

Efficacy of correction of pelvic floor muscle dysfunction using physical therapy in women who underwent Caesarean section

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Abstract.

Problem Statement. The increase in the number of women giving birth by Caesarean section, is actualizing the development and implementation of physical therapy to restore their health and improve their quality of life. **Approach:** determination of the influence of the developed program of physical therapy on the dynamics of signs of pelvic floor muscle dysfunction in women in the postpartum period after Caesarean section. **Methods:** There were examined 112 postpartum women. Comparison group consisted of 47 women who gave birth naturally. Main group 1 consisted of 32 post- Caesarean section women who recovered on their own. Main group 2 consisted of 33 women after Caesarean section who had postpartum physical therapy for 12 months (kinesitherapy, functional training, abdominal bandage, kinesio taping, abdominal and general massage; healthy nutrition, psychological relaxation, education of women). Determination of pelvic floor muscle dysfunction (tone mm. levator ani (using palpation), strength (with perineometry), signs of weakness and their severity (Pelvic Floor Distress Inventory (PFDI-20)), impact on daily activity, social and emotional spheres (Pelvic Floor Impact Questionnaire (PFIQ-7)), changes in sexual function (Female Sexual function (FSFI-19)), was performed after 8 weeks, 6 and 12 months after childbirth. **Results:** In the postpartum period, pelvic floor muscle dysfunction in women manifests itself in the form of a decrease in their tone (on the results of palpation), strength (according to the data of perineometry), the presence of a pathological signs of their weakness (diagnosed according to PFDI-20), negative impact on daily activity, social and emotional spheres (defined by PFIQ-7), deterioration of sexual satisfaction (according to FSFI-19). The use of physical therapy allowed statistically significantly improve the results of all studied parameters for women in 6 months after Caesarean section ($p < 0.05$), in comparison with women who gave birth naturally; according to the results of determining the tone mm. levator ani, PFDI-20, PFIQ-7, FSFI-19 – with those who recovered after Caesarean section independently. Performance of physical therapy with the use of exercises to correct pelvic floor muscle dysfunction one year after childbirth allowed to achieve a statistically significant improvement in the condition of main group 2 women according to all studied indices regarding the representatives of main group 1 and comparison group. **Conclusions:** Physical therapy means should be prescribed from the first days of postpartum rehabilitation for women giving birth by Caesarean section to reduce the intensity of signs of pelvic floor dysfunction.

KeyWords: rehabilitation, obstetrics, gynecology, postpartum period.

Introduction

The basic principle of perinatal obstetrics is to ensure the health of the puerperant woman, fetus and newborn, which in some cases requires a quick and gentle childbirth. Therefore, in recent decades, Caesarean section (CS) in obstetric practice has become a tool to preserve the health of mother and child (Miller, Abalos, Chamillard, & al., 2016).

At the same time, more and more women are choosing CS as the most painless, fast and safe way to give birth. It is especially popular in developed and developing countries. In particular, in Brazil 45% of women have chosen CS, and in European countries this figure has increased from 15% up to 22% over the past 20 years (Boerma, Ronsmans, Melesse, & al., 2018; Di Giovanni, Garzarella, Di Martino, & al., 2018). Therefore, experts from the World Health Organization are concerned that more and more puerperant women are undergoing surgery in the absence of medical indications. With the help of CS 20% of all babies in the world are born, and if this trend continues, this index will increase up to 30% by 2030 (The Lancet, 2018).

Among the reasons for the increase in the frequency of CS, experts call the fear of pain in women, the convenience of this approach for health professionals (because CS can be planned and completed quickly, receiving more money for insurance benefits), as well as mothers' ignorance of CS health consequences (Sandall, Tribe, Avery, & al., 2018; Meireles, Mockdece Neves, Henrique, Pedro, & al., 2021).

In some cases, CS is planned and administered in advance, while in other cases it occurs as a result of complications that arise during childbirth. Despite its widespread use, CS belongs to the category of complex operations with a high frequency of postoperative complications – 3.3-54.4%, which are associated including the technique of intervention (Sandall, Tribe, Avery, & al., 2018). Potential structural and functional complications of this type of childbirth include: risk of pulmonary, gastrointestinal and vascular complications; postoperative pain and discomfort; adhesion at the incision site; change of posture; pelvic floor dysfunction; weakness of the abdominal wall; diastasis of the rectus abdominis; general functional limitations (Chauhan, & Tadi, 2020; Barca, Bravo, Pintado-Recarte, & al., 2021).

