Clinical Trial Protocol
Iranian Registry of Clinical Trials

23 Aug 2026

The effect of dynamic neuromuscular stability training on core muscle contraction and balance in women with chronic specific low back pain

Protocol summary

Study aim

The Effect of of Dynamic Neuromuscular Stabilization (DNS) Exercises on Core Muscle Activation and Balance in Women with Non-Specific Chronic Low Back Pain

Design

This study will be conducted as a randomized single-blind clinical trial on 16 women with non-specific chronic low back pain. The participants will be divided into two groups: control and exercise; one group will receive DNS exercises, while the other group will serve as the control group in the study

Settings and conduct

This study will be conducted at Arak University. After obtaining informed consent, participants will be randomly assigned to either an exercise or a control group. The exercise group will perform DNS exercises focused on core activation and balance for four weeks (three sessions per week) at the university gym. The study is designed as a single-blind randomized clinical trial, with the assessor blinded to group allocation to reduce bias.

Participants/Inclusion and exclusion criteria

Inclusion Criteria:1.Ageed 18 to 30 years. 2.Female gender. 3.Chronic non-specific low back pain more than 3 months. 4.Informed consent to participate in the study. 5.Clinical confirmation by a physician; Exclusion Criteria: 1.lumbar surgery. 2.Low back pain of traumatic or structural origin with neurological symptoms. 3.Neurological, cardiovascular, or respiratory diseases affecting motor function. 4.Absence from more than two consecutive sessions or three non-consecutive sessions. 5.Unwillingness to cooperate

Intervention groups

Intervention Group : Female patients with non-specific chronic low back pain who received a DNS exercise program to assess its effect on core muscle activation and balance. Control Group: Female patients with non-specific chronic low back pain who received no exercise or therapeutic intervention

Main outcome variables

Pain, Balance, Mobility / Walking ability, Difficulty performing abdominal breathing

General information

Reason for update

Dear Sir/Madam, With due respect, I would like to inform you that a total of 24 participants were initially enrolled in the present study. However, due to the circumstances caused by the war and the resulting disruption to the research process, only 16 participants were able to complete the post-test assessment, and it was not possible to continue the study procedures for the remaining participants at that time. Following the establishment of a ceasefire and the restoration of conditions that allowed the study to resume, the remaining available participants underwent the required assessments in order to continue the study and to increase the validity and adequacy of the sample size. Therefore, considering the change in the final number of participants who completed the assessment stages and the availability of additional data, I kindly request that the relevant information, including the sample size, be amended and updated in the IRCT system so that the registered information accurately reflects the actual course of the study. Thank you in advance for your kind cooperation and consideration.

Acronym

IRCT registration information

IRCT registration number: **IRCT20251204068213N1**
Registration date: **2026-07-28, 1405/05/06**
Registration timing: **retrospective**

Last update: **2026-08-18, 1405/05/27**
Update count: **1**

Registration date

2026-07-28, 1405/05/06

Registrant information

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Name of organization / entity
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Recruitment status
Recruitment complete
Funding source

Expected recruitment start date
2025-11-11, 1404/08/20
Expected recruitment end date
2025-12-21, 1404/09/30
Actual recruitment start date
2025-11-11, 1404/08/20
Actual recruitment end date
2025-11-22, 1404/09/01
Trial completion date
2026-01-09, 1404/10/19

Scientific title
The effect of dynamic neuromuscular stability training on core muscle contraction and balance in women with chronic specific low back pain

Public title
Investigating the effect of dynamic neuromuscular stabilization exercises on core muscle contraction and balance in women with non-specific chronic low back pain
Purpose
Supportive
Inclusion/Exclusion criteria
Inclusion criteria:
Age between 18 and 30 years Female gender Diagnosis of chronic non-specific low back pain with persistent pain for more than 3 months Healthy psychological and cognitive functioning, assessed based on the following criteria: a) No reported history of psychological or cognitive disorders b) Participants' ability to understand and complete study instructions during clinical interview c) Confirmation through clinical judgment by an experienced physician
Exclusion criteria:
Previous back surgery, spinal tumors, deformities, or infections Low back pain of traumatic or structural origin, or low back pain with neurological symptoms Previous neurological or cardiopulmonary diseases, including chronic obstructive pulmonary disease, which had severely affected motor function Unwillingness to continue cooperating with you in the course of work
Age
From **18 years** old to **30 years** old
Gender
Female

