Clinical Trial Protocol
Iranian Registry of Clinical Trials

22 Nov 2026

Comparative effects of mulligan two-leg rotation technique and muscle energy technique on hamstring flexibility, pain and functional disability in patients with chronic non-specific low back pain

Protocol summary

Study aim

To compare the effects of the Mulligan two-leg rotation technique and the Muscle Energy Technique on pain, hamstring flexibility, and functional disability in patients with chronic non-specific low back pain.

Design

The double-blinded, parallel-assigned, bi-center, randomized clinical trial was done on 108 patients with a history of pain for more than 12 weeks. Patients were assigned by using the lottery method of simple random sampling.

Settings and conduct

The study was conducted at the physiotherapy department of Bakhtawar Amin Hospital, Multan.

Participants/Inclusion and exclusion criteria

Inclusion Criteria: 1. Both gender, 2. Age group of 18-35years. 3. Non-specific low back pain for more than 3 months. 4. Patients with hamstrings tightness measured by Active Knee Extension (AKE) test. Exclusion Criteria: 1. History of fracture or surgery. 2. Low back pain with active systemic or spine pathology. 3. Upper motor neuron or lower motor neuron lesion 4. Pregnancy, psychological risk factor, or subjects apprehensive for the stretching techniques.

Intervention groups

After taking written informed consent, patients meeting the inclusion and exclusion criteria were screened for hamstring tightness by a trained physiotherapist, having greater than 30-degree loss of knee extension.108 patients were randomly allocated into two groups (54 patients each) by a computer-generated random number table. Group A received Mulligan's two-leg rotation technique with routine physiotherapy and group B received the muscle energy technique with routine physiotherapy. Total 12 sessions were given to both groups, 3 sessions per week. Data was calculated at baseline and after every 6th session.

Main outcome variables

1. Pain measured by Numeric pain rating scale. 2. Hamstring tightness measured by Active knee extension angle. 3. Functional Disability measured by Modified Oswestry Disability Index scale.

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20210821052245N1**
Registration date: **2021-12-07, 1400/09/16**
Registration timing: **retrospective**

Last update: **2021-12-07, 1400/09/16**
Update count: **0**

Registration date

2021-12-07, 1400/09/16

Registrant information

Name

Maryam Razzaq

Name of organization / entity

Bakhtawar Amin Medical and Dental college

Country

Pakistan

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+92 61 6524875

Email address

maryam.raazq@gmail.com

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2020-11-20, 1399/08/30

Expected recruitment end date

2021-07-20, 1400/04/29

Actual recruitment start date

2020-12-01, 1399/09/11

Actual recruitment end date

2021-08-30, 1400/06/08

Trial completion date

2021-08-30, 1400/06/08

Scientific title

Comparative effects of mulligan two-leg rotation technique and muscle energy technique on hamstring flexibility, pain and functional disability in patients with chronic non-specific low back pain

Public title

Effect of hamstring flexibility in patients with chronic non-specific low back pain.

Purpose

Treatment

Inclusion/Exclusion criteria

Inclusion criteria:

Both male and female Age group eighteen to thirty years of age Non-specific low back pain for more than three months. Patients with hamstrings tightness measured by Active Knee Extension (AKE) test with measurement having greater than the thirty-degree loss of knee.

Exclusion criteria:

Low back pain with active systemic or spine pathology. Upper motor neuron lesion and lower motor neuron lesion Pregnancy, psychological risk factor or subjects apprehensive for the stretching techniques History of fracture or surgery of spine, pelvis, hip or knee.

Age

From **18 years** old to **35 years** old

Gender

Both

Phase

N/A

Groups that have been masked

- Participant
- Outcome assessor

Sample size

Target sample size: **116**

Actual sample size reached: **108**

Randomization (investigator's opinion)

Randomized

Randomization description

Patients who were eligible were randomly assigned, using the simple random sampling technique by lottery method. Out of the screened patients, 108 patients who fulfill the inclusion criteria were assigned a number. The walk-in patients were assigned by even numbers and odd numbers. Patients coming at the even numbers were included in Group A (Two Leg Rotation) and those with odd numbers were included in Group B (Muscle Energy Technique). 54 patients were included in Group A and 54 patients were assigned to Group B.

