ТЕРАПІЯ ТА РЕАБІЛІТАЦІЯ

EFFECTIVENESS OF CORRECTION OF POSTPARTUM LUMBOPELVIC PAIN IN WOMEN WITH PELVIC FLOOR DYSFUNCTION AFTER VARIOUS METHODS OF DELIVERY USING PHYSICAL THERAPY

ЕФЕКТИВНІСТЬ КОРЕКЦІЇ ПІСЛЯПОЛОГОВОГО ПОПЕРЕКОВО-ТАЗОВОГО БОЛЮ У ЖІНОК З ДИСФУНКЦІЄЮ ТАЗОВОГО ДНА ПРИ РІЗНИХ СПОСОБАХ РОЗРОДЖЕННЯ ЗАСОБАМИ ФІЗИЧНОЇ ТЕРАПІЇ

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Abstracts

Aim – to evaluate the effectiveness of the developed comprehensive physical therapy program for women with pelvic floor dysfunction after vaginal and abdominal delivery according to indicators associated with lumbopelvic pain.

Material. 175 women participated in the study. The control group consisted of 32 women who had no history of pregnancies and were not characterized by diagnosed pelvic floor dysfunction. The group with signs of pelvic floor dysfunction in the postpartum period consisted of 143 women who were divided into two groups (comparison – gave birth vaginally and main – gave birth abdominally) with two subgroups in each. Subgroup 1 was restored according to the recommendations of clinical protocols, subgroup 2 – according to the developed physical therapy program lasting 3 months with the use of therapeutic exercises (for the lower extremities, pelvic girdle, trunk, with a wireless Kegel trainer), preformed physical factors (pelvic floor muscle stimulator), educational component. The effectiveness was assessed by the results of the visual analogue pain scale, Oswestry Disability Index, Pelvic Girdle Questionnaire, Pregnancy Mobility Index, Ott, Schober, Thomayer, Sedin tests, and the deadlift index.

Results. Women with pelvic floor dysfunction after childbirth, regardless of abdominal or vaginal delivery, remain at high risk of new and prolongation of existing signs of lumbopelvic pain. Lumbopelvic pain in them in the late postpartum period is associated with moderate pain (according to the visual analog scale), limitations in vital activity (according to the Oswestry Disability Index, Pelvic Girdle Questionnaire, Pregnancy Mobility Index), deterioration of spinal mobility even in the absence of pain syndrome (determined by the Ott, Schober, Thomayer, Sedin tests), decreased back muscle strength (according to the deadlift index). The use of a physical therapy program with the use of specific methods of influence aimed at leveling pelvic floor dysfunction in combination with a set of therapeutic exercises for the trunk and extremities allowed a statistically significant ($p<0.05$) improvement in the results of the visual analogue scale, Oswestry Disability Index, Pelvic Girdle Questionnaire, Pregnancy Mobility Index, and deadlift index over three months in comparison with the baseline parameters and the corresponding indicators of women who recovered independently. The magnitude of the absolute achieved effect of the physical therapy program depended on the initial parameters associated with the type of childbirth – abdominal or vaginal, but was proportionally the same for both methods of childbirth.

Conclusions. Physical therapy is advisable to prescribe to reduce the intensity of symptoms of lumbopelvic pain and prevent the chronicity of pain syndrome in women with postpartum pelvic floor dysfunction, which threatens with psychoneurological disorders, loss of work capacity, and decreased quality of life, i.e. for faster postpartum recovery of women and their return to full-fledged life activities.

Key words: physical therapy, rehabilitation, women, postpartum period, obstetrics and gynecology, cesarean section, childbirth, pelvic floor dysfunction.

Мета – оцінити ефективність розробленої комплексної програми фізичної терапії для жінок з дисфункцією тазового дна після вагінального та абдомінального розродження за динамікою показників, асоційованих з попереково-тазовим болем.

Матеріал. У дослідженні взяли участь 175 жінок. Контрольну групу становили 32 жінки, які не мали вагітностей в анамнезі та не характеризувались діагностованою дисфункцією тазового дна. Групу з ознаками дисфункції тазового дна у післяпологовому періоді становили 143 жінки, які були поділені на дві групи (порівняння – народжували вагінально та основну – народжували абдомінально) з двома підгрупами у кожній. Підгрупи 1 відновлювались за рекомендаціями клінічних протоколів, підгрупи 2 – за розробленою програмою фізичної терапії тривалістю 3 місяці із застосуванням терапевтичних вправ (для нижніх кінцівок, тазового поясу, тулуба, з бездротовим тренажером Кегеля), преформованих фізичних факторів (міостимулятор м'язів тазового дна), освітнього компонента. Ефективність оцінювали за результатами візуальної аналогової шкали болю, Oswestry Disability Index, Pelvic Girdle Questionnaire, Pregnancy Mobility Index, пробами Отта, Шобера, Томаєра, Сєдіна, індексом станової сили.