Period of pregnancy and the first 6-8 weeks after childbirth – is a vulnerable one, when the musculoskeletal system of the pelvic organs and pelvic floor structures, which have undergone significant physiological changes during pregnancy and childbirth against the background of increased dynamic load associated with care for a child, which are not able to perform a full-fledged support function for the relevant organs (Kesikburun, Güzelküçük, Fidan, & al., 2018). Against this background, the symptoms of pelvic floor dysfunction begin to appear and/or progress: pelvic organs prolapse, urination disorders, anal sphincter failure, sexual dysfunction (Zuchelo, Santos, Dos Santos Figueiredo, & al., 2018; Cattani, Neefs, Verbakel, & al., 2021). These symptoms affect all areas of patients' life, dramatically reducing its quality.

Pelvic floor dysfunction (PFD) is a complex of disorders of the ligamentous apparatus and muscles that hold the pelvic organs in a normal position and provide urine and feces withholding (Bo, Frawley, Haylen, & al., 2017). Symptoms of PFD are observed in 43% of women, and, in the absence of timely diagnosis and correction, they may progress in the remote future in 25% of cases, despite the natural regenerative potential of soft tissues of the birth canal (Cattani, Neefs, Verbakel, & al., 2021). As a rule, the development of PFD as an independent syndrome in women begins in reproductive age, often after childbirth: 6 weeks after childbirth through the natural birth canal in 32% of women and after CS – in 35% of women (Barca, Bravo, Pintado-Recarte, & al., 2021). Another aspect of PFD is the sexual problems during the postpartum period, which are reported, according to various data, by 22-86% of women (Verbeek, & Hayward, 2019; Cattani, Neefs, Verbakel, & al., 2021).

Perineal trauma received during childbirth is considered a serious risk factor for the development of PFD (Bo, Frawley, Haylen, & al., 2017; Barca, Bravo, Pintado-Recarte, & al., 2021). However, childbirth by CS surgery is not a panacea for the prevention of pelvic dysfunction, which confirms the direct role of pregnancy itself in the occurrence and progression of PFD (Barca, Bravo, Pintado-Recarte, & al., 2021). Provoking factors of its occurrence are: a prolonged increase in intra-abdominal pressure and excessive stretching of the ligamentous apparatus and muscles of the pelvic organs due to the progressive increase in the size of the uterus and fetus, as well as changes in hormonal background – increased progesterone levels, decreased relaxin levels. This leads to a decrease in the urethrovesical angle, and, subsequently, to the hypermobility of the urethra. Also, as the gestational age increases, there is a displacement and compression of the rectum (Deegan, Stothers, Kavanagh, & Macnab, 2018).

Therefore, the problem of improving the comprehensive recovery of women's health after childbirth requires the introduction of new practical medical knowledge and technologies into the practical rehabilitation and obstetrics, in particular, methods of active functional physical therapy in order to improve quality of life and the most rapid physical and mental recovery. Long-term programs for the correction of dysfunction of the muscles of the pelvic floor, in particular, in women who underwent CS, have not been developed or studied. The advantages of using physical therapy in the postpartum period are their safety, the possibility of their use during lactation, adaptation to any physical condition of a woman (Boyle, Hay-Smith, Cody, & Mørkved, 2014; Kahyaoglu, & Balkanli, 2016). This determines the relevance of the represented work, its theoretical and practical value.

Materials and methods

Participants. During the study there were examined 112 women after childbirth.

Inclusion criteria: postpartum period after childbirth by natural (in the control group) or abdominal (in the main group) way; the first CS (main group); physiological course of the postpartum period; absence of acute or exacerbation of chronic extragenital pathology at the time of examination; informed consent to participate in the study (in control surveys for women of the control group and main group 1).

Exclusion criteria: pregnancy with the threat of abortion, which required a long-term bed regimen and changes, as a result, of physical status; childbirth in multiple pregnancies; complicated postpartum period; re-pregnancy or abortion during the observation period; severe genital prolapse diagnosed before pregnancy.

