Clinical Trial Protocol
Iranian Registry of Clinical Trials

22 Nov 2026

Comparative study of open and closed kinetic chain exercises on balance and range of motion in patients with knee osteoarthritis

Protocol summary

Study aim

• To compare the Effects of open kinetic chain exercises and closed chain exercises on balance and range of motion in patients with knee osteoarthritis.

Design

Randomized clinical trial, Single-blind (outcomes assessor), on clinically diagnosed patients with knee osteoarthritis by orthopedic surgeon and radiographic imaging, 46 patients

Settings and conduct

The study will be conducted in the Outpatient Department of Physical Therapy, Chughtai Rehabilitation Unit, chughtai medical center jail road Lahore

Participants/Inclusion and exclusion criteria

Inclusion criteria: • Patients between 45-65 years of age and suffering from knee pain for more than 3 months. • OA confirmed by radiographic imaging, Grade I and II according to Kllegren and Lawrence classification of knee OA. Exclusion criteria: • Patients suffering from degenerative diseases of other lower extremity joints. • Patients having other musculoskeletal problems with Red flag signs For instance: Osteoporosis, Paget's disease, Rheumatoid arthritis. • Prolonged immobilization. • Patients having neurological deficits/Hemiplegics.

Intervention groups

Group 1: Patients will be asked to perform open chain exercise using cuff weights of (0.5-2.5Kg) tied on ankle or dorsum of foot in a progressive resistance training according to the strength of the patient by finding his/her 1 repetition maximum. Group 2: Patients will be asked to perform closed chain exercises including step up and step down, terminal extension in standing using therapeutic resistance band of different resistances light, medium and medium to heavy using three colours yellow, red and green respectively in standing position according to their submaximal strength in first session. Two times per week sessions of 1 month protocol will be done in weight bearing/standing position (1 set of 10 reps).

Main outcome variables

Joint range of motion; balance

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20200513047419N1**
Registration date: **2020-06-15, 1399/03/26**
Registration timing: **registered_while_recruiting**

Last update: **2020-06-15, 1399/03/26**
Update count: **0**

Registration date

2020-06-15, 1399/03/26

Registrant information

Name

muhammad ehtisham ul haq raza

Name of organization / entity

Riphah international university

Country

Pakistan

Phone

+92 42 35299988

Email address

ehtisham.raza13@yahoo.com

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2020-05-20, 1399/02/31

Expected recruitment end date

2020-07-30, 1399/05/09

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Comparative study of open and closed kinetic chain exercises on balance and range of motion in patients with knee osteoarthritis

Public title

Comparative study of open and closed kinetic chain exercises on balance and range of motion in patients with knee osteoarthritis

Purpose

Treatment

Inclusion/Exclusion criteria

Inclusion criteria:

1: Patients between 45-65 years of age and suffering from knee pain for more than 3 months. Osteoarthritis confirmed by radiographic imaging, Grade I and II according to Kllegren and Lawrence classification of knee Osteoarthritis. Unilateral knee osteoarthritis. Both males and females are included in the study

Exclusion criteria:

• Patients suffering from degenerative diseases of other lower extremity joints. • Recent fractures. • Vertigo • Chronic heart disease. • Patients having other musculoskeletal problems with Red flag signs For instance: Osteoporosis, Paget's disease, Rheumatoid arthritis. • Prolonged immobilization. • Patients having neurological deficits/Hemiplegics. • Osteoarthritis of Bilateral knee joint. • Patients who are not able to ambulate without assistive device or aid. • Patients who have received knee surgery in past 3 months. • Patients who have received intra-articular injection in last 6 weeks prior to study are excluded from research.

Age

From **45 years** old to **65 years** old

Gender

Both

Phase

N/A

Groups that have been masked

- Outcome assessor

Sample size

Target sample size: **46**

Randomization (investigator's opinion)

Randomized

Randomization description

Patients will be divided into 2 groups using computer generated random number table

Blinding (investigator's opinion)

Single blinded

Blinding description

Outcome assessor will be kept blinded about the treatment protocols and study groups.