Результати. У жінок з дисфункцією тазового дна після пологів, незалежно від абдомінальних чи вагінальних, зберігається високий ризик виникнення нових та пролонгації уже наявних ознак попереково-тазового болю. Попереково-тазовий біль у них у віддаленому післяпологовому періоді асоціюється з помірним болем (за візуальною аналоговою шкалою), обмеженнями життєдіяльності (за анкетами Oswestry Disability Index, Pelvic Girdle Questionnaire, Pregnancy Mobility Index), погіршенням рухливості хребта навіть за умови відсутності больового синдрому (визначеного за пробами Отта, Шобера, Томаєра, Сєдіна), зниженням сили м'язів спини (за індексом станової сили). Запровадження програми фізичної терапії із застосуванням специфічних методів впливу, спрямованих на нівелювання дисфункції тазового дна у поєднанні з комплексом терапевтичних вправ для тулуба та кінцівок, дозволило статистично значуще ($p<0,05$) упродовж трьох місяців покращити результати візуальної аналогової шкали, Oswestry Disability Index, Pelvic Girdle Questionnaire, Pregnancy Mobility Index, індексу станової сили порівняно з вихідними параметрами та відповідними показниками жінок, які відновлювались самостійно. Величина абсолютного досягнутого ефекту від програми фізичної терапії залежала від вихідних параметрів, асоційованих з видом пологів – абдомінальних чи вагінальних, але пропорційно була однаковою при обох способах пологів.

Висновки. Засоби фізичної терапії доцільно призначати для зменшення інтенсивності ознак попереково-тазового болю та профілактики хронізації больового синдрому у жінок з післяпологовою дисфункцією тазового дна, що загрожує психоневрологічними розладами, втратою працездатності, зниженням якості життя, тобто для швидшого післяпологового відновлення жінок та повернення їх до повноцінної життєдіяльності.

Ключові слова: фізична терапія, реабілітація, жінки, післяпологовий період, акушерство та гінекологія, кесарів розтин, пологи, дисфункція тазового дна.

Introduction. Pelvic floor dysfunction is caused by weakness of the pelvic floor muscles, resulting in urinary incontinence, pelvic organ prolapse, fecal incontinence, or other sensory and lower urinary tract and gastrointestinal disorders [2]. Pregnancy and childbirth, age, hormonal changes, obesity, and pelvic surgery are major risk factors for dysfunction, along with anatomical, physiological, genetic, reproductive, and lifestyle factors. More than 25% of all women report symptoms of pelvic floor dysfunction [3].

People with low back pain have a more pronounced worsening of pelvic floor dysfunction than those without it [4; 5]. The psychosocial impact of this dysfunction can be much more detrimental to women's quality of life than the physiological impact.

The pelvic floor muscles do not contract in isolation but function as a single unit. They play an important role in maintaining and increasing intra-abdominal pressure during functional tasks such as lifting weights (including lifting a child), sneezing, coughing, and laughing, preventing urinary and fecal incontinence and prolapse [7].

Pregnancy causes numerous physiological and anatomical changes in the female body involving all systems (cardiovascular, respiratory, endocrine, urinary, etc.), as well as the musculoskeletal system. In many women, structural and functional changes in the

musculoskeletal system during pregnancy or the postpartum period provoke low back and/or pelvic pain [8; 11].

It has been established that more than two-thirds of pregnant women have low back pain, and approximately one-fifth have pelvic pain. The discomfort begins at about the 18th week of pregnancy, with a peak between the 24th and 36th weeks. Between 12 and 18 weeks of gestation, the prevalence of pain is about 62%, with 33% of pregnant women experiencing low back pain, 11% experiencing pelvic pain, and 18% experiencing a combination of both. By the end of gestation, around 35 weeks, the prevalence of low back pain can reach 71.3% and pelvic pain 64.7% [4; 13].

The increase in body weight during pregnancy, coupled with changes in posture to accommodate the increased volume of the abdomen and breasts, leads to a redistribution of the load on the joints and other musculoskeletal structures, which causes pain [8; 15]. The increase in uterine volume leads to stretching and weakening of the abdominal muscles, also causing increased tension in the lumbar muscles. The enlarged breasts and abdomen shift the center of gravity forward, causing a change in posture with anteversion of the pelvis and increased lumbar lordosis, which leads to increased stress on the lumbar spine and sacroiliac ligaments. Increased axial load causes compression of the intervertebral discs, displacing fluid from the disc and reducing its height, which can also contribute to low back pain [5].

Ligament weakness is associated with increased levels of progesterone, estrogen, and relaxin, which causes poorer stability of the hip and spinal joints [5]. Compression of the large abdominal vessels by the gravid uterus causes venous stasis and hypoxemia, disrupting the metabolic activity of neural structures, causing pain [8].

The limitation of vital activity, directly related to the intensity of lumbar and pelvic pain and the degree of disability as a result, their magnitude in women during pregnancy and in the postpartum period doubles compared to other women. Women with lumbopelvic pain face difficulties in such types of daily activities as standing up, sitting for a long time, walking long distances, dressing, carrying loads, caring for a child, etc. [11; 12].