Procedure. Comparison group (CG) consisted of 47 women (aged 26.3 ± 1.3 years), whose childbirth occurred naturally (vaginal delivery). The main group (MG) consisted of 65 women delivered babies by abdominal delivery – CS, who were divided into two subgroups. Main group 1 (MG1) consisted of 32 women aged 25.8 ± 0.9 years, who were given general recommendations for self-care in the postpartum period after CS (following the hygiene, restriction of motor activity due to postoperative scarring, etc.), because they expressed a

desire to recover on their own. Main group 2 (MG2) consisted of 33 women aged 26.1 ± 1.5 years who had postpartum PhT (physical therapy), the effectiveness of which is represented in this study.

The developed program of physical therapy lasted for 12 months, starting from the early postpartum period. It was divided into three periods – initial one (3 months, restorative interventions have begun in the maternity hospital, continued in the rehabilitation center three times a week), basic one (6 months, classes were performed in a mixed format – once a week in the rehabilitation center, twice a week – in the format of telerehabilitation), final one (3 months, classes were performed in the form of telerehabilitation and independent classes with periodic face-to-face monitoring).

The following means were used in the physical therapy program: kinesitherapy, abdominal wall bandage (in the early stages), kinesio taping of the abdomen and back, abdominal massage (to prevent the adhesion process around the postoperative suture) and general massage; healthy diet, psychological relaxation, education of women. The basis of kinesitherapy as the main method that affected muscular dysfunction was the performance of therapeutic exercises, improvement of motor skills and abilities in the form of functional training on the platforms “PROCEDOS PLATFORM 9™ Pro” and “PROCEDOS WALL9” (Prosedos. Powered by Gray’s Institute) in order to normalize the motor stereotype, restore the muscles of the pelvic floor, torso, limbs with adaptation to household movements for child care. The block of special exercises for the correction of pelvic floor muscle dysfunction included: exercises for the muscles of the buttocks, thighs, abdominal cavity, pelvis minor, abdominal breathing, Kegel exercises (Kegel, 1948), which will be included into the classes during all periods of restorative intervention.

Characteristic of these exercises were the starting positions – lying on the back, side, abdomen, with the pelvis raised, performing exercises with a tight pelvic floor. During the first weeks after the CS, they restricted the movements that would contribute to the tension of the postoperative suture, and chose the facilitated starting positions. Women were taught strategies to adhere to the optimal dynamic stereotype to avoid overloading the abdominal and pelvic floor muscles during daily activities and specific movements for child care – lifting, feeding, moving the baby stroller, etc.

The objectives of the physical therapy program were: to improve mood, psychological condition, reduce anxiety and the risk of developing postpartum depression; improving the function of internal organs and general fitness; normalization of body weight; prevention of the adhesion processes in the abdominal cavity; reducing the risk of chronic diseases; normalization of the function of the organs and muscles of the pelvic floor; prevention and correction of postpartum diastasis of the abdominal muscles; improving the quality of life taking into account physiological and pathological changes in the body of women after childbirth, lactation, lifestyle changes taking into account contextual factors; return to normal domestic and professional activity with a high level of efficiency and psycho-emotional state.

Perineal muscular tone was determined with the help of palpation mm. levator ani, the obtained result was evaluated according to Modified Oxford Scale (MOS) (Bo, Frawley, Haylen, & al., 2017). Perineal muscular strength was determined using an iEASE XFT0010 digital perineometer according to standard guidelines (Angelo, Varella, de Oliveira M, & al., 2017). Satisfaction with sexual life in women was determined according to the questionnaire Female Sexual function (FSFI-19) (Rosen, Brown, Heiman, & al., 2000). The presence and extent of pelvic floor muscle dysfunction were performed using the Pelvic Floor Distress Inventory (PFDI-20) questionnaire, which is structured in three blocks: Pelvic Organ Prolapse Distress Inventory 6 (POPDI-6); Colorectal-Anal Distress Inventory 8 (CRADI-8); Urinary Distress Inventory (UDI-6) (Barber, Walters, & Bump, 2005). The effect of PFD-related symptoms on the womens’ daily activities, social and emotional spheres was performed according to the Pelvic Floor Impact Questionnaire (PFIQ-7), structured into the sections: Urinary Impact Questionnaire (UIQ-7), Colorectal-Anal Impact Questionnaire (CARDI- 7), Pelvic Organ Prolapse Impact Questionnaire (POPIQ-7) (Barber, Walters, & Bump, 2005). The condition of women was assessed in dynamics according to the results of three examinations – at the end of the late postpartum period (8 weeks after delivery), after 6 and 12 months after the childbirth.

