

## PHYSIOTHERAPY AND THERAPEUTIC HORSE RIDING FOR COLON CANCER IN THE LATE POSTOPERATIVE PERIOD - A CASE REPORT

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**Nezabravka Gencheva**

*Department of Kinesitherapy and Rehabilitation  
National Sports Academy „V. Levski“ - Sofia, Bulgaria*

### Abstract

*Physical activity is an essential part of colorectal cancer prevention and treatment. The study aims to investigate the impact of late postoperative Physiotherapy with a combination of Therapeutic horseback riding on the functional and emotional recovery of a 57-year-old colon cancer patient. Research methods: we applied the SF-8 Health Survey, 6 min walk test, Cumulated Ambulation, Score, and Bertoti balance test. Special physical therapy and therapeutic riding are used to improve respiratory function, strengthen weakened abdominal, back, and gluteal muscles, balance, and coordination, reduce pain, and restore mobility by training in pain-free sitting, standing, and walking, as well as positive emotional impact. Results: The results show a significant improvement in the investigated indicators and a good quality of recovery.*

**Keywords:** *colorectal cancer, physiotherapy, therapeutic horse riding, muscle functional recovery*

### INTRODUCTION

Colorectal carcinoma (CRC) is a widespread socially significant disease that poses serious problems in the field of prevention, diagnosis, and treatment. CRC is characterized by high frequency, high death rate, detection in a relatively late stage of the disease, and expensive treatment. Colorectal cancer (CRC) is the third most common cancer worldwide, accounting for 1.8 million new cases in 2018 (Rawla et al., 2019). According to data from GLOBOCAN 2020, the lack of physical activity ranks with the same weight among other etiological factors causing cancer such as stress, smoking, high body mass index, excessive alcohol consumption, and inappropriate diet. Physical activity is an essential part of prevention against the development of cancer. For example, a study by Vainio et al. (2002) showed that physical activity can prevent about 15% of colon cancer. Similar are the studies of Behrens et al. (2013) and Boyle et al. (2012). Physiotherapy helps throughout all periods and stages of treatment. The research shows better results if preoperative home physiotherapy is applied under the supervision of a specialist, which will also be included in the postoperative period (Mayo et al. 2011, Onerup et al. 2017, Wong, Lee, Chang, 2016.). There was

a lack of a multidisciplinary approach to the treatment of cancer, and until recently physiotherapy was often neglected in Bulgaria. The lack of specialized physiotherapy in the early and late postoperative periods in abdominal operations increases the risk of postoperative complications, delays recovery, and may prolong hospital stay (Gencheva, 2015, Parashkevova, 2015, Oruç, Kaplan, 2019). In 2021, Bulgaria created a National Plan to fight cancer until 2027, in which physiotherapy treatment is included as a mandatory part of medical rehabilitation. The document was adopted by Decision No. 3 of the Council of Ministers on 04.01.2023 ([www.nsi.bg](http://www.nsi.bg)).

The aim of physiotherapy is a full functional recovery and prevention of cancer recurrence in patients who are evaluated to be able to functionally reintegrate into society. In patients with noticeable deficits as a result of the illness caused by metastatic disease, the goal of physical therapy is to maintain functional independence and a better quality of life. When the patient is in a terminal stage, physiotherapy is palliative to ensure maximum patient comfort (Gencheva, 2022).

### RESEARCH METHODOLOGY

The purpose of the study was to follow the effect of a specialized physiotherapy program combined with therapeutic riding in a patient with colon carcinoma in the late postoperative period. The subject of the study is a 57-year-old patient who underwent surgery for stage 3 colon carcinoma. The diagnosis was confirmed after a colonoscopy and biopsy. A median laparotomy was performed under general anesthesia and a right hemicolectomy. Before the operation, no concomitant diseases

were detected, but the condition was satisfactory. The early recovery period went smoothly, without complications, which was helped by daily specialized kinesitherapy. The patient was discharged after one week, and the sutures were removed on day 13. After removal of the sutures, the patient continues with kinesitherapy in the late postoperative period lasting 3 months at home. Two months after the operation, therapeutic riding is included for 1 month.

### Research methods:

1. **SF-8 Health Survey.** The questionnaire is the easiest to apply and at the same time sufficiently informative with a high degree of reliability (0.90) (Vileikyte, L., Peyrot, M., et al. 2003) It assesses different aspects of physical and mental health status.

2. **6-minute walk test.** (Awdeh et al.2015). The instrumentation is easy to implement, does not require complex equipment, and can be performed both in hospital and ambulatory conditions. The patient walks for 6 minutes and the distance covered is recorded. The test was conducted 14, 30, and 60 days after the operation. For comparison, the data from the early postoperative period on day 1 and day 7 are also presented.