Current data confirm the effectiveness of physical therapy with the general goal of restoring neuromuscular control in conditions of various etiologies [1; 10], as well as over the pelvic floor and deep abdominal muscles in a functional plan in the postpartum period [5; 8; 9]. There is also evidence of the effectiveness of pelvic floor muscle training as a method of conservative treatment of stress urinary incontinence and lumbopelvic pain [9; 15].

Thus, pelvic floor dysfunction and related pathological conditions are a significant problem for women of reproductive age both in the postpartum period and in later life. The issues of comprehensive rehabilitation of this condition require further research, which determined the relevance of the presented work.

The aim and objectives of the study – to assess the effectiveness of the developed comprehensive physical therapy program for women with pelvic floor dysfunction after vaginal and abdominal childbirth based on the dynamics of indicators associated with lumbopelvic pain.

Materials and methods. 175 women participated in the study.

The control group consisted of 32 women aged 25.3±0.8 years, who had no history of pregnancy and were not characterized by diagnosed pelvic floor dysfunction.

The group with signs of pelvic floor dysfunction in the postpartum period consisted of 143 women, who were divided into two groups (comparison and main) with two subgroups (1, 2) in each (the distribution of women into subgroups was carried out by the method of randomization of blocks with permutation).

The comparison group (CG) consisted of 74 women aged 26.0±0.4 years after vaginal delivery, who were divided into two subgroups: CG1 (39 women), who recovered independently, according to the general recommendations of the Unified Clinical Protocol for Primary, Secondary (Specialized) and Tertiary (Highly Specialized) Medical Care “Caesarean Section” and CG2

(35 women), who recovered according to the developed comprehensive physical therapy program.

The main group (MG) consisted of 69 women aged 24.6±0.7 years after abdominal delivery, who were divided into two subgroups: MG1 (33 women), who recovered independently, according to the general recommendations of the Unified Clinical Protocol of Primary, Secondary (Specialized), Tertiary (Highly Specialized) Medical Care "Physiological Childbirth", and MG2 (36 women), who recovered according to the developed comprehensive physical therapy program.

Inclusion criteria:

– First birth;

– Presence of pelvic floor dysfunction according to the international classification Pelvic Organ Prolapse Quantification (POP-Q) System of I–II degree;

– 8 weeks after childbirth – completion of the late postpartum period (the period of time during which changes in the birth canal regress, the scar after caesarean section heals – the woman's body functions with more or less stable residual postpartum changes in the usual format);

– Consent to participate in the study.

Exclusion criteria:

– Multiple pregnancy;

– Complicated postpartum period;

– Premature birth and birth after 42 weeks of pregnancy;

– Presence of pelvic floor dysfunction according to the international classification Pelvic Organ Prolapse Quantification (POP-Q) System III–IV degree;

– Diastasis of the rectus abdominis muscles;

– Presence of pelvic floor muscle dysfunction diagnosed before pregnancy;

– Presence of infectious and inflammatory diseases of the pelvic organs;

– Presence of markers of connective tissue dysplasia (joint hypermobility) – positive thumb test, positive wrist test.

The purpose of the developed comprehensive physical therapy program was to reduce the number and severity of signs of pelvic floor dysfunction by increasing the strength and tone of the muscles of the pelvic floor, lower back, buttocks, and abdominal cavity; improve self-control; prevent the progression of pelvic floor dysfunction; improve the quality of life of women.

The intervention program was divided into three components: therapeutic exercises, preformed physical factors, and an educational component.

The developed comprehensive physical therapy program lasted 3 months; it was implemented in an outpatient format (first month), in the form of independent classes with periodic control and consultations in the format of telerehabilitation (second and third months). During the first month, women visited the rehabilitation center three times a week, performing interventions in the format of classes with a physical therapist and training with an individual medical wireless Kegel simulator "Emy" (FIZIMED SAS, France). During the second and third months, women independently performed the developed therapeutic exercise program and performed training using an individual simulator "Emy" with periodic (once every two weeks) monitoring of the dynamics of the condition and consulting in the format of telerehabilitation.

The complex of therapeutic exercises included Kegel exercises, diaphragmatic breathing exercises with simultaneous control of the pelvic floor muscles, the "vacuum" exercise, exercises for the buttocks, thighs, lumbar spine, anterior abdominal wall (to increase their strength, improve extensibility, control). To modify the load when performing exercises for the lower extremities, pelvic girdle, and torso, the Pelvicore Pro simulator (Pelvic Solutions LLC, USA) was used.

Training with the individual medical wireless Kegel trainer "Emy" was based on the principle of biofeedback – after inserting the vaginal probe, women performed game tasks (20 exercises) using a mobile application, gradually increasing their complexity. Advantages of the independent format of performing interventions using biofeedback in women in the postpartum period: the ability of the woman to independently choose the time of

the intervention (which is especially important taking into account child care); the ability to independently increase the load depending on individual progress; game.

