

# Dynamics of the Level of Functioning of Patients After Laparoscopic Cholecystectomy in the Long-term Rehabilitation Period

## Dynamika poziomu funkcjonowania pacjentów po laparoskopowym usunięciu pęcherzyka żółciowego w okresie długotrwałej rehabilitacji

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Nataliya R. Golod<sup>1</sup>, Ljudmyla P. Rusyn<sup>2</sup>, Igor K. Churpiy<sup>1</sup>, Nataliia R. Zakaliak<sup>3</sup>, Volodymyr G. Saienko<sup>4</sup>, Kseniia P. Meleha<sup>2</sup>, Yuliya V. Dutkevych-Ivanska<sup>2</sup>

<sup>1</sup>Department of Physical Therapy and Occupational Therapy, Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine

<sup>2</sup>Department of Fundamentals of Medicine, Uzhhorod National University, Uzhhorod, Ukraine

<sup>3</sup>Department of Physical Therapy, Occupational Therapy, Drohobych Ivan Franko State Pedagogical University, Drohobych, Ukraine

<sup>4</sup>Department of Innovation Management, Academy of Management and Administration, Opole, Poland

### SUMMARY

**Aim:** to determine the dynamics of the level of functioning of patients after laparoscopic cholecystectomy in the long-term rehabilitation period.

**Materials and Methods:** 79 patients after laparoscopic cholecystectomy were included, double-blind survey on the presence of impairments in functioning, activity and participation using the ICF. Statistical methods: measurement of the median value (Me), upper and lower quartiles (25%; 75%). The Mann-Whitney U-test was used to compare independent samples; the Wilcoxon T-test was used for dependent samples.

**Results:** under the influence of rehabilitation, positive dynamics in the state of the gastrointestinal tract and the gait activity of patients of group A were revealed after the implementation using a biomedical approach. The rehabilitation method of group B was based on the assessment of the patient's functioning using the ICF and the organization of problem-oriented and aimed at achieving long- and short-term tasks with a patient-centered approach. to achieve improved functioning of gastrointestinal functions, general endurance, aerobic capacity, muscle strength and improved activities.

**Conclusions:** the dynamics of the level of functioning and activity of patients after laparoscopic cholecystectomy in the long-term rehabilitation period was better in the group that used a biopsychosocial approach with the use of ICF.

**Key words:** cholecystectomy, rehabilitation, functioning, participation

**Słowa kluczowe:** cholecysektomia, rehabilitacja, funkcjonowanie, uczestnictwo

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### INTRODUCTION

The health care system of Ukraine is at the stage of harmonizing the legislation of Ukraine with the legislation of the European Union on the path of our country to EU membership. Law of Ukraine "On rehabilitation in the field of health care", which provides for "determination of the legal, organizational and economic principles of rehabilitation of a person with limitations day-to-day functioning in the field of health care in order to achieve and maintain an optimal level of functioning in its environment"[1]. The use of a patient-centered approach in rehabilitation requires the use of the international classification of functioning, limitations of life and health (ICF) to develop individual rehabilitation

programs and evaluate their effectiveness give a link to my article ICF [1, 2].

### AIM

To determine the dynamics of the level of functioning of patients after laparoscopic cholecystectomy in the long-term rehabilitation period.

### MATERIALS AND METHODS

The study included 79 patients after laparoscopic cholecystectomy, aged 45 to 59 years, who underwent surgery from 1 to 6 months. Exclusion criteria: patients with inflammatory processes in the stomach and duodenum; with exacerbation of the inflammatory process in the

pancreas, with chronic enteritis and colitis in the phase of severe exacerbation; with acute pyelonephritis; malignant diseases of digestive organs; with a violation of the passage of food masses through the gastrointestinal tract; with complicated urolithiasis; acutely expressed insufficiency of blood circulation, with neuropsychological pathology; refusal of patients to participate in the study, participation of the patient in another study. 79 patients underwent rehabilitation in the health-resort complex Morshinkurort rehabilitation department "Lavanda", who were divided into 2 groups by the method of randomization by simple random selection with drawing lots: group A (n=39) age  $52,56 \pm 0,62$  years, duration of rehabilitation intervention  $19,85 \pm 0,61$  days; group B (n=40)  $52,80 \pm 0,64$  years, duration of rehabilitation intervention  $18,78 \pm 0,72$  days. Group A patients received rehabilitation services according to the standard scheme of the medical institution using a biomedical approach (diet, hydrotherapy, mineral or coniferous baths and therapeutic physical education using general-developing exercises). In the group B, individual rehabilitation programs were formed on the basis of identified functional disorders with the help of ICF, using a biopsychosocial approach. The program included physical therapy, if necessary occupational therapy, diet, hydrotherapy." Methods: A parallel-group research design was used. Double blinding was carried out: patients and assessors during the survey, examination and processing of the received data. A survey was conducted regarding the presence of impairments in functioning, activity and participation using the ICF (according to the 2001 version of the World Health Organization) [1]. Methods of synthesis, analysis, randomization. Evaluation of the degree of violations according to the general classification of the ICF was evaluated Function/Structure/Activity and participation. Statistical analysis. The obtained results were processed by means of mathematical statistics using the IBM SPSS Statistics 23 program. The calculations included the measurement of the median value (Me), upper and lower quartiles (25%; 75%). The Mann-Whitney U-test was used to compare independent samples, dependent samples – Wilcoxon T-test.

