Clinical Trial Protocol
Iranian Registry of Clinical Trials

22 Nov 2026

EFFECTS OF QUADRICEPS KINETIC EXERCISES AT SPECIFIC KNEE ANGLE IN PATIENTS WITH POST-SURGICAL ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION: A RANDOMIZED CONTROLLED TRIAL

Protocol summary

Study aim
To examine the effects of specific quadriceps open and closed chain on knee function (pain, knee function, ROM and recurrence of ACL) after anterior cruciate ligament reconstruction surgery.

Design
Parallel group single blind randomized controlled trial

Settings and conduct
Physical Therapy Department, Northwest General Hospital & Research Center Peshawar, Pakistan and Rehman Medical Institute Peshawar, Pakistan.

Participants/Inclusion and exclusion criteria
Inclusion Criteria: Age: 20-50 years, Both Gender Patients having Unilateral Anterior Cruciate Ligament reconstruction Healthy Contralateral leg ACL reconstruction surgery Ability to walk with or without an assistive device Exclusion Criteria: Any previous knee injury History of dislocation hip Concomitant injury Posterior Cruciate ligament Tear Any rheumatologic conditions Any trauma or meniscus injury History of Ligamentous instability at knee History of referred pain from the lumbar spine, hip, pelvis and sacroiliac regions Patients with history of remarkable knee joint inflammation and effusion, Patients with history of Hyperextension of knee joint Patients with history of polio paralysis Previous History of physiotherapy session for knee treatment

Intervention groups
Group-A: consisting of Controlled alternate quad and hamstring activity in open kinematic chain (OKC) plus Routine Physical Therapy Group-B: consisting of Controlled squats in closed kinematic chain (CKC) plus Routine Physical Therapy Group-C: (Combined Group) consisting of Controlled squats in closed kinematic chain (CKC) & controlled alternate quad and hamstring activity in open kinematic chain (OKC) plus Routine Physical Therapy All groups will get 60 Minute session, 3 days a week alternatively for 12 weeks

Main outcome variables
Pain Knee Function Range of Motion Recurrence of ACL

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20200331046903N1**
Registration date: **2020-04-21, 1399/02/02**
Registration timing: **registered_while_recruiting**

Last update: **2020-04-21, 1399/02/02**
Update count: **0**

Registration date
2020-04-21, 1399/02/02

Registrant information

Name
Danish Ali Khan
Name of organization / entity
University of lahore
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Pakistan
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Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2020-04-15, 1399/01/27

Expected recruitment end date
2020-10-15, 1399/07/24

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

EFFECTS OF QUADRICEPS KINETIC EXERCISES AT SPECIFIC KNEE ANGLE IN PATIENTS WITH POST-SURGICAL ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION: A RANDOMIZED CONTROLLED TRIAL

Public title

EFFECTS OF QUADRICEPS KINETIC EXERCISES AT SPECIFIC KNEE ANGLE IN PATIENTS WITH POST-SURGICAL ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION: A RANDOMIZED CONTROLLED TRIAL

Purpose

Treatment

Inclusion/Exclusion criteria

Inclusion criteria:

Patients aged 20-50 years Both male and female patients Patients having Unilateral Anterior Cruciate Ligament reconstruction Healthy Contralateral leg ACL reconstruction surgery Ability to walk with or without an assistive device

Exclusion criteria:

Any previous knee injury History of dislocation hip Concomitant injury Posterior Cruciate ligament Tear Any rheumatologic conditions (osteoarthritis, rheumatoid arthritis), Any trauma or meniscus injury History of Ligamentous instability at knee History of referred pain from the lumbar spine, hip, pelvis and sacroiliac regions Patients with history of remarkable knee joint inflammation and effusion, Patients with history of Hyperextension of knee joint Patients with history of polio paralysis Previous History of physiotherapy session for knee treatment

Age

From **20 years** old to **50 years** old

Gender

Both

Phase

N/A

Groups that have been masked

- Outcome assessor

Sample size

Target sample size: **54**

Randomization (investigator's opinion)

Randomized

Randomization description

The subject fulfilling the inclusion criteria will be enrolled by independent outcome assessor then lottery method will be used for randomization. Each member of the population will be number systematically and in consequent manner by writing each number on a separate piece of paper. These pieces of paper are mixed and put into a box and then numbers are drawn out of the box in a random manner. The subject’s randomization method will reduce the chances of group bias allocation.