The component of using preformed physical factors included the use of an individual pelvic floor muscle stimulator Elise 2 (TensCare, Great Britain), which was recommended to be used alternately with the "Emy" trainer during the first month of interventions.

The educational component included training women in specific exercise regimens associated with gentle pelvic floor loading: jumping exercises, stretching exercises, lifting significant weights and holding them statically for long periods. In particular, this included developing individualized child care strategies that took these limitations into account.

The primary examination of women (pre-test, pre-examination) was performed at the end of the late postpartum period – 8 weeks after delivery, which was associated with postpartum recovery of the birth canal, healing of the postoperative scar of the abdominal wall in women who underwent cesarean section, formation of a picture of postpartum pelvic floor dysfunction, the possibility of full-fledged application of assessment and intervention methods, repeated – 5 months after delivery (post-examination – after the implementation of a physical therapy program for 3 months).

Complaints indicating the presence of lumbopelvic pain in the anamnesis and in connection with pregnancy and childbirth were identified: low back pain and pelvic pain before pregnancy, during pregnancy, after childbirth.

The intensity of pain in women was characterized by a 10-point visual analog scale (VAS) at rest and during movements.

Limitations of women's activities of life were assessed using standard questionnaires from the standpoint of differentiation of pain in lower back (Oswestry Disability Index) [6] and pelvic pain (Pelvic Girdle Questionnaire) [12], as well as their combination (Pregnancy Mobility Index) [14].

To determine the mobility of the spine, a number of tests were performed: Ott (mobility of the thoracic spine in the sagittal plane): Schober (mobility of the lumbar spine in the sagittal plane); Thomayer (total mobility of the spine); Sedin (mobility of the spine in the sagittal plane).

The strength of the spinal extensor muscles was assessed by calculating the deadlift index (ratio of the strength of the spinal extensor muscles to body weight).

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 was obtained from all women involved in the presented study. The study protocol was discussed and approved at a meeting of the commission on Bioethics of Vasyl Stefanyk Precarpathian National University.

Statistical processing of the results was carried out in the program "IBM SPSS Statistics". 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 $p<0.05$.

Research results. Questioning of women with pelvic floor dysfunction revealed that during pregnancy 100% of them had low back pain, and almost half of them had pelvic pain. The pain syndrome was persistent and persisted in the postpartum period (Table 1). The frequency of lumbopelvic pain in groups of women with different methods of delivery was the same, which emphasizes the commonality of their etiopathogenesis – changes in tissues due to the long-term increasing load of the enlarged uterus.

Pelvic pain in both modes of delivery was characterized by women as localized between the posterior iliac crest and the ischial fold, near the sacroiliac joints, radiating to the posterior thigh. Women also complained of pain in the symphysis pubis, which occurred in combination with pelvic girdle pain or independently, with irradiation to the anterior thigh. This pain was intermittent, most often provoked by prolonged postures that occurred during activities of daily living, such as walking, sitting, or standing. Low back pain in women was defined as occurring between the superior spinous process of the twelfth thoracic vertebra, near the sacrum and lateral edges of the erector spinae

muscle, and could radiate to the lower limb. The pain increased when the body was tilted forward, causing limited movement in the lower back.

During the initial examination, it was found that the intensity of pain in the lumbar and pelvic areas in the postpartum period was assessed by women as moderate-weak at rest and moderate-strong during movement (Table 2). The intensity of pain was the same in both subgroups ($p>0.05$).

When determining the limitations of performing various activities due to back pain according to the Oswestry Disability Index, women were found to have impairments in all of its subscales (Table 3). The greatest severity of limitations in women of the comparison and main groups was noted in the assessment of Pain intensity, lifting, Social. Travel, which was obviously associated with childcare activities. Pain also significantly affected daily life (self-care, sexual activity, sleep, etc.) (Table 3). In absolute numerical terms, the severity of back pain in women of both groups in the postpartum period was at the level of severe impairments that complicate everyday and social activities.

The impact of pelvic pain on women's activities of life according to the Pelvic Girdle Questionnaire was also significant, indicating difficulty in performing daily activities. This pain was more pronounced in women who gave birth vaginally, $p<0.05$ (Figure 1).