3. **Cumulated Ambulation Score (CAS)** (Bravini et al.2018). It describes the patient's independence in transfers (lying down and

getting out of bed, sitting and standing up from a chair, and walking) Each activity is evaluated on a three-point scale from 0-2 (0 = cannot, despite assistance and verbal prompts, 1 = performs with assistance and/or verbal prompts from one or more people, 2- works safely, without human assistance or verbal prompts Use of a walking aid is permitted). The daily total CAS score ranges from 0 to 6. The scale was also applied in the early postoperative period.

4. **Riding balance test** (Bertoti 1988). It assesses the postural reactivity during riding through 5 areas - head and neck position, shoulders and shoulder blades, torso, spine, and pelvis. The scoring is from 0 to 3 points, as max. number of points is 15.

### Physiotherapy program

Physiotherapy in the late postoperative period in abdominal operations leads to overcoming late postoperative complications, restoring the impaired function of the gastrointestinal tract, improving physical performance, and overcoming the adverse consequences of the operation and the disease on the psycho-emotional status of the patients (Gencheva, 2015). Our physiotherapy program consisted of breathing exercises; exercises to strengthen the hypotonic abdominal, dorsal, and gluteal muscles; special exercises to improve balance and coordination using the large inflatable therapy balls; massage techniques to reduce pain and treat the surgical cicatrix (after a month and a half of the operation); exercises to correct the posture, exercises to restore the general mobility of the patient through training in painless transfers - sitting, standing and walking;

incorporating a variety of activities of daily living and 30 minutes of daily aerobic exercise - walking or cycling.

Two months after surgery, we supplemented the patient's program with a one-month cycle of 12 therapeutic riding sessions, three times a week with each session lasting 30 min. In the therapeutic riding sessions, the presence of a caregiver was not required due to the patient's riding skills, but at the beginning of the course of treatment he needed assistance with some of the exercises due to the presence of pain, limitations from the operative cicatrix and weakened postural musculature. Figures 1. to 5. present exercises on the horse's back in place and gait. The exercises are aimed at improving the patient's balance reactions (Fig. 1.,4., 6.), at correcting the posture (Fig. 5.), and at stretching shortened muscles and operative cicatrix, (Fig. 2. and 3.).



*Fig.1.: Therapeutic riding, exercise for upper limbs, and postural activity*

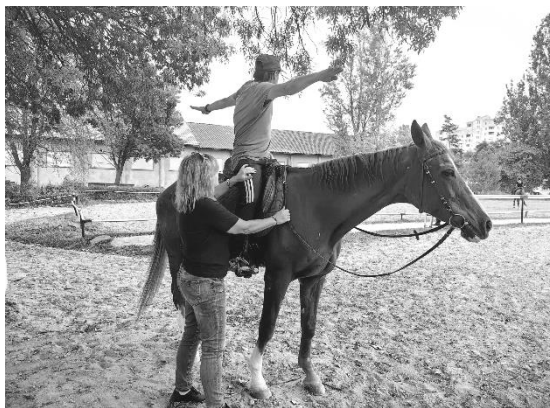


Fig. 2. & Fig. 3.: Therapeutic riding, exercises in place to improve the mobility of the spine mobility and stretching of the operative cicatrix



Fig. 4. & Fig. 5.: Therapeutic riding, exercises without assistance

**RESULTS**

The 6MWT is a simple cardiopulmonary fitness assessment tool. We applied it to assess the walking ability in the postoperative period similar to a study by Moriello et al. (2008). We measured the distance traveled in 6 minutes on the 14th postoperative day, at the end of the first month, and 2 months after

the operation. The test was also applied in clinical settings on the 2nd and 7th postoperative days (Fig. 6.). The results at the end of the second month were within the age norm. The patient completely recovered his ability to walk, without limiting factors caused by the operation

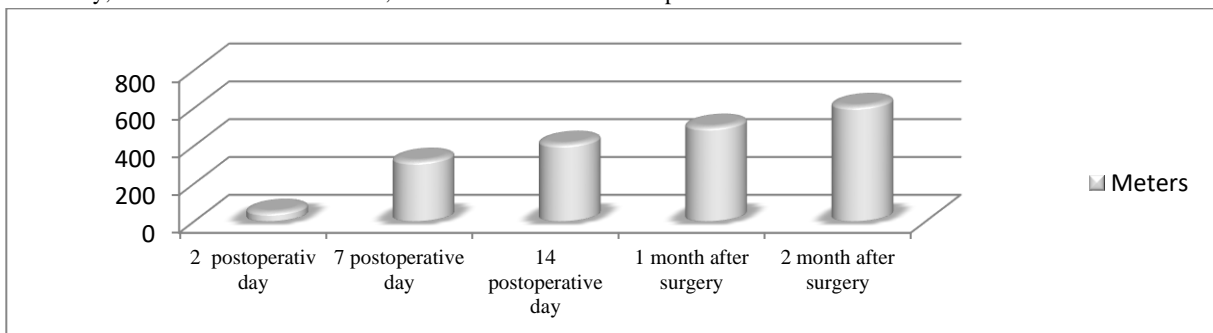


Fig. 6: Changes in the six-minute test in the early and late postoperative period