This research study was performed in accordance with the “Good Clinical Practice” principles. Informed patient consent was obtained from each participant of the study.

Statistical analysis/ Generalization of the studied characteristics was assessed using arithmetic value and standard deviation. Confidence of differences between mean values was assessed by the Student’s t-criterion. Assessment of statistical hypotheses was based on a 5% significance level. For statistical data processing, a licensed Microsoft Excel Program (2016) was used. Statistical analysis of the obtained results was performed by considering the Microsoft Excel table usage recommendations for computer data analysis.

Results

During the initial examination in the late postpartum period, perineal muscular tone was reduced in all groups of examined women (Figure 1). Women who gave birth naturally showed a statistically significantly ($p < 0.05$) worse result compared to women who had CS.

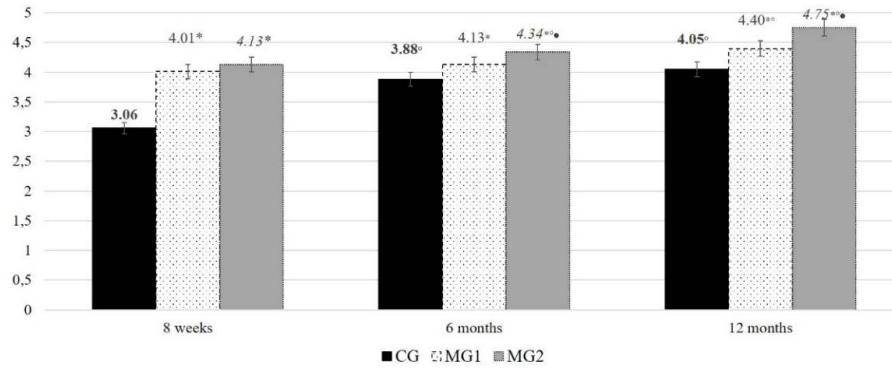


Fig. 1. Dynamics of tone parameters mm. levator ani in women in the postpartum period according to MOS, points. Notes: *– $p < 0.05$ – level of reliability of changes between the indicators of the CG and the MG; °– $p < 0.05$ – level of reliability of changes between the indicators between the relevant parameters relative to the previous survey; ●– $p < 0.05$ – level of reliability of changes between the indicators of the MG1 and the MG2.

A study performed 6 months after the childbirth, has found that in the CG and MG2 groups of women there was a statistically significant improvement in tone compared to the previous index ($p < 0.05$). Compared with the first study, the increase in indices of CG was 26.8%, MG1 – was 3.0%, MG2 – was 5.1%. This demonstrated, on the one hand, the rate of natural regeneration of pelvic floor tissues (in women of CG and MG1) and the effectiveness of physical therapy (in women of MG2, their results were better than in other groups, $p < 0.05$). The value of the studied parameter in CG was statistically significantly smaller ($p < 0.05$) than in MG1 and MG2. The dynamics of long-term results showed that 12 months after the childbirth, pelvic floor muscle tone in CG did not reach the level of women who had had CS ($p < 0.05$), there was a slowdown in the rate of recovery compared to the first half of the postpartum period. The parameters of MG2 were the best among all groups of women ($p < 0.05$ relative to CG, MG1). The improvement of the studied index relative to the first examination in CG was 32.4%, MG1 – was 9.7%, MG2 – was 15.0%.