Table 1

Dynamics of complaints related to lumbopelvic pain in women during pregnancy and in the postpartum period with different methods of delivery

Pain	Comparison group, % (absolute number)				Main group, % (absolute number)			
	CG1 Pre-examination (n=39)	CG1 post–examination (n=39)	CG2 Pre-examination (n=35)	CG2 post–examination (n=35)	MG1 Pre-examination (n=33)	MG1 post–examination (n=33)	MG2 Pre-examination (n=36)	MG2 post–examination (n=36)
lower back before pregnancy	30.8 (12)		25.7 (9)		36.4 (12)		30.6 (11)	
lower back during pregnancy	100 (39)		100 (35)		100 (33)		100 (36)	
lower back after childbirth	82.1 (32)	38.5 (15)	77.1 (27)	2 (5.7)	78.8 (26)	45.5 (15)	72.2 (26)	8.3 (3)
pelvic before pregnancy	7.7 (3)		11.4 (4)		9.1 (3)		13.9 (5)	
pelvic during pregnancy	53.8 (21)		60.0 (21)		48.5 (16)		50.0 (18)	
pelvic after childbirth	30.8 (12)	15.4 (6)	37.1 (13)	0 (0)	24.2 (8)	18.2 (6)	27.8 (10)	0 (0)

Table 2

Dynamics of lumbopelvic pain intensity in women with pelvic floor dysfunction in the postpartum period under the influence of a physical therapy program (M±SD)

Pain intensity, VAS	Comparison group		Main group	
	CG1 (n=39)	CG2 (n=35)	MG1 (n=33)	MG2 (n=36)
At rest				
Pre-examination	2.08±0.53	1.86±0.41	2.23±0.15	1.95±0.12
Post-examination	1.00±0.08°	0.08±0.01°‡	1.05±0.09°	0.05±0.01°‡
With movement				
Pre-examination	6.11±0.20	6.04±0.17	5.88±0.23	6.01±0.19
Post-examination	2.13±0.18°	0.25±0.04°‡	2.24±0.11°	0.35±0.08°‡

Notes: ° – $p<0.05$ – statistically significant difference between the corresponding indicators relative to the initial examination;

● – $p<0.05$ – statistically significant difference between the corresponding indicators of CG and MG;

‡ – $p<0.05$ – statistically significant difference between the corresponding indicators of subgroups 1 and 2.

The Pregnancy Mobility Index result summarized the results of the limitation of life activities of women with lumbopelvic pain, established by the Oswestry Disability Index and the Pelvic Girdle Questionnaire, by all types (daily mobility in the house, household activities, mobility outdoors) (Table 3). According to this indicator, women who gave birth vaginally showed worse results compared to women who underwent cesarean section ($p<0.05$).

The initial examination revealed limited spinal mobility in all samples in all women, regardless of the mode of delivery (Table 4). Apparently, this was a consequence of a long-term change in the trunk movement pattern and redistribution of biomechanical load, residual inflammatory and painful sensations in the pelvic organs, and for women with the consequences of cesarean section, also the period of formation of a postoperative scar in the abdominal cavity, which limited trunk movements and caused antalgic forced body position.

The deadlift index, which characterized the functional capacity of the back extensor muscles, was determined at a low level in women with pelvic floor dysfunction in the postpartum period – there were no representatives with high and above average strength in these groups, instead the majority were characterized by average and below average strength (Figure 2).

At the initial examination, women in the comparison and main groups were statistically significantly similar in terms of the studied indicators ($p>0.05$), which made it possible to include them in further research.

Our study showed that in the studied groups, after the physical therapy program, women did not complain of pelvic pain; lumbar pain was determined in isolated cases. At the same time, in women who recovered independently, the

Table 3

Dynamics of Oswestry Disability Index in women with pelvic floor dysfunction in the postpartum period under the influence of a physical therapy program (M±SD)

Subscale, points	Comparison group				Main group			
	CG1 (n=39)		CG2 (n=35)		MG1 (n=33)		MG2 (n=36)	
	Pre-examination	Post–examination	Pre-examination	Post–examination	Pre-examination	Post–examination	Pre-examination	Post–examination
Pain intensity	3.08± 0.21	2.51± 0.16°	3.15± 0.16	1.02± 0.13°⁑	3.16± 0.21	2.38± 0.16°	3.12± 0.15	1.10± 0.08°⁑
Personal care	2.12± 0.07	1.42± 0.08°	2.05± 0.10	0.13± 0.05°⁑	2.19± 0.09	1.20± 0.15°	2.25± 0.14	0.25± 0.04°⁑
Lifting	3.66± 0.08	2.84± 0.25°	3.52± 0.14	0.90± 0.12°⁑	3.49± 0.12	2.70± 0.12°	3.58± 0.08	1.02± 0.07°⁑
Walking	2.45± 0.12	1.71± 0.10°	2.30± 0.09	0.84± 0.12°⁑	2.40± 0.16	1.63± 0.22°	2.31± 0.18	1.03± 0.07°⁑
Sitting	2.00± 0,.10	1.70± 0.18°	2.16± 0.11	0.29± 0.07°⁑	2.22± 0.15	1.57± 0.14°	2.10± 0.16	0.41± 0.05°⁑
Standing	2.24± 0.15	1.80± 0.16°	2.11± 0.08	0.83± 0.10°⁑	2.15± 0.12	1.63± 0.21°	2.13± 0.10	0.76± 0.04°⁑
Sleeping	1.58± 0.28	1.23± 0.19°	1.63± 0.15	0.08± 0.03°⁑	1.49± 0.12	1.12± 0.14°	1.66± 0.31	0.15± 0.04°⁑
Sex	2.54± 0.14	1.93± 0.20°	2.46± 0.12	0.23± 0.03°⁑	2.38± 0.16	1.63± 0.19°	2.40± 0.15	0.18± 0.05°⁑
Social	3.15± 0.07	2.73± 0.26°	3.26± 0.18	0.74± 0.08°⁑	3.21± 0.15	2.88± 0.19°	3.24± 0.16	0.85± 0.04°⁑
Travel	3.22± 0.09	2.64± 0.17°	3.30± 0.12	0.56± 0.10°⁑	3.28± 0.18	2.51± 0.21°	3.14± 0.11	0.65± 0.07°⁑
Total score, %	52.08± 1.12	41.02± 1.15°⁑	51.88± 1.03	11.24± 0.78°⁑	51.94± 1.18	38.50± 0.63°⁑	51.86± 1.14	12.80± 0.49°⁑

