Clinical Trial Protocol
Iranian Registry of Clinical Trials

07 Nov 2026

Comparison of the effects of aerobic exercise combined with routine physiotherapy management versus routine physiotherapy alone on grip strength, limb volume, quality of life, and physical function in patients with upper limb lymphedema secondary to breast cancer

Protocol summary

Study aim

Assessing the effect of adding aerobic exercises to standard physiotherapy management on lymphedema volume, grip strength, quality of life, and physical function in patients with upper limb lymphedema due to breast cancer.

Design

A randomized, controlled, double-blind, parallel-group, phase 2 clinical trial with 64 participants; randomization performed using the RAND function in Excel.

Settings and conduct

Tehran Specialized Physiotherapy Center; double-blind clinical trial (participants and assessors blinded to group allocation). The 8-week intervention includes aerobic exercises (treadmill or cycling; 3 sessions/week, 30 minutes each, mild to moderate intensity) plus two-phase complete decongestive therapy (CDT): Phase 1 (2 weeks in clinic) — manual lymphatic drainage, bandaging, exercises, skin care; Phase 2 (6 weeks at home) — compression garments, exercises, self-care. Control group receives CDT only. Outcomes assessed at baseline, 8 weeks, and 12 weeks.

Participants/Inclusion and exclusion criteria

Inclusion criteria: Women with upper limb lymphedema due to breast cancer؛ Referred by a physician؛ Less than 6 months since completing adjuvant treatments؛ Exclusion criteria:؛ History of bilateral mastectomy؛ Metastatic cancer؛ Severe cardiac, pulmonary, or liver diseases؛ Severe physical or mental disabilities؛ Unwillingness to participate in the study

Intervention groups

Intervention group: combination of aerobic exercises and complete decongestive therapy (CDT); Control group: CDT only, similar to the intervention group.

Main outcome variables

Upper limb volume change: tape measure at specific points and converted to volume by standard formulas (mL); grip strength: handheld dynamometer model dynamometer hydraulic 1J5030 JAMAR (Newtons); quality of life: score of EORTC QLQ-C30 questionnaire; physical function: distance covered in six-minute walk test (meters).

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20250611066183N1**
Registration date: **2025-07-04, 1404/04/13**
Registration timing: **prospective**

Last update: **2025-07-04, 1404/04/13**
Update count: **0**

Registration date

2025-07-04, 1404/04/13

Registrant information

Name

Sara Vasheghani Farahani

Name of organization / entity

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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2025-07-23, 1404/05/01

Expected recruitment end date

2025-12-21, 1404/09/30

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Comparison of the effects of aerobic exercise combined with routine physiotherapy management versus routine physiotherapy alone on grip strength, limb volume, quality of life, and physical function in patients with upper limb lymphedema secondary to breast cancer

Public title

Effect of adding aerobic exercise to physiotherapy in lymphedema secondary to breast cancer

Purpose

Supportive

Inclusion/Exclusion criteria

Inclusion criteria:

Women diagnosed with upper limb lymphedema secondary to breast cancer Referred by a physician for participation in the study Less than six months had passed since the end of chemotherapy or radiotherapy treatment for breast cancer Average time elapsed since breast cancer surgery between 5 to 6 months

Exclusion criteria:

History of bilateral mastectomy Metastatic breast cancer Planned breast reconstruction within the next 6 months Severe and unstable cardiac diseases (e.g., decompensated heart failure, unstable ischemic heart disease, moderate to severe valvular heart disease, aortic aneurysm) Moderate to severe chronic obstructive pulmonary disease (COPD) Severe untreated hypertension Pulmonary hypertension and chronic respiratory failure Advanced liver failure Severe anemia (hemoglobin less than 8 g/dL) Severe physical disabilities or mental impairments preventing participation Refusal to cooperate with the study protocol

Age

No age limit

Gender

Female

Phase

N/A

Groups that have been masked

- Participant
- Investigator
- Outcome assessor

Sample size

Target sample size: **64**

Randomization (investigator's opinion)

Randomized

Randomization description

In this study, simple randomization was performed. The unit of randomization was the individual participant, meaning each eligible participant was independently assigned to one of two groups. Stratified randomization was not used in this study. The randomization sequence was generated using a random number table created by the RAND function in Microsoft Excel. Based on this sequence, eligible participants were allocated to either the intervention or control group. To ensure allocation integrity, allocation concealment was implemented; participants and outcome assessors were blinded to group assignments. This procedure minimized the risk of selection bias during group allocation.

