INFLUENCE OF PHYSIOTHERAPY ON RECOVERY IN A PATIENT WITH RECTUS ABDOMINIS MUSCLE ENDOMETRIOSIS IN THE LATE POSTOPERATIVE PERIOD (CLINICAL CASE)

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ABSTRACT
Introduction: Endometriosis is a gynecological disease, although sometimes it affects the abdominal wall (AWE). This is a rare form of extra-pelvic endometriosis that attaches to a surgical incision, such as a cesarean section. The aim of the study was to follow the effect of late postoperative physiotherapy on recovery in a 34-year-old female patient with endometriosis of the rectus abdominis muscle as a result of a C-section scar. Methods: To assess the effect of the applied physiotherapy program, we used a curl–up test, the SF-36 Quality of Life (QoL) assessment, and the Post-discharge Surgical Recovery (PSR) scale on the first home day after the hospital stay and at the end of the 3rd month. Physiotherapy methods: We instructed the patient to perform abdominal, pelvic, and back exercises that improve posture. Abdominal massage and beauty ergon were applied to the postoperative scar to prevent adhesions. Walking time and distance were increased each week. At the end of the third month of the physiotherapy program, folk dance movements were also included, as the patient was a dancer. Results: The results of the study showed a good recovery 3 months after discharge from the hospital. The patient had good abdominal muscle function, no postoperative pain, and an overall improved quality of life. Conclusion: The presented physiotherapy program in a patient with endometriosis of the rectus abdominis muscle prevented late postoperative complications. Physiotherapy is an important part of a patient's post-surgical care and supports optimal recovery, especially in patients of childbearing age.

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Cite this article as:
Gencheva, N. (2025). Influence of physiotherapy on recovery in a patient with rectus abdominis muscle endometriosis in the late postoperative period (clinical case). *Proceeding book of the 4th International Scientific Congress "Applied Sports Sciences", 2025, Sofia.* pp. 285 - 290. https://doi.org/10.37393/ICASS2025/44

Keywords: *exercises, abdominal wall, abdominal surgery, abdominal muscles, quality of life*

INTRODUCTION

Endometriosis is a chronic estrogen-dependent gynecological disease (Stull et al., 2014; Vimee et al., 2023). It affects 10 to 15% of women of reproductive age and is defined as the presence and proliferation of endometrial tissue in atypical locations like the peritoneal cavity, ovaries, abdominal organs, bladder, etc. Patients complain of a lump in the abdomen without a prior gynecological history (Hashim, Shami, 2001; Yang et al., 2004; Yang, Zhang, 2023). Women with endometriosis have a reduced quality of life due to chronic pelvic pain and reduced fertility (Barbara et al., 2021; Takeuchi et al., 2024). According to more recent studies, the causes of the disease may involve genetic, endocrine, inflammatory, immunological, and angiogenic factors (Takeuchi et al., 2024). Abdominal wall endometriosis is a rarer form of extrapelvic localization of the disease. It can develop after a cesarean section or gynecological surgery (Sunita et al., 2013; Thanasa et al., 2022; Turčić et al., 2025). Cesarean section endometriosis can be caused by iatrogenic deposition of endometrial cells, glands, and stroma at any time during the surgical procedure, leading to chronic pain (Mishra et al., 2013; Ananias et al., 2021). There are very few scientific reports about endometriosis affecting the rectus abdominis muscle. Ananias et al. (2021), in a systematic review, identified only 103 patients with abdominal wall endometriosis. Thanasa et al. (2022) present a case report of isolated endometriosis of the m.rectus abdominis in a 46-year-old patient with a previous cesarean section. Another report (Ozkan et al., 2014) presents a 31-year-old woman with a history of two cesarean sections. A painful mass was found in the left lateral aspect of the Pfannenstiel incision, which had been continuously enlarging. In most cases, treatment is surgical. Complete removal of the lesion often re-