Notes: ° – $p<0.05$ – statistically significant difference between the corresponding indicators relative to the initial examination; ● – $p<0.05$ – statistically significant difference between the corresponding indicators of CG and MG; ⁑ – $p<0.05$ – statistically significant difference between the corresponding indicators of subgroups 1 and 2.

frequency of episodes of lumbar pain was 38.5% in CG1, 45.5% in CG2, pelvic pain in CG1 was 15.4%, CG2 – 18.2% (Table 1).

At rest, women in all groups practically did not feel pain during the re-examination (Table 2). The load with movement revealed that women in CG1 and MG1 had pain, although weak in intensity. At the same time, in the group of women who underwent active functional rehabilitation, pain during movements was practically not observed.

The improvement in vital activity, which was limited due to low back pain, according to the Oswestry Disability Index in CG1 was 21.2% compared to the initial result, in MG1 – 25.9%, in CG2 and MG2 – 78.3% and 75.3%, respectively ($p<0.05$) (Table 3).

Also, under the influence of the physical therapy program, a statistically significant decrease in self-care limitations due to pelvic pain was noted compared to the baseline level: according to the Pelvic Girdle Questionnaire, in women CG1 it was 26.4%, in MG1 – 32.2%, CG2 – 55.4%, MG2 – 75.4% ($p<0.05$), which confirms the benefits of active physical therapy (Figure 1).

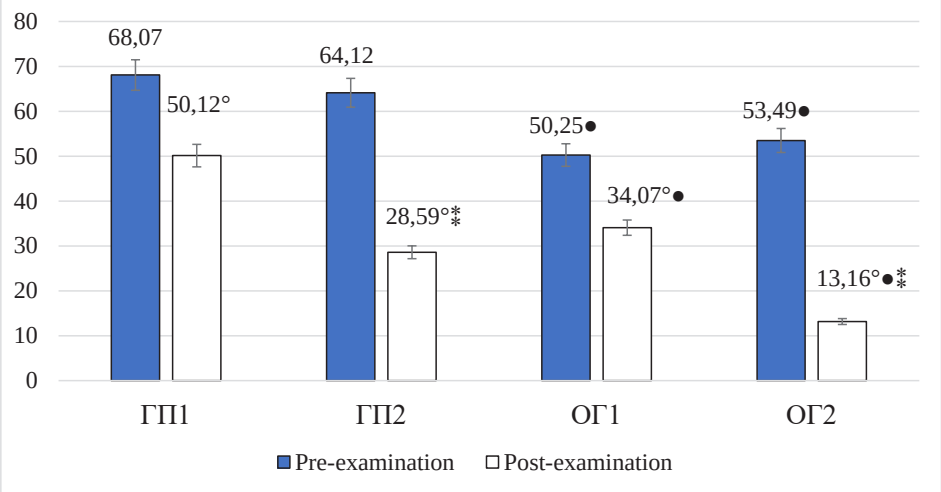

Fig. 1. Dynamics of limitation of vital activity according to the Pelvic Girdle Questionnaire in women with pelvic floor dysfunction in the postpartum period under the influence of a physical therapy program (° – $p<0.05$ – statistically significant difference between the corresponding indicators relative to the initial examination; ● – $p<0.05$ – statistically significant difference between the corresponding indicators of CG and MG; ‡ – $p<0.05$ – statistically significant difference between the corresponding indicators of subgroups 1 and 2)

Table 3

Dynamics of Pregnancy Mobility Index results in women with pelvic floor dysfunction in the postpartum period under the influence of a physical therapy program (M±SD)

Subscale, points	Comparison group				Main group			
	CG1 (n=39)		CG2 (n=35)		MG1 (n=33)		MG2 (n=36)	
	Pre-examination	Post–examination	Pre-examination	Post–examination	Pre-examination	Post–examination	Pre-examination	Post– examination
Daily mobility in the house	17.05± 0.38	11.06± 0.28°	15.87± 0.51	6.20± 0.15°‡	14.25± 0.43	9.12± 0.18°●	15.29± 0.25	6.16± 0.23°●‡
Household activities	20.12± 1.04	14.16± 0.35°	21.49± 0.75	7.20± 0.16°‡	16.30± 0.48	10.20± 0.36°●	17.23± 0.40	6.05± 0.52°●‡
Mobility outdoors	16.31± 0.55	11.27± 0.11°	17.07± 0.68	7.35± 0.18°‡	13.59± 0.34	8.03± 0.13°●	12.80± 0.83	5.67± 0.71°●‡

Notes: ° – $p<0.05$ – statistically significant difference between the corresponding indicators relative to the initial examination; ● – $p<0.05$ – statistically significant difference between the corresponding indicators of CG and MG; ‡ – $p<0.05$ – statistically significant difference between the corresponding indicators of subgroups 1 and 2.