Blinding (investigator's opinion)

Double blinded

Blinding description

The double blinding technique was used. The assessor and participants both were blinded to the given technique. In the end, the study was unblinded and researchers and participants was made aware of the treatment groups in which they were allocated.

Placebo

Not used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Ethics' committee of The University of Lahore, Faculty of Allied health Science

Street address

Defence Road Campus, Bhobatian Chowk, Lahore

City

Lahore

Postal code

54590

Approval date

2020-11-19, 1399/08/29

Ethics committee reference number

IRB-UOL-FAHS/797/2020

Health conditions studied

1

Description of health condition studied

Chronic Low Back Pain with decreased hamstring flexibility

ICD-10 code

M54.5

ICD-10 code description

Low back pain

Primary outcomes

1

Description

Pain intensity

Timepoint

Before the intervention and 2,4 weeks

Method of measurement

Numeric Pain Rating Scale

2

Description

Hamstring flexibility

Timepoint

Before intervention, 2,4 week

Method of measurement
Active knee extension test

3

Description
Functional Disability
Timepoint
Before intervention and 2,4 week
Method of measurement
Modified Oswestary Disability Index

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group (Mulligan Two Leg Rotation): After giving the moist hot pack for 20 minutes at the low back area and hamstrings, the therapist stands at the limited hamstrings flexibility side of the patient lying in a supine position. Both legs were flexed to a level that feet are off the table. After stabilizing the patient shoulders on the bed, the patient’s leg was fully flexed and slowly taken to the side of the limited hamstring muscle flexibility. When the limit was reached, the position was sustained for 30 seconds with overpressure applied by the therapist, and then the legs were lowered to the plinth. Three repetitions were repeated, and 1 minute rest time was given between each stretch. And the same procedure was done for the other side of limited hamstrings flexibility. Total time duration for this technique was 10 minutes.
Category
Rehabilitation

2

Description
Intervention group (Muscle Energy Technique): Post Isometric Relaxation (PIR) of muscle energy technique was used. After applying the moist hot pack for 20 minutes at the low back and hamstrings the patient was instructed to lie in a supine position with the non-treated leg straight on the table. The therapist passively flexed the treated leg at the hip and the patient knee was straightened on the therapist's shoulder until the primary resistance was felt. The patient was instructed to apply pressure for 7-10 seconds on the therapist's shoulder against resistance by using no more than 25% of their strength during isometric contractions. The contraction period was followed by a relaxation period and then the therapist passively straightened the knee towards its new barrier and held it for 30 seconds. The procedure was repeated 4 times with a 10-second rest interval between them. Total time duration for this technique was 10 minutes.
Category
Rehabilitation

Recruitment centers

1

Recruitment center
Name of recruitment center
Bakhtawar Amin Hospital
Full name of responsible person
Maryam Razzaq
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Sponsors / Funding sources

1

Sponsor
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University of Lahore
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Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
No
Title of funding source
UOL
Proportion provided by this source
10
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
Bakhtawar Amin Hospital

Full name of responsible person
Maryam Razzaq

Position
Senior Therapist

Latest degree
Master

Other areas of specialty/work
Physiotherapy

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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
Because patient consent was taken only for this study, so I cannot share the data without their permission.

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
Comparative effects of Mulligan Two Leg Rotation Technique and Muscle Energy Technique on Hamstring flexibility, Pain and Functional Disability in Patients with Chronic Non-Specific Low Back Pain

When the data will become available and for how long
The study is completed and it will be available after publication

To whom data/document is available
To everyone who finds interest.

Under which criteria data/document could be used
Anyone who will request the data,

From where data/document is obtainable
From the Hospital.

What processes are involved for a request to access data/document
Through E-mail address and contact number is given.

Comments
Data will be provided on request.