quires fascial excision (Gunes et al., 2005). Physiotherapy for endometriosis is applied both in the preoperative preparation of patients, as well as in early and late postoperative recovery. The goal of preoperative and postoperative physiotherapy is to prevent early and short-term complications from the cardiovascular and respiratory systems, thrombosis, adhesions, etc., and to improve the quality of life. Physical exercise has a protective effect against anti-inflammatory and antioxidant cytokines and reduces the possibility of endometrial cell proliferation (Wójcik et al., 2022). The effectiveness of motor activity during the early and late postoperative periods in abdominal surgery has been proven. (Moriello, 2008; Khoury et al., 2014; Gencheva, 2015; Onerup et al., 2017; Gencheva, 2022). Unfortunately, the literature on the use of physiotherapy in patients with endometriosis of the rectus abdominis muscle is very limited, and we did not find sufficient data on the application of a physiotherapy program in endometriosis, including dosage, intensity, and types of exercises, in the postoperative period.

The aim of the study was to follow the effect of late postoperative physiotherapy on recovery in a 34-year-old female patient with endometriosis of the rectus abdominis muscle as a result of a C-section scar.

METHODS

A 34-year-old woman with a history of one cesarean section reported a painful lump on the left lateral side of the cesarean section that had continued to grow for 4 years. The complaints worsened during the menstrual cycle. After a detailed history and physical examination of the patient, an ultrasonography was performed, which showed a hypoechoic nodular substance near the rectus abdominis muscle. There were no gynecological changes. Computed tomography (CT) revealed a soft tissue formation on the anterior wall of the rectus abdominis muscle. During the surgical intervention, a defect of the rectus abdominis fascia was discovered with a dense formation measuring 4 cm with unclear boundaries, which was excised. Histological examination after the operation confirmed the diagnosis of endometrial glands and stroma in endometriosis. The patient underwent a 5-day physiotherapy program in the early postoperative period, thanks to which she was quickly mobilized and discharged from the hospital without complications. The patient has signed an informed consent to participate in the study.

Research methods

After the patient was discharged from the hospital and the surgical sutures were removed, and at the end of the third month, we applied an *abdominal functional assessment, Quality of Life (QoL) assessment, and the Scale of Post-discharge Surgical Recovery (PSR).*

We performed a functional assessment of the abdominal muscles using ***the curl-up test***. This is a standardized, objective measure of abdominal muscular endurance. Its results are quantitative (number of repetitions) and can be statistically analyzed to assess changes in core strength and function. It is performed on a mat. During the test, only a partial sit-up is required; the iliopsoas (the strongest hip flexor) does not participate in the movement.

We assessed quality of life using the 36-Item Short Form Survey Instrument (SF-36). The SF-36 does not provide a diagnosis, but a functional profile. Includes the following subscales: *Physical Functioning (PF)*-Limitations in physical activities because of health problems; *Role Physical (RP)*-Limitations in usual role activities because of physical health problems; *Role Emotional (RE)*-Limitations in social activities because of physical or emotional problems; Energy/Fatigue (VT); Emotional Well-being(psychological distress and well-being); (MH); General mental health (psychological distress and well-being); Social Functioning (SF); Pain (BP) General Health (GH).*Value Interpretation*: 85–100 (Excellent functioning); 70–84 (Good health); 50–69 (Moderate limitations); 30–49 (Significant health problems); <30 (Severe difficulty/distress). Scores for the different domains are converted and pooled using a scoring key.

The Post-discharge Surgical Recovery (PSR) scale was developed to measure at-home postoperative recovery, and is a self-assessment of recovery in a target population of patients discharged from the day surgery unit. The PSR scale comprises 15 items rated on a ten-point semantic differential scale. For computation of the actual PSR score, the sum score is divided by the total possible scale score and multiplied by 100, resulting in a score range of 10 to 100 with higher scores indicating better recovery (Materazzi et al., 2007). PCR was designed to evaluate various aspects of recovery, as functional limitations, health status, and pain; activity; fatigue; work ability; and expectations, represented in the 15-item 10-point semantic differential scale.