The dynamics of PMI results showed a statistically significant ($p<0.05$) improvement compared to the baseline result in both groups of women on the subscales Daily mobility in the house (in CG1 – by 35.1%, in CG2 – by 60.9%, MG1 – by 36.0%, MG2 – by 59.7%), Household activities (in CG1 – by 29.6%, in CG2 – by 65.5%, MG1 – by 37.4%, MG2 – by 64.9%), Mobility outdoors (in CG1 – by 30.9%, in CG2 – by 56.9%, MG1 – by 40.9%, MG2 – by 55.7%) (Table 3).

During the repeated examination of women, a statistically significant ($p<0.05$) improvement in spinal flexibility was determined in all groups according to the functional tests performed (table 4). The flexibility of the thoracic spine according to the results of the Ott test in CG1 improved by 21.1%, CG2 – by 54.8%, MG1 – by 29.6%, MG2 – by 45.7%.

The improvement in the flexibility of the lumbar spine, determined by the Schober test,

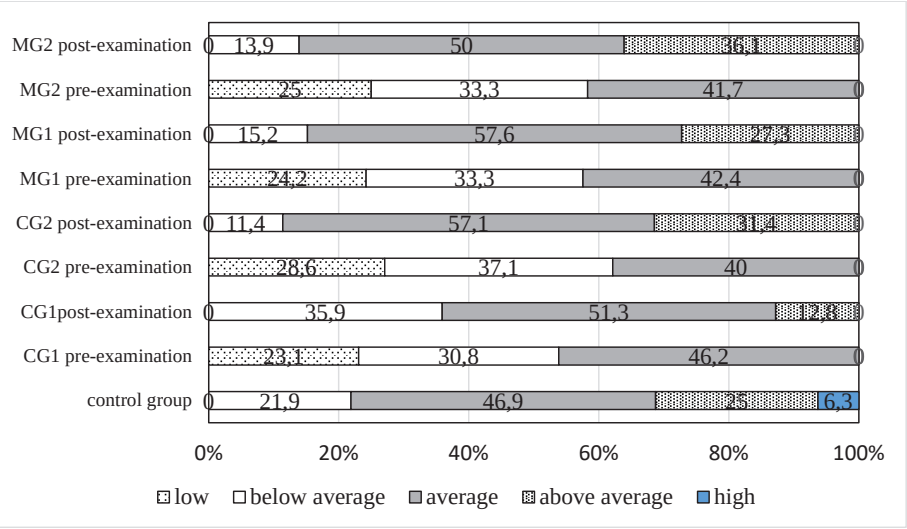

Fig. 2. Dynamics of distribution by deadlift index of women with pelvic floor dysfunction in the postpartum period under the influence of a physical therapy program

Table 4

Dynamics of results for determining spinal flexibility in women with pelvic floor dysfunction in the postpartum period under the influence of a physical therapy program (M±SD)

Tests to determine spinal flexibility, cm	Control group (n=32)	Comparison group				Main group			
		CG1 (n=39)		CG2 (n=35)		MG1 (n=33)		MG2 (n=36)	
		Pre-examination	Post–examination	Pre-examination	Post–examination	Pre-examination	Post–examination	Pre-examination	Post–examination
Ott	5.21± 0.11	3.41± 0.05□	4.13± 0.10□°	3.56± 0.12□	5.51± 0.16°⁑	3.28± 0.18□	4.25± 0.11□°	3.50± 0.19□	5.10± 0.42°⁑
Schober	7.11± 0.48	5.23± 0.51□	6.20± 0.27□°	5.08± 0.31□	7.11± 0.23°⁑	5.18± 0.20□	6.37± 0.15□°	5.31± 0.24□	7.50± 0.27°⁑
Thomayer	0.74± 0.13	6.08± 0.36□	4.11± 0.52□°	6.83± 0.57□	1.12± 0.41°⁑	5.97± 0.54□	4.60± 0.22□°	6.29± 0.49□	0.83± 0.08°⁑
Sedin, forward tilt	6.30± 0.11	4.87± 0.37□	5.44± 0.13□°	4.30± 0.53□	6.12± 0.22°⁑	4.61± 0.41□	5.90± 0.15□°	4.77± 0.43□	6.58± 0.31°⁑
Sedin, backward tilt	5.83± 0.09	3.52± 0.14□	4.33± 0.18□°	3.70± 0.25□	5.49± 0.11°⁑	3.66± 0.20□	4.60± 0.41□°	3.57± 0.23□	5.85± 0.08°⁑