**CAS Cumulated Ambulation Score – A Danish measure of mobility**

The evaluation of the patient's independence in transfers - three activities (lying down and getting out of bed, sitting and standing up from a chair, and walking), compared to the early postoperative period, shows a full functional recovery in terms of moving in space, without the presence of external verbal and

physical help. This is related to the improvement of the postural musculature and especially of the abdominal musculature, which was in insufficiency after the operation. (Bravini, Sartorio, et al. 2018), and the ability to walk independently was restored at the end of the early postoperative period (Table 1.).

Table 1: Changes in the Cumulated Ambulation Score from the 2nd postoperative day to the end of the second month

Activities	Day 2	Day 7	Day 14	Day 30	Day 60
Lying down and getting out of bed	1	1	1	2	2
Sitting and standing up from a chair	1	1	2	2	2
Walking	1	2	2	2	2

**Bertoti (1988) test results**

Horses are known to constantly demand from their riders’ adaptive responses to the movements of the horse's back. As a result, the riders improve their coordination, and postural reactivity and develop a better posture by training the trunk muscles (Gencheva, 2017). So far, therapeutic riding has not been applied after abdominal surgery and it was a serious challenge for us. However, we were facilitated by the fact that the patient had good

riding skills and achieved the highest Bertoti score in a very short period of one month (2 months after surgery). It will be a challenge in our next study to establish the impact of therapeutic riding on operated patients who did not previously possess these skills. Fig. 7 shows the changes from the Bertoti test positions for the 5 monitored areas: head and neck, shoulders and shoulder blades, spine, body, and pelvis.

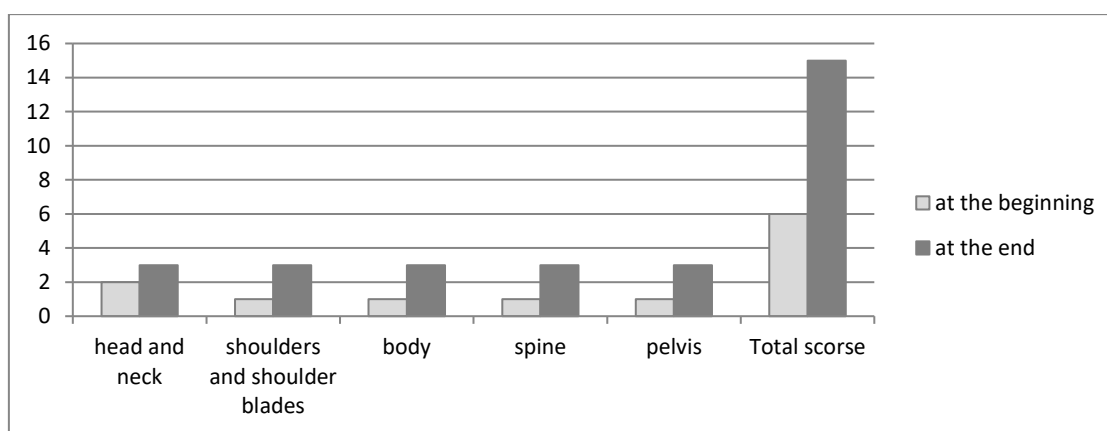


Fig.7: Changes in the Bertoti test at the beginning of the treatment course (8 weeks after surgery) and the end of the treatment course (12 weeks after surgery)

**SF-8 Health Survey questionnaire**

The results show a significant change in the psycho-physical status of the patient. Table 2 reflects his condition at the end of the first and third postoperative months. The patient has more

energy and fewer difficulties in daily life. We may note that despite the good results, there is still much to be desired in terms of the patient's emotional stability, physical health, and pain perception.

