all elderly patients with the consequences of total hip arthroplasty and control group individuals involved in the presented study. The study protocol was discussed and approved at a meeting of the Bioethics Commission of the Vasyl Stefanyk Precarpathian National University.

Statistical processing of the results was carried out in the "IBM SPSS Statistics" program. To describe the obtained quantitative characteristics, the arithmetic mean (M), standard deviation (S) and standard error of the mean (D) were calculated. Differences were considered statistically significant at $p<0.05$.

Results of the study. The distribution of patients by the duration of endoprosthesis use was as follows: 1-2 years after total hip arthroplasty in CG was in 51.5%, in MG – 62.5%; 2-5 years – in 36.4% of CG people and 28.1% of MG people; more than 5 years – in 12.1 CG people and 9.4% of MG people.

The initial examination of elderly people with the consequences of total hip arthroplasty, occurring against the background of obesity, revealed impaired motor pattern of the lower limb, residual hip contracture, signs of weakness of the thigh muscles, signs of minor instability of the endoprosthesis, complications when performing activities related to movement and balance.

When interviewing elderly people with obesity, it was found that a greater number of them underwent shorter cycles of postoperative rehabilitation, did not perform independently recommended rehabilitation exercises. At the same time, 93.8% of MG patients believed that obesity negatively affects the functioning of the hip endoprosthesis. All MG patients (100%) also noted that they limit their mobility both due to the presence of obesity

Table 1

Results of anamnesis taking in the elderly after total hip arthroplasty

Anamnesis	Comparison group (n=33) % (absolute quantity)	Main group (n=32) % (absolute quantity)	
		Pre-test	Post-test
Duration of postoperative rehabilitation			
1 month	45,5 (15)	53,6 (18)	
1-3 months	39,4 (13)	34,4 (11)	
3-6 months	15,2 (5)	9,4 (3)	
Independent performance of therapeutic exercises	51,5 (17)	25,0 (8)	90,6 (29)
Negative impact of obesity on the condition of the operated limb		93,8 (30)	
Limited mobility due to obesity		100 (32)	37,5 (12)
Limited mobility due to endoprosthesis	45,5 (15)	100 (32)	15,6 (5)
Fear of falling	60,6 (20)	100 (32)	
Pain in the area of the operated joint	12,1 (4)	37,5 (12)	9,4 (3)
Need for mobility aids	6,1 (2)	37,5 (10)	6,3 (2)

and due to the functioning of the endoprosthesis (table 1). Obese patients more often than people with normal body weight complained of fear of falling, pain in the operated joint, and noted the need for mobility aids (table 1).

The intensity of pain according to VAS in the area of the operated joint at rest was insignificant (in CG – 0.38±0.03 cm, in MG – 0.59±0.08 cm), increased during loading, reaching a moderate level (in CG – 2.19±0.12 cm, in MG – 4.11±0.09 cm) (Figure 1). Such an increase in pain can be explained, in particular, by overloading the soft tissues with weight, stretching postoperative scars and causing low-intensity inflammation.

Subjective discomfort in the hip area, movement restrictions were associated with impaired mobility and difficulties in performing everyday activities. According to the mHHS, at the initial examination, on all subscales of the ability to fully perform functional tasks in terms of the limitations