The higher the percentage of violations, the higher the score received by the patients. When the violations were absent or insignificant, patients received 0 points during the assessment (0-4%); 1 point – light, minor violations (5-24%); 2 points – violations are average, significant (25-49%); 3 points – serious, significant, intense violations (50-95%); 4 points – absolute, total violations. No patients were dropped from the study.

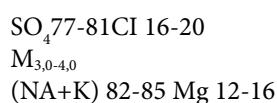
The methods used in the research were approved by the ethics commission of the Ivano-Frankivsk Medical University (IFMU).

## RESULTS

Our study concerns the assessment of the dynamics of the level of functioning of patients after laparoscopic cholecystectomy in the long-term rehabilitation period. And evaluation of the effectiveness of the application of ICF in the development of individual rehabilitation programs for

such patients in comparison with the generally accepted methodology of a health-resort facility. The presence in patients of groups A and B "postcholecystectomy syndrome" [3, 4], became the reason for continuing treatment in sanatorium-resort conditions according to the clinical protocol. Groups A and B in SCC conditions received, according to the clinical protocol, an individual dietary regimen [5].

Along with diet therapy, the patients of both groups were prescribed hydrotherapy. Diluted therapeutic mineral water (DTMW) of well No. 3-k was used. with Goryshnoe of Stryi district of Lviv region in a dilution of 3.0-3.4 g/dm<sup>3</sup> when used internally. When diluting the brines of well "No. 3-k" with weakly mineralized water of spring "No. 4" in a ratio of 1:41.69 to 1:41.55, the chemical composition of DTMW will correspond to the following formula:



DTMW refers to low-mineralized sulfate, chloride-sulfate-sodium. Mineral water was taken in the amount of 200-250 ml. for one dose, with a temperature of 40-42 °C, 40 minutes before eating three times a day [5, 6]. Group A patients, along with hydrotherapy and diet therapy, received coniferous or mineral baths or other passive water procedures; group daily therapeutic gymnastics lasting 30-45 minutes, which consisted of general developmental exercises, classical massage of the back and abdomen lasting 25-30 minutes, applications with ozokerite on the abdominal area in the absence of contraindications were also prescribed.

The rehabilitation method of group B was based on the evaluation of the patient's functioning using the ICF. The process was problem-oriented and aimed at achieving long- and short-term goals. We used a patient-centered approach, which involved planning and carrying out rehabilitation taking into account the needs, capabilities and wishes of the person who received rehabilitation assistance. Each person in this group was selected an individual rehabilitation plan in accordance with the change in the functional state of the person who received rehabilitation assistance. Special means of rehabilitation were selected for each detected dysfunction. The rehabilitation process was consistent, taking into account the actual changes in the functional state of the person, the reaction to the performed procedures. Physical activity increased gradually. The duration of therapeutic exercises was determined strictly individually, taking into account the condition of the patients. The entire rehabilitation process was aimed at achieving the optimal level of functioning and quality of life of a person in his environment [7]. Physical therapy included the following means: breathing exercises (diaphragmatic breathing exercises with prolonged exhalation prevailed), exercises to strengthen the muscles of the abdominal press on exhalation to avoid increase in intra-abdominal pressure, exercises for stretching the front and side areas of the abdomen. Exercises aimed at improving motor performance (strength, coordination and flexibility) were used, depending

on individual indicators. For patients with impaired endurance function and aerobic capacity, cyclic exercises in the aerobic mode, such as dosed walking, riding an exercise bike, Nordic walking, and circuit training, were also used. Massage and management of scars were also used according to the indications, with existing diastasis – kinesiotaping. When experiencing intestinal colic – applications with ozokerite. In more detail, the method of rehabilitation intervention based on ICF group B is depicted in Table 1. The results of the assessment of the level of functioning of patients by group before and after the rehabilitation intervention are presented in Table 2.