Physiotherapy in the late postoperative period

for patients with endometriosis is a complex therapy (Wójcik et al., 2022). Our patient underwent physiotherapy before surgery and early postoperative physiotherapy (a total of 5 days) in an abdominal surgery clinic**.** She stood up 3 hours after surgery and immediately started walking training to prevent early complications (Gencheva, 2024). The physiotherapy program for patients aimed to restore muscles in the abdominal and pelvic areas, eliminate pelvic pain, prevent adhesions, and improve the woman's overall self-esteem and quality of life. The applied physiotherapy in the early post-clinical period was still protective, as gradual activation of the abdominal muscles from a relaxed starting position to an increasing load, and active participation of the diaphragm in the breathing act**.** Stretching exercises are also important, but should be performed until the patient feels a stretch, not a strain that would lead to discomfort. We instructed the patient to perform abdominal, pelvic, and back exercises that improve posture. Instructions were given on how to lift objects up to 5 kilograms between 2 and 4 weeks after surgery, as well as wearing a seat belt during the heaviest loads. The curl-up exercise targets abdominal endurance, which is important for back support and core stability. A month and a half after the surgery, we gradually included manual massage (Marinova, 2019) and instrument-assisted soft tissue mobilization using the Beauty Ergon IASTM (Instrument Assisted Soft Tissue Mobilization) technique to prevent postoperative adhesions and improve the elasticity of scar tissue. Ergon stimulates anabolic processes in connective tissue (collagen fibers), reduces pain, and restores elasticity of connective and muscle tissue (Tasheva, 2019; Nadeem, 2023). Walking time and distance increased each week, and at the end of the period, the patient was able to walk 5-6 km daily at a moderate to fast pace. We trained the patient to perform daily activities correctly without overloading the operated muscles. At the end of the third month of the physiotherapy program, folk dance movements were also included, because the patient is a dancer.

RESULTS

The functional assessment of abdominal muscles with the **Curl Up Test** showed strengthening of the abdominal muscles at the end of the three-month study period. The Curl Up exercises work on the endurance of the abdominal muscles, which is important for back support and torso stability. After discharge from the hospital, the patient performed exercises involving the abdominal muscles, but from a relaxed starting position, with slightly raised lower limbs, due to sparing the postoperative wound and the presence of postoperative pain. One month after the surgery, exercises with greater intra-abdominal pressure were included. The first Curl Up assessment with arms folded was done a month and a half after surgery. The patient could perform 11 anti-gravity body lifts and, at the end of the research period, 50 lifts— five times more.

The psychometric **recovery assessment questionnaire (PSR)** was completed personally by the patient on the 15th postoperative day and at the end of the study. The postoperative recovery result on the PSR scale is 60% (0–100%) after the second week. It is higher than the average cases according to the literature data. After 12 weeks, PSR shows 90%. Positive changes are found in all five subscales: health status; activity; fatigue; work capacity; and expectations, which may be an indicator of good effectiveness of the rehabilitation physiotherapy program (Table 1).

Table 1. *Changes of the PSR scale*

Testing	PSR%	PSR% % (average values according to literature data)
2 weeks after surgery	60	55
12 weeks after surgery	90	85

The patient completed the questionnaire SF-36 two weeks after surgery, and the results show the following: The patient had moderate limitations in her physical fitness; significant difficulty in usual role activities and social activities due to a physical health or emotional problem, and a medium energy level. Postoperative pain has decreased after removal of surgical sutures, but was still moderate, frequency of anxiety and/or depression; restrictions in social life due to health; average self-rated health (Table 2).