Blinding (investigator's opinion)

Double blinded

Blinding description

To minimize potential biases, the principal investigator, who is also responsible for outcome assessment, will remain blinded to the group allocation of participants throughout the study. Interventions will be administered by a trained physiotherapist who is aware of the assigned treatments. This study is designed as a double-blind randomized controlled trial, where both the participants and the outcome assessor are unaware of the group assignments. Such blinding is implemented to reduce performance and detection biases during data collection and analysis.

Placebo

Not used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Ethics Committee of Semnan University of Medical Sciences

Street address

No. 1, Central Headquarters, Semnan University of Medical Sciences, Basij Blvd., Semnan

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Province

Semnan

Postal code

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Approval date

2025-06-07, 1404/03/17

Ethics committee reference number

IR.SEMUMS.REC.1404.069

Health conditions studied

1

Description of health condition studied

Postmastectomy lymphedema syndrome

ICD-10 code

I97.2

ICD-10 code description

This code is specifically used to classify lymphedema as a direct complication of mastectomy (surgical removal of the breast), often due to lymph node removal or damage to lymphatic vessels during the procedure.

Primary outcomes

1

Description

Change in upper limb volume (in milliliters), calculated by circumferential measurements at specified points using a measuring tape and converted to volume using standard formulas.

Timepoint

The time points for measuring the primary outcomes include three stages: assessment at the beginning of the study (before the start of the intervention), assessment after the completion of the eight-week Complete Decongestive Therapy intervention, and a follow-up assessment in the twelfth week (four weeks after the end of the intervention) to evaluate the sustainability of the outcomes.

Method of measurement

To assess the volume of upper limb edema, circumferential measurements are taken at specific points on the limb using a measuring tape. The limb volume is then calculated in milliliters using standardized formulas. Measurement points include the metacarpophalangeal region, mid-metacarpals, wrist, distal quarter of the forearm, mid-forearm, proximal quarter of the forearm, mid-arm, and the axillary line.

2

Description

Grip strength will be measured using a hand-held dynamometer (Hydraulic Hand Dynamometer, Model 1J5030, JAMAR).

Timepoint

The time points for measuring the primary outcomes include three stages: assessment at the beginning of the study (before the start of the intervention), assessment after the completion of the eight-week Complete Decongestive Therapy intervention, and a follow-up assessment in the twelfth week (four weeks after the end of the intervention) to evaluate the sustainability of the outcomes.

Method of measurement

For grip strength assessment, a handheld dynamometer model dynamometer hydraulic 1J5030 JAMAR will be used. Participants are asked to hold the dynamometer, keep their elbow flexed at 90 degrees and shoulder in a neutral position. Then, they squeeze the dynamometer with maximum effort. This process is repeated three times, and the highest value from each hand will be recorded.

Secondary outcomes

1

Description

The quality of life score of patients was measured using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire – Core 30 items (EORTC QLQ-C30).

Timepoint

The time points for measuring the primary outcomes include three stages: assessment at the beginning of the study (before the start of the intervention), assessment after the completion of the eight-week Complete Decongestive Therapy intervention, and a follow-up assessment in the twelfth week (four weeks after the end of the intervention) to evaluate the sustainability of the outcomes.