Blinding (investigator's opinion)

Single blinded

Blinding description

The study is single blinded in which outcome assessor will be kept blind

Placebo

Not used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Institutional Review Board of University Institute of Physical therapy University of Lahore

Street address

1- Km Raiwind Rd, Sultan Town, Lahore, Punjab

City

Lahore

Postal code

54792

Approval date

2020-01-22, 1398/11/02

Ethics committee reference number

IRB-UOL-FAHS/695/2020

Health conditions studied

1

Description of health condition studied

Anterior Cruciate ligament Reconstruction

ICD-10 code

S83.519A

ICD-10 code description

Sprain of anterior cruciate ligament of unspecified knee, initial encounter

Primary outcomes

1

Description

Pain

Timepoint

before intervention and 6, 12 and 24 weeks after intervention

Method of measurement

Visual Analogue Scale

2

Description

Knee Function

Timepoint
before intervention and 6, 12 and 24 weeks after intervention
Method of measurement
Lysholm Knee Scoring scale

3

Description
Range of Motion
Timepoint
before intervention and 6, 12 and 24 weeks after intervention
Method of measurement
Goniometer

4

Description
Recurrence of Anterior Cruciate Ligament
Timepoint
before intervention and 6, 12 and 24 weeks after intervention
Method of measurement
Lachman Test

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group 1. Patients in this study group will get 60 Minute session, 3 days a week alternatively for 12 weeks consisting of Controlled alternate quad and hamstring activity in open kinematic chain (OKC) + Routine Physical Therapy, Modalities and Exercise for other body parts including contralateral lower limb, trunk, upper limbs, respiratory exercises.
Category
Treatment - Other

2

Description
Intervention group 2. Patients in this study group will get 60 Minute session, 3 days a week alternatively for 12 weeks consisting of Controlled squats in closed kinematic chain (CKC) + Routine Physical Therapy, Modalities and Exercise for other body parts including contralateral lower limb, trunk, upper limbs, respiratory exercises.
Category
Treatment - Other

3

Description
Intervention group 3. Patients in this study group will get 60 Minute session, 3 days a week alternatively for 12 weeks consisting of Controlled squats in closed kinematic chain (CKC) & controlled alternate quad and hamstring activity in open kinematic chain (OKC) + Routine Physical Therapy, Modalities and Exercise for other body parts including contralateral lower limb, trunk, upper limbs, respiratory exercises.
Category
Treatment - Other

Recruitment centers

1

Recruitment center
Name of recruitment center
Physical Therapy Department Northwest General Hospital and Research Center , Peshawar, KPK, Pakistan
Full name of responsible person
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Street address
Passport Office Rd, Phase 5 Hayatabad, Peshawar, Khyber Pakhtunkhwa
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Web page address
https://www.nwgh.pk/contact-us

2

Recruitment center
Name of recruitment center
Physical therapy Department Rehman Medical Institute Peshawar, Pakistan.
Full name of responsible person
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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
University of Lahore
Full name of responsible person
Prof Dr. Ashfaq Ahmad
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1- Km Raiwind Rd, Sultan Town, Lahore, Punjab

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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
University of Lahore

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
University of Lahore

Full name of responsible person
Danish Ali Khan

Position
PhD Scholar

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)
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

IPD collected for the primary outcome measure only

When the data will become available and for how long

after the publication of the study

To whom data/document is available

academic institutions and researcher

Under which criteria data/document could be used

on informed request from the investigators

From where data/document is obtainable

via email or telephonic contact with investigator

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

on email request, data will be provided with in week

Comments