Clinical Trial Protocol
Iranian Registry of Clinical Trials

28 Jun 2026

Comparison of the Effects of Knee Exercises and Knee Exercises with Additional Hip Strengthening Exercises on Landing Kinematics in Females with Patellofemoral Pain Syndrome

Protocol summary

Summary

The aim of this study is to investigate the effects of knee and hip muscle strength training on the knee and hip kinematics in subjects with Patellofemoral Pain Syndrome. This study is a double – blind (subjects and examiners), randomized controlled trial. Seventy six females with PFPS will be included in this study if, they have a history of anterior or retropatellar knee pain with a severity of at least 30 on a 100 visual analogue scale (VAS) for at least the past 3 months subjects will be excluded if they have a history of patellar dislocation; surgery involving the patellofemoral joint; or signs or symptoms of meniscal pathology or other intra-articular conditions. Patients will be randomly assigned into 2 treatment groups of the knee exercises and the knee and hip exercises. The first group receives a conventional treatment with focus of the knee musculature strengthening and stretching exercises and the second group performs hip strengthening exercises in addition to the exercises of the knee group. The treatment period will be 3 days a week and lasts for 4 weeks. A motion analysis system will be used to record the kinematic data while subjects perform a jump-landing task, a handheld dynamometer and a gyroscope will be used to access hip and knee isometric muscle strength and flexibility before and after treatment interventions. Main outcome measures such as: Hip adduction and internal rotation angles, Knee dynamic Valgus, Maximal isometric strength of Quadriceps, Hamstring, Hip external Rotators and Abductors will be reported.

General information

Acronym

IRCT registration information

IRCT registration number: **IRCT2014070518362N1**
Registration date: **2015-12-26, 1394/10/05**
Registration timing: **retrospective**

Last update:
Update count: **0**

Registration date

2015-12-26, 1394/10/05

Registrant information

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Name of organization / entity

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Recruitment status

Recruitment complete

Funding source

University Research Grant,

Expected recruitment start date

2014-12-01, 1393/09/10

Expected recruitment end date

2015-12-01, 1394/09/10

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Comparison of the Effects of Knee Exercises and Knee Exercises with Additional Hip Strengthening Exercises on

Landing Kinematics in Females with Patellofemoral Pain Syndrome

Public title
Comparison of the Effects of Knee and Hip Muscle Exercises and Isolated Knee Muscle Exercises in Treatment of Anterior Knee Pain
Purpose
Treatment
Inclusion/Exclusion criteria
Inclusion Criteria: Females with PFPS in the age range of 18-45 years will be included in this study if they have a history of anterior or retropatellar knee pain with a severity of at least 30 on a 100 visual analogue scale (VAS) for at least the past 3 months, in 2 or more daily activities including: ascending and descending stairs, squatting, kneeling, jumping, long sitting, isometric knee extension, quadriceps contraction at 60° of knee flexion, and pain on palpation of the medial and/or lateral facet of the patella. Exclusion Criteria: Subjects will be excluded if they have more than trace knee effusion, a history of patellar dislocation; surgery involving the patellofemoral joint; or signs or symptoms of meniscal pathology or other intra-articular conditions; cruciate or collateral ligament involvement; tenderness of the patellar tendon, the iliotibial band, and/or the pes anserinus tendon; positive patellar apprehension sign; Osgood-Schlatter or Sinding-Larsen-Johansson syndrome; hip pain, back pain, or sacroiliac joint pain. Subjects who have been diagnosed with any neuromuscular disorder of the lower extremity will also be excluded in this study.
Age
From **18 years** old to **45 years** old
Gender
Female

Phase
N/A
Groups that have been masked
No information
Sample size
Target sample size: **76**
Randomization (investigator's opinion)
Randomized
Randomization description
Blinding (investigator's opinion)
Double blinded
Blinding description
Placebo
Not used
Assignment
Parallel
Other design features
Table of random numbers will be used to simply assign the subjects in two groups of treatment The examiner will not be aware of which intervention will be administered to which subject. The patients aware of the existence of two different groups, but do not know about their groups (treatment or control)