Phase
N/A
Groups that have been masked

- Data analyser

Sample size
Target sample size: **26**
Actual sample size reached: **24**
Randomization (investigator's opinion)
Randomized
Randomization description
In this study, randomization will be conducted as simple randomization at the individual level. The sequence of group assignments will be generated prior to participant enrollment using a random number table created in Excel. To ensure allocation concealment, the generated sequence will be kept by an individual outside the research team, and the researcher will remain unaware of the assignment order; thus, the risk of systematic bias in the enrollment process will be reduced. Each eligible participant, after screening and providing informed consent, will be assigned sequentially according to the predetermined random sequence into one of the two study groups (exercise group and control group).
Blinding (investigator's opinion)
Single blinded
Blinding description
In this study, due to the nature of the exercise interventions, blinding of participants and researchers is not feasible; since the type of exercise is evident to both participants and researchers, as well as to data collectors and outcome assessors, they are necessarily aware of the group allocation. However, the data analyst responsible for the statistical analysis of the results will remain blinded to the group assignments in order to prevent bias in the final analysis. Information regarding group allocation will only be provided to the analyst through specific coding.
Placebo
Not used
Assignment
Parallel
Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Ethics Committee of Arak University
Street address
Arak University, Karbala Boulevard, Basij Square, Sardasht, Arak
City
Arak
Province
Markazi
Postal code

3848177584

Approval date

2025-10-22, 1404/07/30

Ethics committee reference number

IR.ARAKU.REC.1404.035

Health conditions studied

1

Description of health condition studied

Chronic non-specific low back pain

ICD-10 code

M54.5

ICD-10 code description

Low back pain

Primary outcomes

1

Description

Core Muscle Contraction

Timepoint

At the beginning of the study and after 12 intervention sessions

Method of measurement

Diagnostic ultrasound unit

Secondary outcomes

1

Description

Balance

Timepoint

At the beginning of the study and after 12 intervention sessions

Method of measurement

Y Balance Test. Stork Balance Test

Intervention groups

1

Description

Intervention group: Participants in the Dynamic neuromuscular exercises group received 12 sessions of 50 minutes each over 4 weeks (three sessions per week). Each session consisted of 5 minutes of warm-up, 40 minutes of main exercises, and 5 minutes of cool-down. The main exercises included six movements based on the DNS approach (diaphragmatic breathing, dead-bug, rolling to the side, bear-crawl, side plank, and transition to sitting and kneeling positions). Each exercise was performed in 2 sets of 10 repetitions, with 2 minutes of rest between exercises. An experienced physiotherapist provided verbal feedback to ensure adherence to the three DNS principles (abdominal breathing, sagittal stability, and simultaneous agonist-antagonist contraction).

Category

Rehabilitation

2

Description

The control group did not perform dynamic neuromuscular stability exercises, but they did perform abdominal muscle sonography in two phases (pre-test and post-test). Additionally, dynamic balance tests and static balance tests were also conducted in two phases (pre-test and post-test).

Category

N/A

Recruitment centers

1

Recruitment center

Name of recruitment center

Kimia Ultrasound

Full name of responsible person

Kimia Mohammadi

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Basement -1, Professor Hesabi Building, Next to Parsian Bank, Dr. Hesabi Intersection, Imam Khomeini Street

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

The university of Arak

Full name of responsible person

Mohammad Soliman nejad

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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
The university of Arak

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

Name of organization / entity
The university of Arak

Full name of responsible person
Shahnaz Shahrjerdi

Position
PhD in Sport Medicine

Latest degree
Ph.D.

Other areas of specialty/work
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Person responsible for updating data

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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
Undecided - It is not yet known if there will be a plan to make this available

Informed Consent Form
Undecided - It is not yet known if there will be a plan to make this available

Clinical Study Report
Undecided - It is not yet known if there will be a plan to make this available

Analytic Code
Undecided - It is not yet known if there will be a plan to make this available

Data Dictionary
Undecided - It is not yet known if there will be a plan to make this available

Title and more details about the data/document

All research data will be made available after publication, except for any data that could lead to the identification of participants. Only de-identified data or aggregated data related to the primary outcome variables will be shared, if needed.

When the data will become available and for how long

Five months after the publication of the results

To whom data/document is available

All individuals, researchers, faculty members, and people with non-specific chronic low back pain can benefit from this research.

Under which criteria data/document could be used

Individuals who wish to review the study may contact the researcher via email to request access to the documentation.

From where data/document is obtainable

They should first contact Dr. Shahrjerdi via email at s-shahrjerdi@araku.ac.ir and then follow up by calling +98-939-032-8958. They may also visit the Arak University Library, located in Sardasht, Karbala Boulevard, Arak University.

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

Researchers may receive the requested documentation after sending an email and obtaining confirmation from the researcher.

Comments