Placebo

Not used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Research Ethical Committee (REC) Riphah College of Rehabilitation & Allied Health Sciences

Street address

Riphah International University - Lahore Campus - 28-M Quaid-e-Azam Industrial Estate Kot Lakhpat, Lahore, Lahore, Pakistan-54000

City

lahore

Postal code

54000

Approval date

2019-10-09, 1398/07/17

Ethics committee reference number

RCRS-RE-MS-OMPT/SPring19/033

Health conditions studied

1

Description of health condition studied

Osteoarthritis (OA) is a most common chronic degenerative joint disease, affecting weight bearing joints. It gradually leads to a disability restricting the individual from various daily functional activities. It is a combination of mechanical abnormalities characterized by degradation of articular cartilage, articulating joints and subchondral space. This damage to articular cartilage leads to fibrillation, fissures, gross ulcerations and finally disappearance of the full thickness of articular cartilage

ICD-10 code

M17

ICD-10 code description

Osteoarthritis of knee

Primary outcomes

1

Description

Balance

Timepoint

Before treatment, after 2 weeks, after 4 weeks at the end of treatment

Method of measurement

Dynamic y balance test

2

Description

Range of motion

Timepoint

Before treatment, after 2 weeks, after 4 weeks at the end of treatment

Method of measurement

Goniometer

Secondary outcomes

1

Description

Pain intensity

Timepoint

Before treatment, after 2 weeks, after 4 weeks at the end of treatment

Method of measurement

Visual analogue scale

Intervention groups

1

Description

"Intervention group 1:Open chain exercise of knee using cuff weights of (0.5-2.5Kg) tied on ankle or dorsum of foot in a progressive resistance training according to the strength of the patient by finding his/her 1 repetition maximum. Therefore, from that 1 RM by calculating 75% of its 1RM we can find its 10RM. As 75% of 1RM makes 10RM for that specific exercise. This 1 RM AND 10 RM will be found in first session only

Category

Rehabilitation

2

Description

Intervention group 2: Closed chain exercises including step up and step down, terminal extension in standing using therapeutic resistance band of different resistances light, medium and medium to heavy using three colours yellow, red and green respectively in standing position according to their submaximal strength in first session.Two times per week sessions of 1month protocol will be done in weight bearing/standing position (1 set of 10reps).

Category

Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center

Neurological and physical rehabilitation unit Chughtai medical centre

Full name of responsible person

Dr Saajid Bhatti

Street address

10-jail road, main Gulberg, Lahore

City

Lahore

Postal code

54000

Phone

+92 42 35299988

Email

Sajidbhatti@btinternet.com

Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Riphah International University

Full name of responsible person

Danish Hassan

Street address

28-M Quaid-e-Azam Industrial Estate Kot Lakhpat, Lahore, Pakistan

City

Lahore

Postal code

54000

Phone

Email

Admissions.lahore@riphah.edu.pk

Grant name

Danish Hassan

Grant code / Reference number

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

Yes

Title of funding source

Riphah International University

Proportion provided by this source

100

Public or private sector

Private

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

Riphah international university

Full name of responsible person

Dr Daanish Hassan

Position

Assistant professor

Latest degree

Master

Other areas of specialty/work

Physiotherapy

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Person responsible for scientific inquiries

Contact
Name of organization / entity
Riphah international university
Full name of responsible person
Dr Daanish Hassan
Position
Assistant professor
Latest degree
Master
Other areas of specialty/work
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Person responsible for updating data

Contact
Name of organization / entity
Rashid latif medical complex
Full name of responsible person
Muhammad Ehtisham Ul Haq
Position
Lecturer
Latest degree
Bachelor
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
Not applicable
Data Dictionary
Not applicable