## DISCUSSION

When comparing both groups before the start of the rehabilitation intervention, no statistical difference was found between the two groups in the presence of impairments in functionality and activity and participation.

Many scientific works have proven that LHC improves the quality of life and condition of patients with calculous cholecystitis [10]. Many works are also devoted to the effectiveness and improvement of surgical treatment tactics. But there are many works that indicate that there is a percentage of patients after LHC who have the so-called post-cholecystectomy syndrome and need rehabilitation intervention not only in the acute, sub acute, but also in the long-term period. Although such a percentage of

complications is not large, however, taking into account the large number of cholecystectomies performed annually in Ukraine and the world, it becomes clear that this issue remains relevant for many patients. The reasons for this are quite different – from the complication of surgical intervention to the presence of concomitant pathology of the abdominal organs, or concomitant diseases. Most of the works are devoted to the effectiveness of medical treatment of post-cholecystectomy syndrome. Our study, thanks to the use of ICF, established that patients with post-cholecystectomy syndrome, in addition to the function of the biliary system [5], also have disorders of the tone of the muscles of the trunk and abdomen, a decrease in aerobic capacity, muscle strength and general endurance, some difficulties in certain activities and disorders participation [9]. Drug treatment or hydrotherapy, although effective, will not be able to solve all problems, but requires a broader view and intervention with the use of physical therapy and occupational therapy methods to restore or improve the impaired functions identified during the initial examination and restore activity and participation. After the implementation of the rehabilitation intervention, when analyzing the dynamics of the level of functioning and activity in group A, a statistically significant improvement was found in the following indicators ( $p < 0,05$ ): b28012 Pain in the stomach or abdomen, 515 Digestive functions, namely in b5153 Tolerance of food, b5250 Removal

**Table 1.** Methodology of rehabilitation intervention based on the ICF of the group

Code	Methods of Rehabilitation
<b>Body function</b>	
b 134 Sleep functions	Positioning, sleep management
b 152 Functions of emotions	Patient education
b 28012 Stomach or abdominal pain	Use of DTMV, therapeutic exercises
b 28013 Back pain	Therapeutic exercises, massage
b 440 Respiratory functions	Breathing exercises, cyclic aerobic exercises, therapeutic exercises
b 4550 Overall physical endurance	Cyclic aerobic exercises, therapeutic exercises
b 4551 Aerobic ability	Cyclic aerobic exercises, therapeutic exercises
b 4552 Fatigue	Cyclic aerobic exercises, therapeutic exercises
b 515 Digestion functions	Use of DTMV, dietary nutrition, massage
b 5250 Removal of feces	Use of DTMV, dietary nutrition
b 5252 Frequency of defecation	Use of DTMV, diet, cyclic aerobic exercise
b 5254 Flatulence	Use of DTMV, dietary nutrition, massage
b 5350 Feeling sick	Taking DTMV, dietary nutrition, massage, breathing exercises, cyclic aerobic exercises
b 5351 Feeling bloated	Use of DTMV, dietary nutrition, massage
b 5352 Feeling of intestinal colic	DTMV consumption, dietary nutrition, cyclic aerobic exercise, positioning, preformed physical factors, ozokerite
b 7305 Torso muscle strength	Strength exercises, cyclic aerobic exercises
b 7355 Torso muscle tone	Therapeutic exercises, breathing exercises
b 7401 Endurance of muscle groups	Therapeutic exercises, breathing exercises, cyclic aerobic exercises
b 7402 Endurance of all muscles of the body	Cyclic aerobic exercises, therapeutic exercises
<b>Activities and participation</b>	
d 4501 Walking long distances	Ergotherapeutic exercises, aids, cyclic aerobic exercises, therapeutic exercises
d 5100 Washing body parts	Ergotherapeutic exercises, aids, therapeutic exercises
d 5204 Toenail care	Ergotherapeutic exercises, aids, therapeutic exercises
d 5402 Putting on the lower extremities	Ergotherapeutic exercises, aids, therapeutic exercises
d 5701 Adherence to diet and fitness	Special training on lifestyle modification, diet, calorie intake, physical activity

**Table 2.** The results of the assessment of the level of functioning of patients by group before and after the rehabilitation intervention

