

Clinical Trial Protocol

Iranian Registry of Clinical Trials

10 Jun 2026

Comparison of the effect of anaerobic strengthening exercises and aerobic exercise (walking) on the balance of patients with knee osteoarthritis.

Protocol summary

Study aim

Comparison of the effect of anaerobic strengthening exercises and aerobic exercise (walking) on the balance of patients with knee osteoarthritis.

Design

40 patients with knee osteoarthritis who are referred to the centers of physical therapy in Semnan University of Medical Sciences are selected.

Settings and conduct

This study was conducted on women with knee osteoarthritis referred by physicians to Semnan Medical Sciences Physiotherapy Centers. Patients were randomly assigned into two groups of aerobic and strengthening exercises. The intervention will take place for 4 weeks. Before and after the intervention, the static and dynamic balance will be measured and comparison will be made between the two groups.

Participants/Inclusion and exclusion criteria

Inclusion criteria: 1- Having unilateral or bilateral primary osteoarthritis 2-At least 40 years of age up to 60 years 3- Pain when sitting, standing or climbing stairs 4-Gaining pain equal to or greater than 3 in 10 in the VAS scale
Exclusion criteria: 1- Inability to walk 2- The condition of orthopedic or musculoskeletal and uncontrolled heart and 3- respiratory diseases affecting walking. 4- Previous neurological conditions that affect the strength and balance of the lower limbs and walking. 5- cold or ear infection in recent months 6- History of lower limb joint replacement 7- Severe obesity

Intervention groups

All patients are treated with therapeutic, 3 times a week for 4 weeks including continued ultrasound therapy, transcutaneous nerve electrical stimulation and hot pac. Before starting exercise training, all subjects are asked to perform warm up exercise on ergonomic bicycle for 5 minutes. strengthening exercises group: Strength training protocol included flexion and extension exercise

of the knee joint utilizing a Quadriceps chair. each exercise sessions included 3 sets with 2 minutes intervals. The load of exercise increased progressively from 60 to 65 of 10 RM in the first, 70 to 75% of 10 RM in the second and 80 to 85% of 10 RM in the third. The amount of 10 RM are assessed every week for each participants. Aerobic exercise: The patient walk on treadmill for 50% to 85 % of the maximum heart rate for 40 minutes. The maximum heart rate during walking depending on the patient's tolerance, will increase gradually. To cool down, five minutes of walking will be done at a low speed.

Main outcome variables

Static balance, Dynamic balance

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20100811004549N10**

Registration date: **2018-03-23, 1397/01/03**

Registration timing: **prospective**

Last update: **2018-03-23, 1397/01/03**

Update count: **0**

Registration date

2018-03-23, 1397/01/03

Registrant information

Name

Elham Fatemy

Name of organization / entity

Semnan University Medical Sciences

Country

Iran (Islamic Republic of)

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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2018-04-03, 1397/01/14

Expected recruitment end date

2018-07-22, 1397/04/31

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Comparison of the effect of anaerobic strengthening exercises and aerobic exercise (walking) on the balance of patients with knee osteoarthritis.

Public title

The effect of exercise on the balance of patients with knee osteoarthritis

Purpose

Treatment

Inclusion/Exclusion criteria

Inclusion criteria:

Having unilateral or bilateral primary osteoarthritis At least 40 years of age up to 60 years Pain when sitting, standing or climbing stairs Gaining pain equal to or greater than 3 in 10 in the VAS scale

Exclusion criteria:

Inability to walk The condition of orthopedic or musculoskeletal and uncontrolled heart and respiratory diseases affecting walking. Previous neurological conditions that affect the strength and balance of the lower limbs and walking. cold or ear infection in recent months History of lower limb joint replacement Severe obesity

Age

From **40 years** old to **60 years** old

Gender

Female

Phase

N/A

Groups that have been masked

No information

Sample size

Target sample size: **40**

Randomization (investigator's opinion)

Randomized

Randomization description

The volunteers are randomly assigned to two intervention groups by lottery.

Blinding (investigator's opinion)

Not blinded

Blinding description

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

Kilometer 5, Damghan Road

City

Semnan

Province

Semnan

Postal code

3513138111

Approval date

2018-02-06, 1396/11/17

Ethics committee reference number

13960218

Health conditions studied

1

Description of health condition studied

Knee osteoarthritis

ICD-10 code

M19.0

ICD-10 code description

Primary Osteoarthritis of other joints

Primary outcomes

1

Description

Static balance,Dynamic balance

Timepoint

Before and after intervention

Method of measurement

Biodex system

Secondary outcomes

empty

Intervention groups

1

Description

Aerobic exercise group: The patient walk on treadmill for 50% to 85 % of the maximum heart rate for 40 minutes.The maximum heart rate during walking

depending on the patient's tolerance, will increase gradually. To cool down, five minutes of walking will be done at a low speed. The patient walk on treadmill for 50% to 85 % of the maximum heart rate for 40 minutes. The maximum heart rate during walking depending on the patient's tolerance, will increase gradually. To cool down, five minutes of walking will be done at a low speed.

Category

Rehabilitation

2

Description

strengthening exercises group: Strength training protocol included flexion and extension exercise of the knee joint utilizing a Quadriceps chair. each exercise sessions included 3 sets with 2 minutes intervals. The load of exercise increased progressively from 60 to 65 of 10 RM in the first, 70 20 75% of 10 RM in the second and 80 to 85% of 10 RM in the third. The amount of 10 RM are assessed every week for each participant.

Category

Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center

The Rehabilitation Center of Tabatabaee

Full name of responsible person

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Semnan University of Medical Sciences

Full name of responsible person

Ali Rashidipour

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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

Name of organization / entity

Semnan University of Medical Sciences

Full name of responsible person

Elham Fatemy

Position

Lecturer

Latest degree

Master

Other areas of specialty/work

Physiotherapy

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Sharing plan

Deidentified Individual Participant Data Set (IPD)

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

Study Protocol

Undecided - It is not yet known if there will be 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

Not applicable