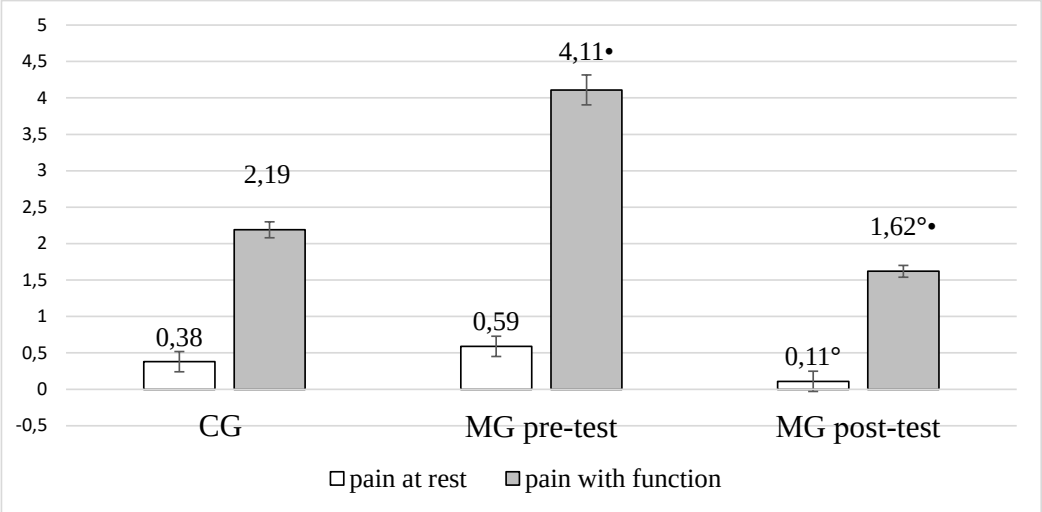

Fig. 1. Dynamics of the intensity of pain syndrome according to VAS in the area of the operated joint under the influence of physical therapy (° – p<0.05 – statistically significant difference between the corresponding parameters of the examinations before and after physical therapy; • – p<0.05 – statistically significant difference between the corresponding parameters of CG and MG)

Table 2

Dynamics of mHHS indicators in elderly people with consequences of total hip arthroplasty and obesity under the influence of a physical therapy program (M±SD)

Subscale, points	Comparison group (n=33)	Main group (n=32)	
		Pre-test	Post-test
Pain	38,46±2,13	27,31±1,50	41,50±1,12°
Limp	9,08±0,41	6,13±0,52	8,85±0,35°
Support	10,43±0,78	7,52±0,41	10,16±0,63°
Distance walked	9,42±0,52	6,82±0,36	9,11±0,40°
Stairs	3,19±0,39	2,09±0,55	3,47±0,41°
Squatting	3,07±0,22	2,51±0,38	3,21±0,53°
Sitting cross legged	4,11±0,75	3,26±0,64	4,00±0,84°
Public transportation	0,89±0,15	0,68±0,20	0,92±0,12°
Range of motion scale	2,95±0,24	2,08±0,30	2,77±0,35°
Absence of deformity	3,51±0,42	3,03±0,25	3,42±0,48°

Notes: ° – p<0.05 – statistically significant difference between the corresponding parameters of the examinations before and after physical therapy; • – p<0.05 – statistically significant difference between the corresponding parameters of CG and MG.

imposed by the endoprosthesis, obese patients showed a statistically significantly worse result ($p<0.05$) than those with normal weight (table 2).

When questioning patients, it was found that during the initial examination, the presence of subjective and objective signs of incomplete recovery of hip function did not allow completely "forgetting" about the presence of the joint during the performance of various functional activities, which was determined by the results of the FJS-12 (Figure 2). CG parameters were 86.15±2.03 points (out of 100 possible points), MG – 58.27±1.45 points ($p<0.05$), i.e. the functional result in people with normal body weight was better.

Evaluating the gait, the full implementation of which was the main goal of the absolute majority of the examined patients, the negative impact of obesity on it in people with hip endoprosthesis was determined. When performing the Functional Gait Assessment tasks (which require normal resistance of the lower extremities, muscle strength, joint flexibility, and balance), both groups of patients with hip endoprosthesis lagged behind the control group (according to the parameters Gait level surface and Gait with horizontal head turn, the CG representatives were at the level of the control group, $p>0.05$ (Table 2). This can be justified by the patients' kinesiophobia, fear of performing a motor task (for example, trunk rotations) that may worsen the condition of the endoprosthesis, insufficient understanding of the safe biomechanics of trunk and hip joint movements after arthroplasty, advanced age and associated geriatric syndromes (frailty, sarcopenia, risk of falling). According to the total numerical value, the deterioration of the condition of people with hip endoprosthesis relative to the control group was 13.7% in the CG, 36.5% in the MG (Table 2).

The identified violations justified the need for active functional physical therapy, determined the list of its methods, the features of therapeutic exercises and functional training, and the basis for determining individual rehabilitation goals.

The comprehensive physical therapy program led to a statistically significant functional improvement of the hip joint in obese patients compared to the studied baseline indicators.