Code ICF	Points Me [25 %, 75 %]				p-value			
	Group A		Group B		for Wilcoxon T-test		for Mann-Whitney U-test	
	before rehabilitation	after rehabilitation	before rehabilitation	after rehabilitation	Group A before and after rehabilitation	Group B before and after rehabilitation	Groups A i B before rehabilitation	Groups A i B after rehabilitation
b 134	1 [1; 2]	1 [1; 2]	1 [1; 2]	1 [0; 1]	0,067	0,000	0,479	0,000
b 152	2 [2; 3]	2 [2; 3]	2 [2; 3]	1 [1; 2]	0,523	0,000	0,274	0,000
b 28012	2 [2; 3]	1 [1; 1]	2 [2; 3]	1 [1; 1]	0,000	0,000	0,390	0,215
b 28013	2 [1; 2]	2 [1; 2]	2 [1; 2]	1 [0; 1]	0,320	0,000	0,355	0,000
b 440	2 [1; 2]	2 [1; 2]	2 [1; 2]	1 [0; 1]	0,113	0,000	0,298	0,000
b 4550	2 [2; 3]	2 [2; 2]	2 [2; 3]	1 [1; 2]	0,186	0,000	0,336	0,000
b 4551	2 [2; 2]	2 [1; 2]	2 [2; 2]	1 [1; 2]	0,120	0,000	0,256	0,000
b 4552	2 [2; 2]	2 [2; 2]	2 [2; 3]	1 [1; 2]	0,436	0,000	0,058	0,000
b 515	2 [2; 3]	2 [1; 2]	2 [2; 2]	2 [1; 2]	0,000	0,000	0,282	0,494
b 5250	2 [2; 3]	1 [1; 2]	2 [2; 3]	1 [1; 1]	0,000	0,000	0,346	0,001
b 5252	2 [2; 3]	2 [2; 2]	2 [2; 3]	1 [1; 1]	0,000	0,000	0,377	0,000
b 5254	2 [2; 2]	2 [2; 2]	2 [2; 3]	2 [1; 2]	0,086	0,000	0,262	0,138
b 5350	1 [1; 2]	1 [1; 1]	1 [1; 2]	1 [0; 1]	0,036	0,001	0,226	0,349
b 5351	3 [3; 3]	2 [1; 2]	3 [3; 3]	1 [1; 2]	0,000	0,000	0,284	0,121
b 5352	3 [3; 3]	1 [1; 2]	3 [2; 3]	1 [1; 2]	0,000	0,000	0,186	0,180
b 7305	3 [2; 3]	3 [2; 3]	3 [2; 3]	2 [1; 2]	0,333	0,000	0,540	0,000
b 7355	2 [2; 3]	2 [2; 2]	2 [2; 3]	2 [1; 2]	0,089	0,002	0,454	0,019
b 7401	2 [2; 3]	2 [2; 2]	2 [2; 3]	2 [1; 2]	0,068	0,000	0,412	0,000
b 7402	2 [2; 2]	2 [2; 2]	2 [2; 2]	2 [1; 2]	0,301	0,000	0,305	0,017
d 4501	2 [2; 3]	2 [1; 2]	2 [2; 3]	1 [1; 2]	0,002	0,000	0,352	0,019
d 5100	1 [0; 1]	1 [0; 1]	1 [0; 1]	0 [0; 1]	0,375	0,002	0,256	0,036
d 5204	2 [1; 2]	1 [1; 2]	2 [1; 2]	1 [0; 1]	0,380	0,000	0,497	0,000
d 5402	1 [1; 2]	1 [1; 2]	1 [1; 2]	1 [1; 1]	0,306	0,002	0,300	0,004
d 5701	2 [2; 3]	2 [2; 2]	2 [2; 3]	2 [1; 2]	0,050	0,000	0,456	0,000

of feces, b5252 Frequency of defecation, b5350 Sensation of nausea, b5351 Sensation of bloating, b5352 Sensation of intestinal colic. Such results prove the effectiveness of the rehabilitation program using the standard scheme of a medical institution using a biomedical approach (diet, hydrotherapy, mineral or coniferous baths and physical therapy using general developmental exercises) on the condition of the gastrointestinal tract, normalization of sleep and emotions of patients. Also, particularly d4501 Long-distance walking, improved in this group, as the patients walked more than 5 km per day on average.

In group B, after the implementation of the rehabilitation intervention, the indicators improved statistically significantly: b 134 Sleep functions, b 152 Functions of emotions, b 28012 Stomach or abdominal pain, b 28013 Back pain, b 440 Respiratory functions, b 4550 Over all physical endurance, b 4551 Aerobic ability, b 4552 Fatigue, b 515 Digestion functions, b 5250 Removal off feces, b 5252 Frequency of defecation, b 5254 Flatulence, b 5350 A feeling of nausea, b 5351 Feeling bloated, b 5352 Feeling of intestinal colic, b 7305 Torso muscle strength, b 7355 Torso muscle tone,

b 7401 Endurance of muscle groups, b 7402 Endurance of all muscles of the body, Activities and participation, d 4501 Walking long distances, d 5100 Washing body parts, d 5204 Toe nail care, d 5402 Putting on the lower extremities, d 5701 Adherence to diet and fitness.