The results of the performed perineometry have confirmed the trends identified during the determination of the tone mm. levator ani (Figure 2.). The first examination in CG women revealed the perineal muscular strength, the absolute numerical value of which corresponded to the lower parameters of moderate strength, while in women after CS – good one (according to the classification of Angelo, Varella, de Oliveira, & al., 2017). At the same time, MG2 women showed a statistically significantly better result compared to CG and MG1 women. During re-examination after 6 months in CG women, perineal muscular strength improved at 12.4%, demonstrating the dynamics of physiological tissue repair after natural childbirth, reaching the upper digital values of moderate strength. In MG1, the increase in strength was 8.5%, MG2 – 5.9% (being statistically significantly better than the in CG, $p < 0.05$), maintaining a level of good strength. During the examination 1 year after childbirth, women in CG according to the digital value of the result of perineometry reached the lower limit of good perineal muscular strength, improving the overall result relative to baseline at 21.7%, not significantly different in MG1 women ($p > 0.05$). MG1 parameters improved at 15.5%, MG2 – at 16.5% (a level of strong perineal muscle contraction and statistically significant improvement was achieved relative to the results of CG and MG1, $p < 0.05$).

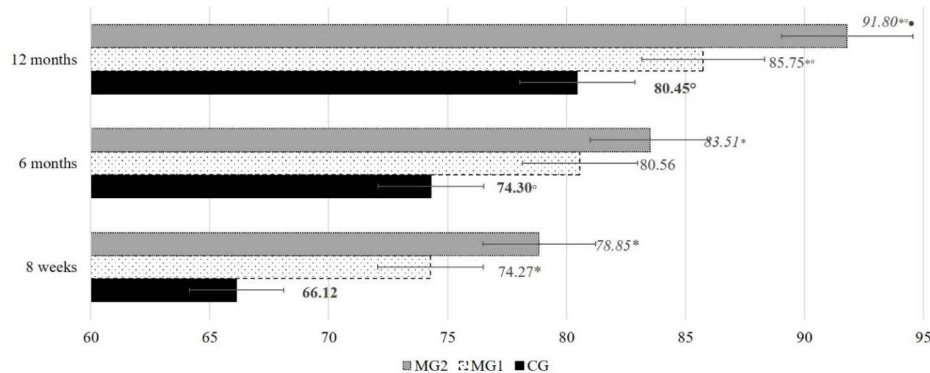


Fig. 2. Dynamics of parameters of perineal muscular strength in women in the postpartum period according to the results of perineometry, mm Hg. Notes: *– $p < 0.05$ – level of reliability of changes between the indicators of the CG and the MG; °– $p < 0.05$ – level of reliability of changes in the indicators between the relevant parameters relative to the previous study; ●– $p < 0.05$ – level of reliability of changes between the indicators of the MG1 and the MG2.

When analyzing the scales that characterize the presence and severity of signs associated with pelvic floor muscle weakness, the first examination in all groups of women revealed the symptoms associated with pelvic prolapse, urinary and fecal incontinence according to PFDI-20 (Table 1). The most severe changes were characterized by women who gave birth naturally ($p < 0.05$ relative to the parameters in MG1 and MG2), who received stretching of the perineal tissues during childbirth; the most pronounced changes were according to the POPDI-6 and UDI-6 subscales. The early onset of reconstructive intervention showed the advantages of the developed program against the background of relatively preserved perineal tissues in women of MG2 – their condition was characterized by a statistically significantly better condition according to all studied subscales regarding the CG and MG1. Six months after the childbirth, the CG women according to the POPDI-6 and CRADI-8 subscales reached the MG1 parameters, lagging behind them in the UDI-6 level. The advantage over other groups in MG2 women ($p < 0.05$) was kept. One year after the childbirth, women who gave birth naturally and those who recovered on their own after CS grade up to each other according to the prevalence and severity of subjective signs of PFD. Representatives of MG2 showed the best result according to all subscales of PFDI-20 ($p < 0.05$) – in this group only isolated symptoms of disorders were found. The total improvement according to all components of PFDI-20 after 6 months after the childbirth in CG was 40.1%, MG1 – was 39.6%, MG2 – was 66.5%; after 12 months – respectively – 86.7%, 85.8%, 90.4%.