When questioned, it was found that patients improved their compliance with self-exercise therapy (from 25.0% to 90.6%), improved their mobility associated with obesity (from 100% to 37.5%) and arthroplasty (from 100% to 15.6%). Also, pain in the operated joint area decreased

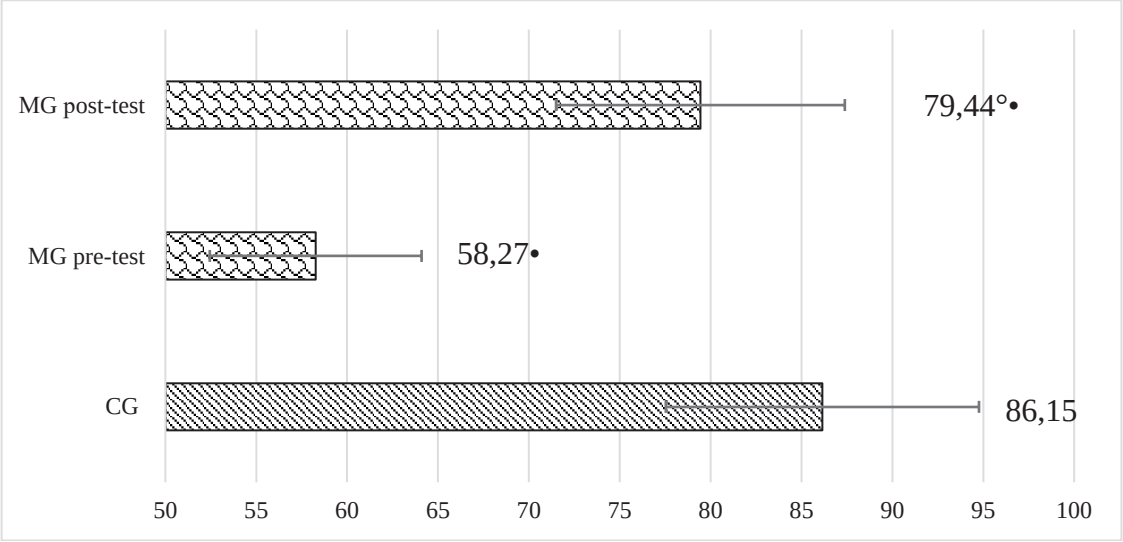

Fig. 2. Dynamics of self-assessment of hip status according to FJS-12 (scores) in elderly people with consequences of total hip arthroplasty and obesity under the influence of physical therapy (° – $p<0.05$ – statistically significant difference between the corresponding parameters of the examinations before and after physical therapy;• – $p<0.05$ – statistically significant difference between the corresponding parameters of CG and MG)

Table 2

Dynamics of Functional Gait Assessment indicators in elderly people with consequences of total hip arthroplasty and obesity under the influence of a physical therapy program (M±SD)

Gait type, points	Control group (n=34)	CG (n=33)	MG (n=32)	
			Pre-test	Pre-test
Gait level surface	2,87±0,05	2,69±0,11	2,05±0,09*•	2,51±0,08*°
Change in gait speed	2,55±0,07	2,14±0,09*	1,23±0,07*•	2,16±0,07*°
Gait with horizontal head turn	2,20±0,12	1,96±0,09	1,44±0,06*•	2,07±0,08*°
Gait with vertical head turns	2,63±0,06	2,29±0,08*	1,88±0,09*•	2,25±0,07*°
Gait and pivot turn	2,68±0,08	2,33±0,10*	1,76±0,09*•	2,20±0,06*°
Step over obstacle	2,49±0,09	2,08±0,10*	1,69±,011*•	2,13±0,07*°
Gait with narrow base of support	2,51±0,07	2,12±0,08*	1,53±0,12*•	2,28±0,07*°
Gait with eyes closed	2,05±0,17	1,85±0,11*	1,23±0,08*•	1,92±0,05*°
Ambulating backwards	2,19±0,12	1,91±0,08	1,57±0,08*•	2,01±0,06*°
Steps	2,67±0,12	2,06±0,05*	1,39±0,05*•	2,31±0,07*°
Total score	24,84±0,16	21,43±0,11*	15,77±0,12*•	21,84±0,10*°

*Notes: * – <0.05 – statistically significant difference with the corresponding parameter of the control group; ° – p<0.05 – statistically significant difference between the corresponding parameters of the examinations before and after physical therapy; • – p<0.05 – statistically significant difference between the corresponding parameters of CG and MG.*

(from 37.5% to 9.4%) and the need for mobility aids (from 37.5% to 6.3%) (Table 1).