## CONCLUSIONS

Therefore, the method of rehabilitation intervention with the use of mineral water, hydrotherapy and diet therapy, coniferous or mineral baths, or other passive water procedures, group daily therapeutic gymnastics, classic massage of the back and abdomen, applications with ozokerite on the abdominal area in the absence of contraindications can reliably improve the dynamics functions that are responsible for the functions of sleep, emotions, the gastrointestinal tract and long-distance walking activity. The rehabilitation method of group A, which was based on the evaluation of the patient's functioning using the ICF and the organization of problem-oriented and aimed at achieving long- and short-term tasks with a patient-centered approach, and the combination of the use of mineral water and diet therapy can affect the achievement of improvement

not only in the optimal level of gastric functioning -intestinal functions, but also improving activity, which will help patients with post-cholecystectomy syndrome to function as actively as possible in society.

## References

1. International Classification of Functioning, Disability and Health (ICF), Geneva, Switzerland: World Health; 2001. Available online: [https://physrehab.org.ua/wp-content/uploads/docs/5210-preklad\\_mkf\\_dorosla\\_v\\_docx.pdf](https://physrehab.org.ua/wp-content/uploads/docs/5210-preklad_mkf_dorosla_v_docx.pdf).
2. Prodinge B, Stucki G, Coenen M & Tennant A. The measurement of functioning using the International Classification of Functioning, Disability and Health: comparing qualifier ratings with existing health status instruments. *Disabil. Rehabil.* 2019;41(5):541-548.
3. Arora D, Kaushik R, Kaur R et al. Post-cholecystectomy syndrome: A new look at an old problem. *J Minimal Access Sur.* 2018;14:202-207. doi: 10.4103/jmas.JMAS\_92\_17.
4. Jensen SW, Gelbel J. Postcholecystectomy Syndrome Clinical Presentation. *Medscape.* 2018. <http://www.emedicine.medscape.com/article/192761-overview>. [date access 7.09.2021]
5. Golod N, Churpiy I, Yaniv O et al. The Influence of the Application of Mineral Water on the Functional State of the Liver of Patients after Laparoscopic Cholecystectomy in the Long Period of Rehabilitation. *Acta Balneol.* 2022;1(167):29-33. DOI: 10.36740/ABAL202201106.
6. Aliksieienko N, Babov K, Hushcha S et al. New Nyniv mineral water spring in Morschyn resort]. *Drohobych: Kolo.* 2012:148. (in Ukrainian)
7. Hertsyk A. The creation of programs of physical rehabilitation/therapy in musculoskeletal disorders. *Slobozans'kij naukovo-sportivnij visnik.* 2016;5(55),22-7.
8. Romanyshyn N. Fundamentals of the construction of a rehabilitation diagnosis in clinical practice by a physical rehab. *Pedagog. psychol. med.-biol. probl. phys. Train. Sport.* 2012;1:94-96.
9. Golod N, Buhaienko T, Imber V et al. The Results of the Examination of Patients After Laparoscopic Cholecystectomy in the Acute Period of Rehabilitation Using the International Classification of Functioning. *Acta Balneol.* 2022;3(169):224-229. Doi: 10.36740/ABAL202203104
10. Koishibayeva L, Turgunov Ye, Teleuov M et al. Comparing of Quality of Life in cholecystitis patients before and after cholecystectomy. *Abstractbok Kirurgveckan: JKPG Jönköping, Sweden.* 2017:287.

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### Conflict of interest:

The Authors declare no conflict of interest

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### ADDRESS FOR CORRESPONDENCE:

**Nataliya Golod**

Ivano-Frankivsk National Medical University  
Halytska St. 2, Ivano-Frankivsk, 76018 Ukraine  
phone: +380673443259  
e-mail: n.golod@ukr.net

### ORCID ID and AUTHORS CONTRIBUTION

0000-0003-0996-6920 – Nataliya R. Golod (A, D)

0000-0002-0839-1072 – Ljudmyla P. Rusyn (E)

0000-0003-1735-9418 – Igor K. Churpiy (F)

0000-0002-9550-1961 – Nataliia R. Zakaliak (E)

0000-0003-2736-0017 – Volodymyr G. Saienko (C)

0000-0002-2205-9236 – Kseniia P. Meleha (B)

0000-0003-4306-4234 – Yuliya V. Dutkevych-Ivanska (B)

A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of article



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