Clinical Trial Protocol
Iranian Registry of Clinical Trials

22 Nov 2026

Study of Electromyographic Variables in People with Patellar Maltracking Received Dry Needling of Popliteus Muscle: A Randomized Clinical Trial

Protocol summary

Study aim
The study of electromyographic variables following the use of dry needling on the popliteus muscle.

Design
A controlled, parallel-group, single-blind, randomized clinical trial of 24 patients. Permutation block randomization is used.

Settings and conduct
Study will be conducted at the Neuromuscular Rehabilitation Research Center of Semnan University of Medical Sciences, people with patellar maltracking randomly allocated in control and treatment groups. the evaluator will be blinded to allocation.

Participants/Inclusion and exclusion criteria
Inclusion criteria: Age between 18-39. Having pain in at least two of the following: climbing and descending stairs, squatting, prolonged sitting, running, isometric quadriceps contraction and kneeling. Pain of at least 30 out of 100 on the Visual Analog Scale in the past three weeks (maximum pain 70). Positive Clarke and McConnell tests. Having at least one period of routine physical therapy without impact for patellar maltracking in the past. Presence of one of the factors that cause disorders in the direction of the patella. Presence of at least one trigger point in the popliteus muscle. Exclusion criteria: Systemic and Neurological diseases. Peripheral nerve entrapment. Connective tissue injuries. History of lower limb surgery. Injury to the lower limb in the past year or fracture, dislocation and sublaxation. Pathologies and other similar anterior knee pain. Receiving medicine in the previous two weeks. People who have received rehabilitation, acupuncture or dry needling for patellar maltracking in the last 6 months. Dry needling contraindications.

Intervention groups
In the intervention group, three dry needling sessions per week (with an interval of 48 hours) are performed for two weeks.

Main outcome variables
Visual analog scale score, Kujala patellofemoral scale score, Signal amplitude and muscle activation time while moving on the stairs.

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20230512058156N1**
Registration date: **2023-05-14, 1402/02/24**
Registration timing: **prospective**

Last update: **2023-05-14, 1402/02/24**
Update count: **0**

Registration date
2023-05-14, 1402/02/24

Registrant information

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Name of organization / entity

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Iran (Islamic Republic of)

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Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2023-05-22, 1402/03/01

Expected recruitment end date
2023-08-23, 1402/06/01

Actual recruitment start date
empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Study of Electromyographic Variables in People with Patellar Maltracking Received Dry Needling of Popliteus Muscle: A Randomized Clinical Trial

Public title

The effect of Dry needling on the Popliteus muscle in Patellar maltracking

Purpose

Treatment

Inclusion/Exclusion criteria

Inclusion criteria:

Age between 18-39. Having pain in at least two of the following: climbing stairs, descending stairs, squatting, prolonged sitting, running, isometric quadriceps contraction and kneeling. Pain of at least 30 out of 100 on the Visual Analog Scale in the past three weeks (maximum pain 70). Positive Clarke and McConnell tests. Having at least one period of routine physical therapy without impact for patellar maltracking in the past. Presence of one of the factors that cause disorders in the direction of the patella including defects in supporting muscles and guiding mechanisms, bone abnormalities, lower limb abnormalities, quadriceps muscle abnormalities such as vastus medialis oblique weakness, internal retinaculum laxity, external retinaculum stiffness, iliotibial band stiffness, hamstring shortness, gastrocnemius shortness , patella tendon elongation and patella alta, Q angle increase, genu valgum, genu recurvatum, femoral antiversion, trochlear dysplasia, external tilt of the patella, external displacement of the tibial tubercle or external rotation of the tibia and excessive pronation of the foot. Presence of at least one trigger point in the popliteus muscle.

Exclusion criteria:

Systemic diseases such as diabetes, rheumatoid arthritis, etc. Neurological diseases such as multiple sclerosis, epilepsy, etc. Peripheral nerve entrapment (acute disc herniation, spondylolisthesis, etc). Connective tissue injuries (torn meniscus, ligament, patella tendinopathy, etc). History of knee, hip and lower limb surgery. Injury to the lower limb in the past year or fracture, dislocation and sublaxation. Pathologies and other similar anterior knee pain include knee osteoarthritis, patellar chondromalacia, osteochondritis dissecans, articular cartilage damage, osgood schlatter, plica syndrome, bone tumors, patellar stress fracture, knee and pes anserine bursitis, fat pad impingement, patellar tendonitis and quadriceps tendinopathy. Receiving medicine in the previous two weeks. People who have received rehabilitation treatment, acupuncture or dry needling for patellar maltracking in the last 6 months. Dry needling contraindications, such as pregnancy, cardiovascular diseases, cancer, epilepsy, presence of lymphedema in the body, history of allergy to needles and injections, needle phobia and patient dissatisfaction.