Method of measurement

To assess the quality of life of patients, the Persian version (third edition) of the “European Organization for Research and Treatment of Cancer Quality of Life Questionnaire – Core 30 items” (EORTC QLQ-C30) will be used. This self-administered questionnaire consists of 30 items and evaluates the quality of life of cancer patients across five functional domains (physical functioning, role functioning, emotional functioning, cognitive functioning, and social functioning), nine symptom domains (fatigue, pain, nausea and vomiting, dyspnea, insomnia, appetite loss, constipation, diarrhea, and financial difficulties), and one global quality of life domain. Scoring interpretation varies depending on the domain type: higher scores in the functional domains and global health status indicate better quality of life, while higher scores in the symptom domains reflect more severe symptoms. Therefore, improvement is reflected by increased scores in functional domains and decreased scores in symptom domains. Several validation studies conducted in Iran have confirmed the reliability and validity of this tool. For instance, in the study by Kahrizi et al. (2011), Cronbach’s alpha coefficients were reported as 0.65 for fatigue, 0.69 for pain, 0.66 for nausea and vomiting, and above 0.70 for other subscales. In another study by Akbari et al. (2014), Cronbach’s alpha values ranged from 0.68 to 0.79 across different dimensions.

2

Description

Physical performance will be assessed based on the distance walked (in meters) during the Six-Minute Walk Test (6MWT).

Timepoint

The time points for measuring the primary outcomes include three stages: assessment at the beginning of the study (before the start of the intervention), assessment after the completion of the eight-week Complete Decongestive Therapy intervention, and a follow-up assessment in the twelfth week (four weeks after the end of the intervention) to evaluate the sustainability of the outcomes.

Method of measurement

In this study, the six-minute walk test will be used to assess physical performance. Participants will be instructed to walk back and forth continuously between two markers placed 15 meters apart for six minutes at their maximum possible effort. At the beginning and end of the course, participants will be required to turn around within a 0.5-meter radius circular area. The assessor will provide verbal encouragement every minute to motivate participants to maintain their maximum effort throughout the test. The total distance walked (in meters) during the six minutes will be considered an indicator of the individual's physical performance.

Intervention groups

1

Description

Intervention group: Participants in this group, after a complete evaluation, will simultaneously receive two interventions over a period of 8 weeks under the supervision of an experienced physiotherapist: Aerobic exercise: Participants will perform treadmill walking or cycling at a mild to moderate intensity (50 to 60% of heart rate reserve - HRR) or a Borg scale rating of 7 to 13, 3 sessions per week, each session lasting 30 minutes. Each session includes 5 minutes of warm-up, 20 minutes of main aerobic exercise, and 5 minutes of cool-down. The speed, intensity, and duration of the exercise will be gradually increased according to the participants' exercise capacity. Complete Decongestive Therapy (CDT):This therapy consists of two phases: Phase one (two weeks, 10 sessions in clinic):Participants will receive manual lymphatic drainage (MLD), multi-layer bandaging, limb mobilization exercises, and skin care. The aim of this phase is to maximize the reduction of lymphedema volume, decrease lymphatic fluid congestion, and prevent infection. Phase two (six weeks, maintenance phase at home):Participants will be trained to maintain the reduction in lymphedema volume and prevent recurrence by wearing compression garments, performing skin care, regularly doing exercises, and applying self-lymphatic massage.

Category

Rehabilitation

2

Description

Control group: Participants in this group, following a comprehensive initial assessment, will receive Complete Decongestive Therapy (CDT) under the supervision of an experienced physiotherapist for a duration of 8 weeks. This therapy consists of two phases: Phase I (two weeks, 10 sessions at the clinic):Participants will undergo Manual Lymphatic Drainage (MLD), multilayer bandaging, limb mobility exercises, and skin care. The goal of this phase is to achieve maximum reduction in lymphedema volume, decrease lymphatic fluid congestion, and prevent infection. Phase II (six weeks, maintenance phase at home):Participants will be trained to maintain the reduced lymphedema volume and prevent recurrence through self-management techniques, including wearing compression garments, performing regular exercises, maintaining proper skin care, and conducting self-lymphatic massage.