Table 2.: SF-8 Health Survey results at the end of 4 and 12 weeks after surgery

N	SF - 8 Questionnaire
1	Overall, how would you rate your health during the past 4 weeks? Excellent, Very good, <b>Good</b> , <u>Fair Poor</u> , Very poor
2	During the past 4 weeks, how much did physical health problems limit your usual physical activities (such as walking or climbing stairs)? Not at all, <b>Very little</b> , Somewhat, <u>Quite a lot</u> , Could not do physical activities
3	During the past 4 weeks, how much difficulty did you have doing your daily work, both at home and away from home, because of your physical health? None at all, <b>A little bit</b> , Some, <u>Quite a lot</u> , Could not do daily work
4	How much bodily pain have you had during the past 4 weeks? None, <b>Very mild</b> , Mild, <u>Moderate</u> , Severe, Very Severe
5	During the past 4 weeks, how much energy did you have? Very much, <b>Quite a lot</b> , Some, <u>A little</u> , None

6	<p><b>During the past 4 weeks, how much did your physical health or emotional problems limit your usual social activities with family or friends?</b></p> <p>Not at all, <b>Very little</b>, Somewhat, <u>Quite a lot</u>, Could not do social activities</p>
7	<p><b>During the past 4 weeks, how much have you been bothered by emotional problems (such as feeling anxious, depressed, or irritable)?</b></p> <p>Not at all, <b>Slightly</b>, Moderately, <u>Quite a lot</u>, Extremely</p>
8	<p><b>During the past 4 weeks, how much did personal or emotional problems keep you from doing your usual work, school, or other daily activities?</b></p> <p>Not at all, <b>Very little</b>, Somewhat, <u>Quite a lot</u>, Could not do daily activities</p>
<p>Legend: <u>At the end of the first month</u> <b>At the end of the third month</b></p>	

## DISCUSSION

In the present study, specialized physiotherapy combined with therapeutic riding was applied in the late postoperative period in a patient after colon cancer surgery. We also wanted to apply some tools for evaluating the effect of the implemented physiotherapy program, which has not yet been applied in Bulgaria for this type of patient. The selected test tasks evaluate both the functional capabilities and the mental status of the patient in the late postoperative period. The results show that there is an improvement in the quality of life of the patient compared to the early postoperative period. We believe that the rapid recovery of the patient is due to the combination of physiotherapeutic influence and therapeutic riding. In our opinion, training in walking and saturation of the physiotherapy program with aerobic exercises, exercises to strengthen the weakened postural muscles, the inclusion of massage for the treatment of surgical cicatrix, etc. have contributed significantly to improving general endurance, covering longer distances and recovering completely of self-movement in space. Numerous studies on the impact of therapeutic riding on the posture, balance reactions, coordination, and musculature of patients with various pathologies confirm this (Bertoti 1988, Land et al. 2002, Angoules et al. 2015). Filkova et al. (2022) recommend using a sports hammock to improve coordination and balance in operated patients which approximates the effect of therapeutic riding. In our patient, while riding, the lateral flexion to the right

was corrected, the midline head position was improved, the scapular retraction was reduced, the back was straightened and the symmetry of the whole torso was generally improved, and this was reflected in the final results of the test of Bertoti. Keeping the torso upright and resisting the four-plane rocking impulses is due to good motor control and a reduction of the negative influence of the postoperative cicatrix on maintaining the forward and lateral posture.

We believe that collaboration with the horse, riding outdoors, and meeting other riders improved the patient's social communication, reduced the anxious-depressive thoughts, and achieved a balance in the mental processes, which is evident from the results of the SF-8 Health Survey. Similar results have been found by two scientific teams (Valero et al. 2003 and Johnson et al., 2018). The first study reported a positive effect of therapeutic riding on the quality of life and resocialization of patients with multiple sclerosis, and the second found a reduction in PTSD symptoms and emotion regulation in soldiers.

The postoperative physical therapy intervention in this study was consistent with the protocol for physical activity in the late postoperative period in patients with open abdominal surgery, but it was further extended with more aerobic exercise and therapeutic riding training, and therefore it is innovative as an intervention in Bulgaria.

## CONCLUSION

Physiotherapy is an important part of post-operative care for any patient with colon cancer as it helps them recover optimally and prepares them for subsequent additional therapies such as chemotherapy, radiation therapy, and others. The inclusion of therapeutic riding in the rehabilitation program in the late postoperative period had a positive effect on our patient; therefore,

a large-scale study may be done in the future to evaluate the effect in a larger number of subjects. It is also a challenge to investigate the possibilities of implementing the rehabilitation program in patients who have started a course of chemotherapy and radiation therapy, which adversely affects the health status and self-esteem of the patients.

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**CORRESPONDENCE:**

Nezabravka Gencheva  
 Department Kinesitherapy and Rehabilitation  
 National Sports Academy „V. Levski“  
 Sofia, Bulgaria  
 E-mail: nezig@yahoo.com  
 ORCID: 0000-0002-1760-4228