The intensity of pain according to VAS in the operated area at rest was practically not determined; during movement it decreased by 60.6% (from 4.11±0.09 cm to 1.62±0.05 cm, p<0.05) (Figure 1).

The repeated examination revealed an improvement in the functional status of the hip according to the mHHS subscales (Table 2): pain – 52.0% (p<0.05), limp – 44.4% (p<0.05), support – 35.1% (p<0.05), distance walked – 33.6% (p<0.05), stairs – 66.0% (p<0.05), squatting – 27.9% (p<0.05), sitting cross legged – 22.7% (p<0.05), public transportation – 35.3% (p<0.05), range of motion scale – 33.2% (p<0.05), absence of deformity – 12.9% (p<0.05) (Table 2).

When re-examined according to the FJS-12 result, an improvement in the condition of MG individuals by 36.3% (p<0.05 compared to the initial result) was determined – patients often "forgot" about the existence of the joint, that is, there were no subjective complaints when performing most diverse activities (Figure 2).

Improvement in balance and dynamic resistance of the lower extremities in individuals with hip endoprosthesis was manifested in the form of positive changes according to the results of the Functional Gait Assessment (Table 2). The improvement in gait level surface performance was 22.4%, change in gait speed – 75.6%, gait with horizontal head turn – 43.8%, gait with vertical head turns – 19.7%, gait and pivot turn – 25.0%, step over obstacle – 26.0%, gait with narrow base of support – 49.0%, gait with eyes closed – 56.1%, ambulating backwards – 28.0%, steps – 66.2%. The improvement in the total score was 38.5%, reaching the CG result (p>0.05) (Table 2).

Discussion. Our study demonstrated the negative impact of obesity on the functioning of the operated limb in the long-term after arthroplasty in elderly patients. This justifies a comprehensive approach taking into account geriatric features, reducing the severity of sarcopenia, which facilitates the performance of motor functions and general well-being, proven in the works of various scientists [7, 9].

The decrease in physical activity in the elderly, which is associated with obesity, is directly related to a decrease in working capacity and an increase in the frequency of premature death. Therefore, for the studied contingent of patients, it was useful to use therapeutic exercises within the framework of the physical therapy program we created, aimed at increasing strength and restoring gait. It was expedient to identify and correct the interdependencies of dysfunction of the endoprosthetic limb, limitation of motor activity and obesity by influ-

encing the common etiopathogenetic processes of the combined pathology. Based on literature data [3, 7, 8] and our own experience, we believe that when elderly people are diagnosed with comorbid pathology associated with impaired motor functions of the lower extremities, it is necessary to create optimal conditions for maintaining their autonomy and quality of life by improving the motor component, primarily gait as the basis for performing most activities of daily life. It is also necessary to adhere to the specifics of rehabilitation of geriatric pathology – adequacy of the load, a broad focus on comorbidity and polymorbidity, long-term; comprehensive support of muscle tissue (exercise, nutrition), which echoes the works of other authors [1, 7, 9].

Conclusions.

1. Elderly patients with consequences of total hip arthroplasty and obesity had a deterioration in the functioning of the hip joints in the form of pain syndrome (according to the visual analogue scale), deterioration in the functional activity of the operated limb and difficulties in performing activities of daily living (according to the Modified Harris Hip Score, Forgotten Joint Score-12), and disturbances during various types of gait (according to the Functional Gait Assessment).

2. The studied functional capabilities of elderly patients with hip joint endoprosthesis and obesity in the remote period of endoprosthesis (more than 1 year) were worse ($p<0.05$) compared to a similar contingent of patients, but with normal body weight.

3. A three-month, comprehensive physical therapy program with the use of therapeutic exercises of various directions, gait training, proprioceptive neuromuscular facilitation, and an educational component (in particular, regarding dietary modification) taking into account individual rehabilitation goals revealed an improvement in the condition of patients due to the impact on the components of hip joint dysfunction by reducing pain, expanding motor functional capabilities when performing various activities compared to baseline indicators for all studied parameters ($p<0.05$).

4. Physical therapy should be prescribed for the comprehensive correction of signs of motor dysfunction of the operated limb and improving gait in elderly patients with hip joint endoprosthesis and obesity.

Information on conflict of interest. There is no conflict of interest.

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Прийнято до публікації: 11.06.2025
Опубліковано: 30.07.2025

Accepted for publication on: 11.06.2025
Published on: 30.07.2025