Notes: □ – $p<0.05$ – statistically significant difference relative to the control group indicator; ° – $p<0.05$ – statistically significant difference between the corresponding indicators relative to the initial examination; ● – $p<0.05$ – statistically significant difference between the corresponding indicators of GP and OG; ⁑ – $p<0.05$ – statistically significant difference between the corresponding indicators of subgroups 1 and 2.

was in CG1 18.5%, CG2 – 40.0%, MG1 – 23%, MG2 – 41.2% ($p<0.05$) (Table 4).

The overall flexibility of the spine according to the Thomayer test improved compared to the initial indicator in CG1 by 32.4%, CG2 by 83.6%, MG1 by 22.9%, MG2 by 86.8% ($p<0.05$) (Table 4).

The improvement of the flexibility of the spine during movements in the sagittal plane according to the Sedin test when leaning forward was in CG1 11.7%, CG2 – 42.3%, MG1 – 28.0%, MG2 – 37.9%; when leaning back – respectively 23.0%, 48.4%, 25.7% and 63.9% ($p<0.05$) (Table 4).

The evidence of the improvement in the condition of the back tissues was the repeated determination of the deadlift index: in all groups there were no women with low back muscle strength; however, in groups. About a third of women who completed the physical therapy program had above-average strength, which was not observed in the groups that recovered independently (Figure 2).

Discussion. The significant prevalence of lumbopelvic pain during pregnancy, the limited methods of their correction, inadequate observation and management can lead to chronicity of pain, deterioration of quality of life and further disability during the postpartum period [3; 8]. The problem of physical therapy of women with pain syndrome in the postpartum period with different modes of delivery is one of the most relevant and poorly studied in modern rehabilitation. Little attention is paid to the restoration of the health of women after childbirth, although during this period they are extremely vulnerable due to the exhaustion of the body against the background of increased external needs caused by childbirth [8].

Physical therapy is a highly effective and safe component of the correction of back pain and pelvic pain, in particular during pregnancy and in the postpartum period.

Correction of pain during pregnancy is a difficult task due to the risk of negative consequences of drug treatment in a pregnant woman and fetus [7]. After childbirth, women try to correct the pain syndrome as soon as possible, since they are caring for the child, which is associated with increased mobility and physical activity, while not all medications can be used due to the risk of getting into breast milk. This gives priority to physical therapy methods – therapeutic exercises, preformed physical factors, the use of bandages, massage, relaxation, yoga, etc. [4; 5; 8].

The results obtained in our study confirm the relevance of women's rehabilitation not only in the late postpartum period, but also for a sufficiently long period of time, which is associated with the increased load on the women's body. It is advisable to conduct a physical therapy program with the adaptation of therapeutic exercises to habitual household movements through functional training, which increases women's compliance and contributes to their better adherence to the recommendations provided. Our study complements the work that actualizes the role of physical therapy for the correction of lumbopelvic pain symptoms [2; 4], and also highlights the feasibility of rehabilitation of women in the postpartum period [7; 8; 13]. It reveals unresolved issues regarding the comparison of the course of postpartum dysfunctions with different methods of delivery under the influence of physical therapy.

Conclusions.

1. In women with pelvic floor dysfunction after childbirth, regardless of abdominal or vaginal, there is a high risk of new and prolongation of existing signs of lumbopelvic pain.

2. Lumbopelvic pain in women with pelvic floor dysfunction in the late postpartum period is associated with moderate pain (diagnosed by visual analog scale), limitations in vital activity (established by the Oswestry Disability Index, Pelvic Girdle Questionnaire, Pregnancy Mobility Index), deterioration of spinal mobility even in the absence of pain syndrome (determined by the Ott, Schober, Thomayer, Sedin tests), decreased back muscle strength (by the deadlift index).

3. The use of a physical therapy program with the use of specific methods of influence aimed at leveling pelvic floor dysfunction in combination with a set of therapeutic exercises for the trunk and extremities allowed to statistically significantly ($p<0.05$) improve the results of the

visual analog scale, Oswestry Disability Index, Pelvic Girdle Questionnaire, Pregnancy Mobility Index, and postural strength index within three months in comparison with the initial parameters and the corresponding indicators of women who recovered independently.

4. The magnitude of the absolute achieved effect of the physical therapy program depended on the initial parameters associated with the type of childbirth – abdominal or vaginal, but was proportionally the same for both methods of childbirth.

5. Physical therapy should be prescribed to reduce the intensity of lumbopelvic pain symptoms and prevent the chronicity of pain syndrome, which threatens with psychoneurological disorders, loss of work capacity, and a decrease in the quality of life, i.e. for faster postpartum recovery of women and their return to full-fledged life activities.

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

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