Table 2. *Changes in quality of life indicators from the test SF-36*

Subscale	2 weeks after surgery	12 weeks after surgery	Min. important difference (MID)	Change	Exceeds MID
Physical Functioning	49	78	5	+29	Yes
Role Physical	25	74	10	+48	Yes
Role Emotional	27	85	8	+58	Yes
Vitality/Energy	55	69	5	+14	Yes
Pain	40	73	10	+33	Yes
Emotional Well-being	62	85	8	+23	Yes
Social Functional	68	82	7	+14	Yes
General Health	51	75	5	+24	Yes

The patient was in acceptable physical condition, but pain and physical and some psychological limitations seriously affect her daily functioning. That's why she needed rehabilitation, pain relief, and social support. At the end of the study, all subscales show changes above the minimal important difference (MID), with the greatest improvement in Role Physical, Role Emotional, and Pain. MID was identified by Stull et al. (2014) in patients with endometriosis (Table 2).

DISCUSSION

In this study, we present a case of a patient who underwent surgery for a rare case of rectus abdominis endometriosis. Given the limited number of studies in the literature examining physiotherapy after surgical treatment of abdominal wall endometriosis, our case contributes new clinical insights in this field. The lack of evidence limits the ability to make direct comparisons with similar cases, but it also highlights the importance of analyzing and sharing unique clinical experiences such as ours. What is certain is that recovery after this type of abdominal surgery can take several weeks. Postoperative recovery can serve as an indicator for monitoring the effects of various therapeutic methods and clinical studies. Therefore, we chose to use the Post-Discharge Surgical Recovery (PSR) Scale developed by Kleinbeck (2000) as appropriate in our case. The 30% increase significantly exceeds the minimal important difference (MID = 5–10%) reported by Stull (2014). In a cohort study by Allvin et al. (2007), the average PSR score at week 6 post-surgery was 80%, with a range from 60–88%. Our results indicate accelerated, nearly complete perceived recovery, which exceeds typical postoperative benchmarks.

The main goal of rehabilitation after abdominal surgery is to restore the strength and functional control of the abdominal muscles. In our case, this is of utmost importance because the rectus abdominis fascia was affected, which can quickly lead to muscle weakness and potential long-term consequences, such as reduced stability, altered posture, and impaired trunk function. We did not find any scientific articles or systematic reviews that directly examined the use of Ergon IASTM after abdominal surgery (e.g., after laparotomy or laparoscopy). However, we think that the role of specific abdominal wall exercises and manual techniques (ERGON and massage) has minimized postoperative adhesions, thereby helping reduce pain and dysfunction of the rectus abdominis fascia. Through this structured abdominal wall strengthening program, the patient achieved a fivefold improvement in his performance on the contraction test, a widely used measure of abdominal endurance. These results are consistent with data from studies in postpartum populations and patients with musculoskeletal dysfunction. For example, Gluppe et al. (2023) reported increases in abdominal strength in postpartum women following curl-up-based training. Similarly, Daraï et al. (2017) in their study found that osteopathy and massage improve quality of life (QoL) by reducing endometriosis symptoms in patients with colorectal endometriosis. These parallels suggest that similar mechanisms of functional adaptation may be at work in patients recovering from rectus abdominis endometriosis surgery.

We agree with the conclusion of Haraldstad et al. (2019) that Quality of Life (QoL) is an important concept in the field of health and medicine. The patient demonstrated significant improvements in all eight domains of the SF-36 quality-of-life questionnaire. Our findings are consistent with those of Barbara et al. (2021), who reported improved quality of life in women with endometriosis after hormonal treatment. Additionally, Stull (2014) and Facchin et al. (2017) found strong correlations between endometriosis-related pelvic pain and mental health impairment. The patient in our case reported improved vitality, reduced pain, enhanced emotional well-being, and improved physical

function — all of which contributed to a complete recovery.

CONCLUSION

The application of physiotherapy is an important part of a patient's post-surgical care and helps with optimal recovery, especially in patients of childbearing age. The presented physiotherapy program, in a patient with endometriosis of the rectus abdominis muscle, helped her complete her recovery 3 months after the operation. The study also found a beneficial effect on the patient's quality of life. More research data is needed to establish standards for physiotherapy in the postsurgical period in patients with endometriosis in complicated cases, such as the one presented in the study.

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Design: Slavka Asenova, Svetla Kostova
Publisher: Scientific Publishing House NSA Press
ISBN (Online): 978-954-718-803-7