Table 1. Dynamics of PFDI-20 questionnaire results in women in the postpartum period

Blocks of questions, average score	CG (n=47)			MG1 (n=32)			MG2 (n=33)		
	8 weeks	6 months	12 months	8 weeks	6 months	12 months	8 weeks	6 months	12 months
POPDI-6	1.16±0.11	0.63±0.05°	0.13±0.06°	0.85±*0.05	0.58±0.06°	0.11±0.03°	0.72±0.04* ●	0.24±0.05* °	0.05±0.02* °
CRADI-8	0.93±0.05	0.60±0.10°	0.11±0.05°	1.04±0.03*	0.56±0.07°	0.14±0.06°	0.62±0.06* ●	0.20±0.05* °	0.07±0.04* °
UDI-6	1.33±0.09	0.85±0.08°	0.22±0.07°	1.17±0.06*	0.69±0.05*	0.19±0.04°	1.04±0.05* ●	0.36±0.04* °	0.10±0.03* °
Total	3.47±0.13	2.08±0.15°	0.46±0.09°	3.03±0.10*	1.83±0.12* °	0.43±0.08°	2.39±0.09* ●	0.80±0.09* °	0.23±0.05* °

Notes: * – $p < 0.05$ – statistically significant difference between the corresponding parameters of CG and MG;
° – $p < 0.05$ – statistically significant difference between the corresponding parameters relative to the previous study;
● – $p < 0.05$ – statistically significant difference between the corresponding parameters of MG1 and MG2

Determination of the dynamics of the impact of PFD-related symptoms on the daily activity, social and emotional spheres of women according to PFIQ-7 revealed the following patterns (Table 2). CG women showed the highest level of influence on all types of activities compared to other groups, especially according to the CARDI-7 subscale ($p < 0.05$), which was apparently due to their highest prevalence and intensity determined according to PFDI-20. Accordingly, the impact of dysfunction symptoms on all types of MG2 female activity characterized the lowest influence (due to the lower prevalence). During the re-examination, physiological recovery reduced the manifestations of pelvic floor muscular dysfunction – women in CG and MG1 noted the same effect on different aspects of their lives ($p > 0.05$), which was maintained during the final examination. Representatives of MG2 maintained the advantage also in this study and a year after childbirth according to all subscales PFIQ-7. The total improvement according to all components of PFIQ-7 after 6 months after the childbirth in CG was 38.5%, MG1 – was 32.1%, MG2 – was 64.2%; after 12 months – respectively – 70.6%, 65.7%, 90.9%.

Table 2. Dynamics of PFIQ-7 questionnaire results in postpartum women

Blocks of questions, average score	CG (n=47)			MG1 (n=32)			MG2 (n=33)		
	8 weeks	6 months	12 months	8 weeks	6 months	12 months	8 weeks	6 months	12 months
UIQ-7	1.52±0.07	0.99±0.08°	0.37±0.05°	1.37±0.06*	1.04±0.05°	0.41±0.05°	1.22±0.06* ●	0.48±0.03* °	0.08±0.02* °
CARDI-7	1.76±0.06	1.03±0.06°	0.61±0.07°	1.61±0.05*	0.95±0.07°	0.57±0.05°	1.49±0.05* ●	0.52±0.05* °	0.15±0.03* °
POPIQ-7	1.46±0.10	0.89±0.11°	0.41±0.05°	1.24±0.05*	0.86±0.08°	0.46±0.07°	1.14±0.03* ●	0.38±0.04* °	0.12±0.05* °
Total	4.73±0.12	2.91±0.12°	1.39±0.12°	4.2±0.11*	2.85±0.11°	1.44±0.11°	3.86±0.08* ●	1.38±0.09* °	0.35±0.08* °

Notes: * – $p < 0.05$ – statistically significant difference between the corresponding parameters of CG and MG;
° – $p < 0.05$ – statistically significant difference between the corresponding parameters relative to the previous study;
● – $p < 0.05$ – statistically significant difference between the corresponding parameters of MG1 and MG2

In the late postpartum period, sexual function was worst in women who gave birth naturally (Figure 3) – according to FSFI-19 they showed a statistically worse result ($p < 0.05$) compared to the women who had had CS (apparently due to incomplete structural-functional healing of the soft tissues of the perineum). During examination performed after 6 months after the childbirth, CG women although improved their result (20.5% compared to the first study), but in numerical terms they did not reach the parameters of MG1 (improved the result at 17.2%) and MG2 (an increase of 22.2%, was statistically significantly better than in other groups of women, $p < 0.05$). The results of the remote period after the childbirth (12 months) were characterized by a general tendency to improve sexual function: the increase relative to the first examination in women of CG was 62.4%, MG1 – was 25%, MG2 – was 33.2%. At the same time, the effectiveness of physical therapy means was reaffirmed, as it was the MG2 women who showed the best result among all groups ($p < 0.05$ relative to CG, MG1).