Category

Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center
Sarli Physiotherapy Clinic

Full name of responsible person
Saeideh Sarli

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Sponsors / Funding sources

1

Sponsor

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Semnan University of Medical Sciences

Full name of responsible person
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Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?
Yes

Title of funding source
Semnan University of Medical Sciences

Proportion provided by this source
100
Public or private sector
Public
Domestic or foreign origin
Domestic
Category of foreign source of funding
empty
Country of origin
Type of organization providing the funding
Academic

Person responsible for general inquiries

Contact
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Sharing plan

Deidentified Individual Participant Data Set (IPD)
Yes - There is a plan to make this available
Study Protocol
Yes - There is a plan to make this available
Statistical Analysis Plan
Yes - There is a plan to make this available
Informed Consent Form
Yes - There is a plan to make this available
Clinical Study Report
Yes - There is a plan to make this available
Analytic Code
Yes - There is a plan to make this available
Data Dictionary
Yes - There is a plan to make this available
Title and more details about the data/document
The shared data include all demographic, clinical, and outcome information collected during the study, which have been anonymized by removing all personal identifiers and any information that could potentially identify participants. The entire dataset is potentially available for sharing unless there are ethical or legal restrictions prohibiting its release. In some cases, only data related to the primary study outcomes may be shared. All requests for data access will be reviewed and approved by the research ethics committee. Data will be shared under controlled conditions to ensure confidentiality and protect participant rights.
When the data will become available and for how

long

The data and related documents will be made available starting six months after the publication of the main study results.

To whom data/document is available

Access to the study data and documents will be granted exclusively to qualified and authorized researchers affiliated with academic institutions, research centers, or reputable scientific organizations who submit a valid and written request. All requests will be carefully reviewed by the principal investigator and the research ethics committee, and, subject to confidentiality and ethical standards, data access will be provided only upon final approval.

Under which criteria data/document could be used

In addition to the eligibility criteria outlined above, applicants requesting access to anonymized individual participant data and other study documents must also comply with the following terms and conditions: Purpose of Use: The data and documents shall be used solely for research purposes related to the objectives of the study. Any use beyond the authorized scope is strictly prohibited. Permitted Analyses: Conducting statistical analyses and research methods directly aligned with the study objectives is permitted. Use of the data for secondary analyses or independent research projects requires submission of a separate research proposal and official approval. Confidentiality: All users are obligated to maintain the confidentiality of the data and documents and must not share them with third parties without written permission from the principal investigator or the research ethics committee. Reporting and Citation: Any publications resulting from the use of the shared data and documents must appropriately acknowledge the original study and investigators. Oversight Mechanism: All requests must include a written research proposal, ethics committee approval, and a commitment to adhere to ethical standards and confidentiality. The principal investigator and ethics committee reserve the right to reject or limit access. Time and Legal Restrictions: Data usage is subject to specified timeframes and applicable legal regulations concerning privacy protection.

From where data/document is obtainable

Applicants seeking access to the research data and documents are required to submit their requests through authorized individuals or official channels. Accordingly, the access methods and relevant contact information are provided below in order of priority: 1. Full Name of Responsible Person: Sara Vasheghani Farahani Postal Address: No. 226, Kazemi Street, End of Jeyhoun Street, Unit 2, Tehran, Iran Postal Code: 1357644344 Landline: +98 21 5576 0223 Mobile: +98 912 844 2956 Email: vfsara1375@gmail.com 2. Vice-Chancellery for Research and Technology, Semnan University of Medical Sciences Name: Dr. Abbasali Vafaee Postal Address: Basij Boulevard, opposite Soukan Park, Campus No. 1 – Central Headquarters, Semnan University of Medical Sciences and Health Services, Semnan, Iran Postal Code: 35131-19111 Phone: +98 23 3345 1336 Email: info@semums.ac.ir

What processes are involved for a request to access data/document

Applicants seeking access to the research data or documentation must submit a formal written request, including a clear explanation of the intended use and type of analysis to be performed, to the principal investigator via email. Upon receipt, the request will first undergo an initial review by the principal investigator. If necessary, additional documentation or clarification may be requested from the applicant. The request will then be referred to the Research Ethics Committee for final evaluation. If approved, the requested data will be shared in a de-identified format, ensuring full compliance with ethical standards and data confidentiality. The estimated time required to review and respond to requests is approximately 3 to 6 weeks, depending on the circumstances.

Comments