Age

From **18 years** old to **39 years** old

Gender

Both

Phase

N/A

Groups that have been masked

- Outcome assessor

Sample size

Target sample size: **24**

Randomization (investigator's opinion)

Randomized

Randomization description

Patients will be entered into the treatment group or the control group by the block randomization method. The sample size for each group is 12 patients (24 patients in total). The patients, the therapist and the evaluator do not know about the grouping. Also, two groups will be homogenized in terms of weight, age and gender distribution. In order to create randomization, we use the permuted block randomization method. Random block sequence was obtained using Random allocation software. In total, we will have 6 blocks of 4 and the patients will enter the study based on it.

Blinding (investigator's opinion)

Single blinded

Blinding description

A physiotherapist will be in charge of the treatment process of the intervention group, and another physiotherapist will evaluate the desired variables. Therefore, the future study will be a single-blind study.

Placebo

Not used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Research Ethics Committees of Semnan University Of Medical Sciences and Health Services

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Basij Blvd, Semnan University of Medical Sciences

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Province

Semnan

Postal code

3514799442

Approval date

2023-05-01, 1402/02/11

Ethics committee reference number

IR.SEMUMS.REC.1402.013

Health conditions studied

1

Description of health condition studied
Patellar maltracking
ICD-10 code
M22.2X9
ICD-10 code description
Patellofemoral disorders, unspecified knee

Primary outcomes

1

Description
Signal amplitude
Timepoint
Before and After the Intervention and Follow up
Method of measurement
Surface Electromyography

Secondary outcomes

1

Description
Visual Analog Scale score
Timepoint
Before and After the Intervention and Follow up
Method of measurement
Visual Analog Scale

2

Description
Kujala Patellofemoral Scale System score
Timepoint
Before and After the Intervention and Follow up
Method of measurement
Kujala Patellofemoral Scale System

Intervention groups

1

Description
Intervention group: In the intervention group (12 people), three sessions of dry needling are performed per week (48 hours apart), for two weeks and a total of 6 sessions of dry needling. We should check the popliteus for active or latent myofascial trigger points. The patient is asked to take a bath before the sessions. The area to be needled should be cleaned well with alcohol. The needles used are sterile and disposable. We insert the needle very quickly through the skin with a flick of the wrist or a strong tap into the trigger points. For needling, we place the trigger points between the thumb, index and middle finger, and the needle is directed towards the trigger points, and the therapist's fingers are placed in the lower part of the tissue. The person lies on the side with his knee and hip flexed at 90 degrees, and in this position, the muscle is touched just behind the proximal one-fifth of the tibia. The needle is inserted from the medial to the lateral with a slight superior-anterior orientation towards the trigger points. We keep the needle near the posterior part of the tibia or as a reference, the bone can be touched with the tip of the needle. Needles with a size of 0.3 x 50 mm are inserted into the muscle with a 40 mm tube and remain in the muscle for 6 minutes and are rotated ten times at the beginning, after three minutes and at the end of 6 minutes. In order to reduce the amount and duration of irritation caused by dry needling, after removing the needle, ischemic pressure is applied to the relevant area for one minute.
Category
Treatment - Devices

2

Description
Control group: Due to the invasive nature of dry needling and the difficulty of using placebo studies for this intervention, as well as to find the net effect of dry needling on the myofascial trigger points of the popliteus muscle in people with patellar maltracking, the control group does not receive treatment and they are evaluated only on the first day, the end of the second week, and the end of the fourth week.
Category
N/A

Recruitment centers

1

Recruitment center
Name of recruitment center
Neuromuscular Rehabilitation Research Center of Semnan University of Medical Sciences
Full name of responsible person
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Sponsors / Funding sources

1

Sponsor
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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
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Sharing plan

Deidentified Individual Participant Data Set (IPD)
No - There is not a plan to make this available

Justification/reason for indecision/not sharing IPD
There is no more information.

Study Protocol

No - There is not a plan to make this available

Statistical Analysis Plan

No - There is not a plan to make this available

Informed Consent Form

No - There is not a plan to make this available

Clinical Study Report

No - There is not a plan to make this available

Analytic Code

No - There is not a plan to make this available

Data Dictionary

No - There is not a plan to make this available