Clinical Trial Protocol
Iranian Registry of Clinical Trials

10 Jun 2026

Investigating effects of extracorporeal shockwave therapy on hamstring tightness and comparing it with dynamic soft tissue mobilization in basketball players aged 15 to 18 years old

Protocol summary

Study aim
Determining and comparing the effect of extracorporeal shock wave and dynamic soft tissue mobilization on hamstring tightness in basketball players

Design
Non-randomized, Single-blinding clinical trial, with the parallel groups, Phase 2 on 40 patients

Settings and conduct
In this randomized, single-blind clinical trial, 40 eligible basketball players referred to Amin hospital in Isfahan will be included in the study and will be divided into two groups. Participants in the first group will be treated with mobilization and in the second group will be treated with extracorporeal shockwave. Then the active knee extension angle, Y balance test and popliteal angle will be evaluated and compared between the two groups.

Participants/Inclusion and exclusion criteria
Inclusion criteria included basketball players with hamstring tightness or limited active knee extension angle (AKEA), in the age group of 15 to 18 years, with at least two years of playing basketball and at least 3 sessions per week. Exclusion criteria include a positive slump test, having a history of hip and knee fractures, having a history of femoral fracture, existence of internal fixators such as screws and plates, acute hamstring injury, having a history of back pain in the last three months, complaints of pain and injury to the knee and hip joints, tightness in the knee joint, having a coagulation disorder / acute infection / pregnancy / malignancy.

Intervention groups
Intervention group 1: In this group, participants will undergo dynamic soft tissue mobilization by an experienced physiotherapist for 4 weeks, three sessions per week. Intervention group 2: In this group, participants will be extracorporeal shock wave for 4 weeks, one session per week.

Main outcome variables
Active knee extension angle; Performance and balance; Popliteal angle

General information

Reason for update
Acronym
IRCT registration information
IRCT registration number: **IRCT20220410054479N1**
Registration date: **2022-08-14, 1401/05/23**
Registration timing: **registered_while_recruiting**

Last update: **2022-08-14, 1401/05/23**
Update count: **0**

Registration date
2022-08-14, 1401/05/23

Registrant information
Name
shayan behnammanesh
Name of organization / entity
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Iran (Islamic Republic of)
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+98 31 3629 0875
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Recruitment status
Recruitment complete
Funding source

Expected recruitment start date
2022-06-05, 1401/03/15
Expected recruitment end date
2022-09-21, 1401/06/30
Actual recruitment start date
empty

Actual recruitment end date
empty
Trial completion date
empty

Scientific title
Investigating effects of extracorporeal shockwave therapy on hamstring tightness and comparing it with dynamic soft tissue mobilization in basketball players aged 15 to 18 years old

Public title
Investigating effects of extracorporeal shockwave therapy on hamstring tightness and comparing it with dynamic soft tissue mobilization in basketball players
Purpose
Treatment
Inclusion/Exclusion criteria
Inclusion criteria:
Age between 15 to 18 years Having at least two years of playing basketball and at least 3 sessions per week Referral with the main complaint of posterior femoral hamstring tightness or limitation of the active knee extension angle (AKEA) below 170 degrees of knee extension Consent to participate in the study
Exclusion criteria:
Positive slump test The history of hip and knee fractures The history of femoral bone fracture Existence of internal fixators such as screws and plates Acute hamstring injury The history of back pain in the last three months Complaints of pain and injury to the knee and hip joints Tightness in the knee joint The coagulation disorder / acute infection / pregnancy / malignancy
Age
From **15 years** old to **18 years** old
Gender
Both

Phase
2
Groups that have been masked

- Participant
- Outcome assessor
- Data analyser
- Data and Safety Monitoring Board

Sample size
Target sample size: **40**
Randomization (investigator's opinion)
Randomized
Randomization description
Due to the fact that patients are added to the study over time and not all cases are available at the same time, in order to perform randomization, each eligible patient is assigned to one of the two groups by lottery.
Blinding (investigator's opinion)
Single blinded
Blinding description
Due to the difference in intervention in each of the two groups, the investigator are aware of the type of intervention in each group. But the participant, the outcome assessor, and the Data analyser will not have any knowledge of the type of intervention in each group.
Placebo
Not used
Assignment
Parallel
Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Ethics committee of Isfahan University of Medical Sciences
Street address
Street address Isfahan University of Medical Sciences, Hezar Jarib Ave., Azadi Sq
City
Isfahan
Province
Isfehan
Postal code
8179964167
Approval date
2022-02-13, 1400/11/24
Ethics committee reference number
IR.MUI.MED.REC.1400.801

Health conditions studied

1

Description of health condition studied
Hamstring muscle tightness
ICD-10 code
M95
ICD-10 code description
Other acquired deformities of musculoskeletal system and connective tissue

Primary outcomes

1

Description
Active knee extension angle
Timepoint
Immediately and one month after the intervention
Method of measurement
Goniometer

2

Description
Popliteal angle
Timepoint
Immediately and one month after the intervention
Method of measurement

Goniometer

3

Description
Performance and balance
Timepoint
Immediately and one month after the intervention
Method of measurement
Y balance test

Secondary outcomes

empty

Intervention groups

1

Description
The first intervention group: In this group, participants will undergo dynamic soft tissue mobilization by an experienced physiotherapist for 4 weeks, three sessions per week. In this group, the patient will take a prone sleeping position, the therapist will be placed on the side of the desired muscle, and the following actions will be performed in sequence. Longitudinal strokes will be applied to the entire hamstring muscle to determine the specific point of muscle titans. Once the desired point is determined, the rest of the treatment will be limited to this point. The patient will then shift to a supine position and will flex the hip and knee 90 degrees. Deep longitudinal strokes will be applied from the distal to the proximal in the direction of the titans point while the foot will be passively extended. Subsequently the progressive and dynamic technique will be performed. In this technique, the patient will actively extend the leg to activate deep muscle inhibition. In the final stage, the hamstring muscle must be contracted eccentrically by the therapist's hand, despite the resistance created. At this stage, the muscle is stretched to the end of the range of motion. During this movement, 5 deep blows are applied from the distal to the proximal on the tight point.
Category
Other

2

Description
The second intervention group: In this group, participants will undergo extracorporeal shock wave (ESWT) on hamstring muscles in prone position for 4 weeks, one session per week. The ESWT device is the DUOLITH SD1 model made by STORZ MEDICAL AG. A total of 2,000 impulses will be delivered to the hamstring muscles by the radial head. Of the mentioned impulses, 1,000, 500, and 500 impulses will be for the long head of the biceps femoris, the semitendinosus muscle, and the semimembranosus muscle, respectively. All impulses will enter the middle of these muscles. The repetition frequency of the shock wave will be 15 Hz.
Category
Treatment - Other

Recruitment centers

1

Recruitment center
Name of recruitment center
Amin Hospital
Full name of responsible person
Shila Haghighat
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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Esfahan University of Medical Sciences
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Mansour Siavash Dastjerdi
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Vice Chancellor for Research, School of Medicine, Hezar Jarib Street, Isfahan.
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dean@med.mui.ac.ir
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
No
Title of funding source
Isfahan 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
Esfahan University of Medical Sciences
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Shila Haghighat
Position
Assistant Professor
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Person responsible for updating data

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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 further 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