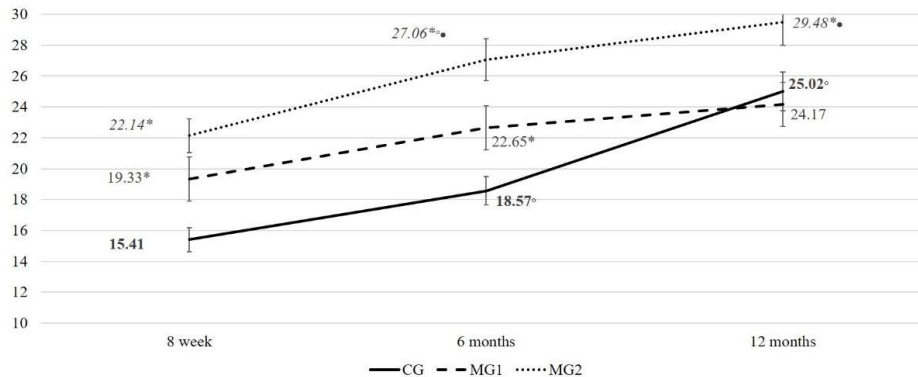


Figure 3. Dynamics of parameters of sexual function assessment in women in the postpartum period according to FSFI-19, points. Notes: * – $p < 0.05$ – level of reliability of changes between the indicators of the CG and the MG; ° – $p < 0.05$ – level of reliability of changes between the indicators of the relevant parameters relative to the previous survey; • – $p < 0.05$ – level of reliability of changes between the indicators of the MG1 and the MG2.

Discussion.

In obstetric-gynecological rehabilitation, the problem of correcting pelvic floor muscle dysfunction in women of reproductive age is the topical one (Deegan, Stothers, Kavanagh, Macnab, & 2018). Timely uncorrected pelvic prolapse leads to the necessity for surgical treatment, the imperfection of whose techniques causes a significant recurrence rate (Cattani, Neefs, Verbakel, & al., 2021). Therefore, early diagnosis and conservative correction of this syndrome are important – before the onset of complications and indications for surgical treatment.

The main etiological factors that provoke the development of pelvic floor muscular dysfunction in women of reproductive age are pregnancy, childbirth and related birth injuries (Zuchelo, Santos, Dos Santos Figueiredo, & al., 2018; Barca, Bravo, Pintado -Recarte, & al., 2021).

Most studies related to the prevention of PFD and the treatment of pre-existing pathology have been performed in women older than 45 years (Doaee, Moradi-Lakeh, Nourmohammadi, & al., 2014; Jacomo, Nascimento, Lucena da Siva, & al., 2020). At the same time, insufficient attention is paid to the methods of early postpartum recovery and their effectiveness in remote periods of postpartum rehabilitation (Thubert, Vinchant, Vieillefosse, & al., 2016; Woodley, Lawrenson, Boyle, & al., 2020).

In the postpartum period (regardless of the childbirth type – natural or abdominal one) in women the residual postural disorders caused by hormones softening of connective tissue proteins, damage to the soft tissues of the pelvic floor and, in Cesarean section – abdominal muscles, which determines the specificity of their motor stereotype, are found (Borg-Stein, & Dugan, 2007; Kuravska, 2021). At the same time, lifestyle transformations such as global changes in physical and mental stereotypes actually slow down tissue healing in the absence of the possibility of gentle recovery and cause chronicity of pre-existing conditions or those that first arose during pregnancy. Therefore, a woman after childbirth needs the most careful preventive-corrective intervention, as the symptoms of pelvic dysfunction can significantly impair quality of life, adversely affect performance and general somatic condition, as well as create a negative mood about further pregnancy planning due to potential deterioration and progression of clinical symptoms. Therefore, the correction of PFD symptoms in women in the postpartum period is an urgent issue of rehabilitation practice and, in particular, physical therapy, the solution of which will not only improve womens' lives during the program, but also reduce the likelihood and severity of pelvic prolapse and sexual dysfunction in the future (Kahyaoglu, & Balkanli, 2016; Igwesi-Chidobe, Emmanuel, & Okezue, 2021). It is the means of physical therapy that is the safest physiological method of restoring motor and other functions impaired due to numerous diseases, injuries, etc. (Lazareva, Aravitska, Andrieieva, & al., 2017; Byrchak, Duma, & Aravitska, 2020; Churpiy, Churpiy, Churpiy, & al., 2021).

