

# Clinical Trial Protocol

## Iranian Registry of Clinical Trials

10 Jun 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

##### Phone

+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, Bhotatian 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

#### Street address

Northern Bypass, Multan

#### City

Multan

#### Postal code

60000

#### Phone

+92 61 6741001

#### Email

maryam.raazq@gmail.com

#### Web page address

<https://www.trust.bamdc.edu.pk/>

## Sponsors / Funding sources

## 1

### Sponsor

#### Name of organization / entity

University of Lahore

#### Full name of responsible person

Maryam Razzaq

#### Street address

Defence Road Campus, Bhotatian Chowk, Lahore

#### City

Lahore

#### Postal code

54590

#### Phone

+92 42 35322501

#### Email

maryam.raazq@gmail.com

#### Web page address

<https://uol.edu.pk/>

#### 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

**Street address**

House number 486, MDA officers co-operative housing society, Multan

**City**

MULTAN

**Province**

Punjab

**Postal code**

60000

**Phone**

+92 61 6524875

**Email**

maryam.raazq@gmail.com

## Person responsible for scientific 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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## Person responsible for updating data

### Contact

**Name of organization / entity**

Bakhtawar Amin Hospital

**Full name of responsible person**

Maryam Razzaq

**Position**

Senior Therapist

**Latest degree**

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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.