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Ethics Committee of Ahvaz Jundishapur University of Medical Sciences
Street address
Central Office, University Campus, Golestan
City
Ahvaz
Postal code
Approval date
2015-04-29, 1394/02/09
Ethics committee reference number
IR,JUMS,REC.1394.25

Health conditions studied

1

Description of health condition studied
Patellofemoral Pain Syndrome
ICD-10 code
M22.2
ICD-10 code description
Chondromalacia patellae

Primary outcomes

1

Description
Hip adduction and internal rotation angles
Timepoint
Before and after treatment interventions
Method of measurement
Motion Analysis System

2

Description
Maximal Isometric Strength of Quadriceps Muscles
Timepoint
Before and after treatment interventions
Method of measurement
Handheld Dynamometer

3

Description
Maximal Isometric Strength of Hamstring Muscles
Timepoint
Before and after treatment interventions
Method of measurement
Handheld Dynamometer

4

Description
Maximal Isometric Strength of Hip External Rotator and

Abductor Muscles

Timepoint

Before and after treatment interventions

Method of measurement

Handheld Dynamometer

5

Description

Knee dynamic valgus

Timepoint

Before and after treatment interventions

Method of measurement

Motion Analysis System

Secondary outcomes

1

Description

Pain and Functional ability of lower extremity

Timepoint

Before and post treatment intervention

Method of measurement

Visual Analog Scale, Kujala Questionnaire

Intervention groups

1

Description

Intervention 1 : The treatment for the individuals in the knee exercise group includes stretching and strengthening of the knee musculature. Each individual will receive 12 sessions of treatment with the frequency of three sessions per week for 45 minutes. For strengthening exercises, the amount of load will be standardized to 70% of the 1-repetition maximum with no pain. For exercises using elastic band, the resistance will be standardized to the maximum resistance that each individual can use to complete 10 repetitions of the exercise. The maximum load and resistance will be determined in the first session, and will be evaluated weekly for any required adjustments. Stretching of the hamstrings and ankle plantar flexors, quadriceps, and iliotibial band will consist of three 30-second stretches, assisted by therapist.

Category

Rehabilitation

2

Description

Intervention 2 : Individuals in the knee and hip exercise group will perform the hip abductor and lateral rotator muscles strengthening exercises in addition to knee musculature stretching and strengthening exercises. Each individual will receive 12 sessions of treatment with the frequency of three sessions per week for 45 minutes. For strengthening exercises, the amount of load will be standardized to 70% of the 1-repetition maximum with no pain. For exercises using elastic band, the resistance will be standardized to the maximum resistance that each individual can use to complete 10 repetitions of the exercise. The maximum load and resistance will be determined in the first session, and will be evaluated weekly for any required adjustments. Stretching of the hamstrings and ankle plantar flexors, quadriceps, and iliotibial band will consist of three 30-second stretches, assisted by therapist.

Category

Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center

Rehabilitation Clinics of School of Rehabilitation Sciences, Ahvaz Jundishapur University of Medical

Full name of responsible person

Dr. Fateme Esfandiarpour

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Ahvaz Jundishapur University of Medical Sciences, Vice Chancellor for Research Development and Techn

Full name of responsible person

Dr. Nader Saki

Street address

The office of Vice Chancellor for Research Development and Technology, University Campus, Golestan

City

Ahvaz

Grant name

Grant code / Reference number

1394-25

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

Yes

Title of funding source

Ahvaz Jundishapur University of Medical Sciences, Vice Chancellor for Research Development and Techn

Proportion provided by this source

100

Public or private sector

empty

Domestic or foreign origin

empty

Category of foreign source of funding

empty

Country of origin

Type of organization providing the funding

empty

Person responsible for general inquiries

Contact

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Sharing plan

Deidentified Individual Participant Data Set (IPD)
empty

Study Protocol
empty

Statistical Analysis Plan
empty

Informed Consent Form
empty

Clinical Study Report
empty

Analytic Code
empty

Data Dictionary
empty