The presence of a postoperative scar in women who have had an abdominal delivery, introduce changes in the postpartum period in the form of a specific restriction of mobility at the time of its formation. This aspect is all the more important from the standpoint of future pregnancies, which requires the formation of a full-fledged elastic strong scar on the uterus and soft tissues (Di Giovanni, Garzarella, Di Martino, & al., 2018; The Lancet, 2018). After all, in the postpartum period, due to the necessity for care and feeding of the baby, changes in sleep mode and rest pattern, further increases the metabolic, physical, psycho-emotional load, which puts pressure on the adaptive capacity of regulatory systems of the woman's body against the background of restructuring and restoration of structural and hormonal components.

The results obtained in our study confirm the relevance of rehabilitation of women not only in the early and late postpartum periods, but also for a fairly long period of time, which is associated with the increased stress on the women's body (Thubert, Vinchant, Vieillefosse, & al., 2016). We have also shown that the early onset of restorative intervention after childbirth leads to a rapid effect from the standpoint of improving vital functions by the end of the postpartum period, maintaining its relevance for a long time after childbirth. We believe that it is advisable to perform a program of physical therapy with the adaptation of therapeutic exercises to the usual household movements through functional training, which increases women's compliance and promotes better following to the given recommendations.

In the postpartum period, sexual dysfunction can be caused by psycho-emotional discomfort, changes in body shape, inability to mentally and physically relax, feeling unattractive due to changes in body shape, postpartum depression (Verbeek, Hayward, & 2019). Therefore, the improvement of sexual function (against the background of normalization of pelvic muscle tissues) can also be explained by the improvement of the general physical status of women, flexibility, motor control under the influence of physical therapy, which we covered in previous works (Kuravska, 2021). Improvement of physical qualities can also lead to an improvement in psycho-emotional state, which is manifested in the improvement of sexual function. We consider the improvement of pelvic functions to be the result not only of a block of special exercises in the physical therapy program. It can also be associated with the elimination of back pain determined by us, which is a predictor of pelvic pain and deterioration of pelvic functions (van Benten, Pool, Mens, & Pool-Goudzwaard, 2014; Kuravska, 2021).

Conclusions

1. Women after childbirth, regardless of the type of delivery, there is a high risk of new and prolonged signs of pre-existing signs of pelvic floor muscle dysfunction.
2. In the postpartum period, pelvic floor muscle dysfunction in women is manifested in the form of decreased tone (according to the results of palpation), strength (according to perineometry), the presence of a number of pathological signs of their weakness (according to PFDI-20), the negative impact on everyday life activity, social and emotional spheres (defined according to PFIQ-7), deterioration of sexual satisfaction (according to FSFI-19).
3. The use of physical therapy means allowed women after 6 months after CS statistically significantly ($p < 0.05$) improve the results of all studied parameters in comparison with women who gave birth naturally; according to the results of determining the tone mm. levator ani, PFDI-20, PFIQ-7, FSFI-19 – with those who recovered after CS independently. Performance of a program of physical therapy with the use of special exercises to correct pelvic floor muscle dysfunction one year after childbirth allowed us to achieve a statistically significant improvement in the condition of MG2 women according to all studied indices regarding the representatives of MG1 and CG.
4. Physical therapy means should be administered from the first day of postpartum rehabilitation in order to reduce the intensity of signs of pelvic floor dysfunction and prevent pelvic organs prolapse, which threatens psycho-emotional disorders, disability, reduced quality of life, i.e., for faster postpartum recovery and return to full life.

Conflict of interest

Authors state no conflict of interest.

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