

Does physiotherapy before and after abdominal surgery improve patients' recovery?

Submission date 25/10/2026	Recruitment status No longer recruiting	☐ Prospectively registered ☒ Protocol
Registration date 28/10/2026	Overall study status Completed	☐ Statistical analysis plan ☐ Results
Last Edited 27/10/2026	Condition category Surgery	☐ Individual participant data ☒ Record updated in last year

Plain English summary of protocol

Background and study aims

People who have abdominal surgery can take time to recover and may experience complications such as infections, reduced mobility, pain, and difficulties carrying out everyday activities. Physiotherapy is often used after surgery, but it is not always clear whether providing a more structured programme both before and after an operation leads to better recovery. This study aimed to find out whether a physiotherapy programme delivered before and after abdominal surgery, as part of an Enhanced Recovery After Surgery (ERAS) pathway, could help patients recover more quickly, regain independence, return to their normal activities sooner, and reduce complications after surgery.

Who can participate?

Adults aged 18 to 75 years who were scheduled to undergo abdominal surgery or combined chest and abdominal surgery were eligible to take part. Participants had to be able to take part in the physiotherapy programme and provide written informed consent.

What does the study involve?

A total of 180 participants took part in the study. They were randomly assigned to one of two groups.

Participants in the physiotherapy group received a structured programme before and after surgery. Before surgery, this included education, breathing exercises, physical exercises, and training in activities such as getting out of bed, sitting, standing, and walking. After surgery, participants received physiotherapy twice each day, including breathing exercises, muscle strengthening, movement exercises, walking practice, and guidance on safely carrying out daily activities.

Participants in the comparison group received the standard physiotherapy usually provided after surgery as part of routine hospital care.

Researchers assessed participants before surgery and during recovery. They measured independence in daily activities, pain, muscle strength, joint movement, breathing function, length of hospital stay, infections, other complications, deaths after surgery, and hospital costs.

What are the possible benefits and risks of participating?

Participants in the structured physiotherapy programme may have benefited from improved

recovery, greater independence, and an earlier return to normal activities after surgery. The study may also help healthcare professionals better understand how physiotherapy can support recovery after major surgery.

The risks were expected to be low because physiotherapy exercises are commonly used in surgical care. However, participants may have experienced temporary discomfort, tiredness, or soreness while performing exercises and physical activities during recovery.

Where is the study run from?

The study was run from the Department of Physiotherapy at the International Hellenic University in Thessaloniki, Greece. Participants were recruited from Hippokration General Hospital of Thessaloniki and AHEPA University General Hospital of Thessaloniki, Greece.

When is the study starting and how long is it expected to run for?

May 2022 to January 2023.

Who is funding the study?

The study was investigator initiated and funded.

Who is the main contact?

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Contact information

Type(s)

Public, Scientific, Principal investigator

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Study information

Scientific Title

Effectiveness of a perioperative physiotherapy program within enhanced recovery after surgery on functional recovery after abdominal surgery: a randomized controlled trial

Study objectives

The primary objective of this randomized controlled trial was to evaluate the effectiveness of a structured perioperative physiotherapy programme within an Enhanced Recovery After Surgery (ERAS) pathway in patients undergoing abdominal or combined thoracoabdominal surgery.

The study investigated the effects of perioperative physiotherapy on postoperative functional recovery, return to normal activity, length of hospital stay, and postoperative infections.

Additional objectives included the evaluation of functional independence, pain intensity, muscle strength, joint range of motion, respiratory function, postoperative complications, mortality, hospitalization costs, and the clinical feasibility of implementing a structured perioperative physiotherapy programme.

Ethics approval required

Ethics approval required

Ethics approval(s)

Approved 23/03/2021, Ethics Committee of the School of Medicine, Aristotle University of Thessaloniki (Faculty of Health Sciences, School of Medicine, Aristotle University of Thessaloniki, Thessaloniki, 54124, Greece; +30 2310 999900; sakka@auth.gr), ref: 6.362

Primary study design

Interventional

Allocation

Randomized controlled trial

Masking

Blinded (masking used)

Control

Active

Assignment

Parallel

Purpose

Treatment

Study type(s)

Health condition(s) or problem(s) studied

Postoperative functional impairment and risk of postoperative complications in adult patients undergoing abdominal or combined thoracoabdominal surgery.

Interventions

This was a prospective, randomized, controlled, parallel-group clinical trial involving 180 adult patients undergoing abdominal or combined thoracoabdominal surgery. Participants were randomly allocated in a 1:1 ratio to an intervention group (ERAS physiotherapy, n = 90) or a control group (standard postoperative physiotherapy, n = 90).

Intervention group (ERAS physiotherapy):

Participants received a structured physiotherapy programme incorporating preoperative and postoperative interventions.

