Clinical Trial Protocol
Iranian Registry of Clinical Trials

22 Nov 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, transcutaneus nerve electical 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 20 75% of 10 RM in the second and 80 to 85% of 10 RM in the third. The amount of 10 RM are assed every week for each participants. Aerobic exercise: The patient walk on tredmill 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 tredmill 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
Elham Fatemy

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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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Person responsible for updating data

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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