The preoperative programme included patient education, assessment of functional independence, respiratory assessment, breathing exercises, thoracic expansion exercises, therapeutic exercises for the upper limbs, lower limbs and trunk, and training in functional activities, including bed mobility, sitting, standing, and walking.

Postoperative physiotherapy was delivered twice daily, with each session lasting approximately 45 minutes. The programme included diaphragmatic, thoracic and synchronized breathing exercises, thoracic expansion exercises combined with upper-limb movements, airway clearance techniques, coughing exercises, incentive spirometry, therapeutic exercises, muscle strengthening, maintenance of joint range of motion, early mobilization, transfer training, gait training, and education regarding safe functional activities.

Control group (standard postoperative physiotherapy):

Participants received conventional inpatient postoperative physiotherapy, consisting of approximately 15-minute treatment sessions. The programme included respiratory physiotherapy, coughing exercises, therapeutic exercises, mobilization, and functional activities according to routine clinical practice.

Both groups received standard medical and surgical care.

The effectiveness of the interventions was evaluated through postoperative clinical outcomes and physiotherapy assessments, including functional independence, pain, muscle strength, joint mobility, and respiratory function.

Randomisation Process: Participants were randomly allocated to either the intervention group or the control group in a 1:1 ratio. The randomisation sequences were computer-generated using a block randomisation method, with separate allocation lists prepared for the two participating study sites (Hippokration General Hospital of Thessaloniki and AHEPA University Hospital), to ensure a balanced distribution of participants between the study groups.

To ensure allocation concealment, sequentially numbered, opaque, sealed envelopes (SNOSE) were used. The investigator opened the next envelope in the sequence only after the participant had provided written informed consent.

Blinding Procedure: This was a single-blinded randomised controlled trial. The participants were blinded to their group assignment, as they were never informed whether they were receiving the specialised pre- and postoperative physiotherapy protocol or standard care.

Both groups underwent the same preoperative baseline assessments and measurements, ensuring that participants remained unaware of their allocation.

However, due to the nature of the physiotherapy intervention and because the principal investigator delivered the physiotherapy programme, the investigator could not be blinded to group allocation.

The principal investigator was also responsible for conducting the clinical outcome assessments and was therefore not blinded to group allocation.

Thus, blinding was maintained at the participant level, while the principal investigator, who delivered the interventions and performed the outcome assessments, was not blinded.

Intervention Type

Behavioural

Primary outcome(s)

1. Return to normal activity (functional recovery) measured using the Functional Independence Measure (FIM) at one day before surgery, postoperative day 1, postoperative day 5, and four weeks after surgery
2. Length of hospital stay measured using duration of hospitalization in days, calculated from hospital admission to discharge at hospital discharge
3. Postoperative infections measured using incidence of postoperative infections, expressed as the number and percentage of affected patients at during postoperative hospitalization

Key secondary outcome(s)

1. Postoperative complications measured using incidence of postoperative complications, expressed as the number and percentage of patients experiencing complications, based on hospital medical records at during postoperative hospitalization
2. Postoperative mortality measured using number and percentage of patient deaths at 28 days after surgery
3. Hospitalization costs measured using estimated hospitalization reimbursement per patient, expressed in euros (€), based on the applicable Greek hospital reimbursement system (KEN) at hospital discharge

Completion date

10/01/2023

Eligibility

Key inclusion criteria

1. Male and female patients aged 18–75 years
2. Patients scheduled to undergo abdominal or combined thoracoabdominal surgery
3. Patients providing written informed consent to participate in the study

Healthy volunteers allowed

No

Age group

Mixed

Lower age limit

18 Years

Upper age limit

75 Years

Sex

All

Total final enrolment

180

Key exclusion criteria

1. Functional Independence Measure (FIM) score below 15 in the mobility/transfers and locomotion domains, as specified in the original research protocol
2. Severe pulmonary or cardiac disease preventing participation in physical exercise
3. Language or psychological disorders preventing comprehension of or adherence to the physiotherapy programme
4. Refusal to provide written informed consent
5. Protocol deviation: During study implementation, the FIM-based exclusion criterion was operationalised as a score below 5 in at least one of the five mobility-related FIM items (three transfer items and two locomotion items), as reported in the submitted manuscript

Date of first enrolment

03/05/2022

Date of final enrolment

05/12/2022

Locations

Countries of recruitment

Greece

Study participating centre

Hippokration General Hospital of Thessaloniki – Fifth Department of Surgery

Thessaloniki

Greece

Study participating centre

AHEPA University General Hospital of Thessaloniki

Thessaloniki

Greece

Sponsor information

Organisation

Aristotle University of Thessaloniki (AUTH)

Funder(s)

Funder type

Funder Name

Investigator initiated and funded

Results and Publications

Individual participant data (IPD) sharing plan**IPD sharing plan summary**

Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol file			26/10/2026	No	No