

# Clinical Trial Protocol

## Iranian Registry of Clinical Trials

13 Jun 2026

### Effect of whole body vibration training, on the lower limb muscles' electromyography and timing of activation in patients with knee osteoarthritis during functional activity

#### Protocol summary

##### Study aim

The aim of this study was to investigate the effect of whole body vibration on electromyographic changes and timing of lower limb muscle activity in patients with knee osteoarthritis during functional activity.

##### Design

68 patients with osteoarthritis of the knee participate in this single blind study, which is randomly divided into two groups of intervention and control using four random blocks.

##### Settings and conduct

Volunteer participants with osteoarthritis of the knee referred to the Neuromuscular Rehabilitation Research Center of Semnan University of Medical Sciences are included in the study.

##### Participants/Inclusion and exclusion criteria

Inclusion criteria in this study are complete satisfaction with participation in this study, age between 55 and 75, grade 2 and 3 knee osteoarthritis, visual analogue scale < 4. Exclusion criteria include acute symptomatic osteoarthritis, previous or concomitant injury to the knee and other lower limb joints, history of serious trauma, surgery and arthroplasty of the knee and other lower limb joints, history of knee intra-articular injection of hyaluronic acid or steroid in the last 6 months, history of medical problems and chronic diseases, history of newly repaired fractures and bone implants, having a pacemaker under medical treatment, incomplete treatment and evaluation, whole body vibration training contraindication and a whole body vibration intolerance.

##### Intervention groups

The control group will receive routine physiotherapy including TENS, Continuous US, hot packs and strengthening exercises three days a week for 4 weeks. In addition to routine physiotherapy, the intervention group will receive WBVT therapy sessions 3 days a week for 4 weeks at a frequency of 30 Hz and a 2 mm

amplitude.

##### Main outcome variables

Active time, onset time and peak time during the static phase of the gate and RMS

#### General information

##### Reason for update

##### Acronym

##### IRCT registration information

IRCT registration number: **IRCT20150602022539N11**

Registration date: **2021-10-22, 1400/07/30**

Registration timing: **prospective**

Last update: **2021-10-22, 1400/07/30**

Update count: **0**

##### Registration date

2021-10-22, 1400/07/30

##### Registrant information

##### Name

Ziaeddin Safavi Farokhi

##### Name of organization / entity

Semnan University of Medical Sciences

##### Country

Iran (Islamic Republic of)

##### Phone

+98 23 3365 4180

##### Email address

zsafavi@semums.ac.ir

##### Recruitment status

**Recruitment complete**

##### Funding source

##### Expected recruitment start date

2021-11-01, 1400/08/10

##### Expected recruitment end date

2022-03-06, 1400/12/15

**Actual recruitment start date**

empty

**Actual recruitment end date**

empty

**Trial completion date**

empty

**Scientific title**

Effect of whole body vibration training, on the lower limb muscles' electromyography and timing of activation in patients with knee osteoarthritis during functional activity

**Public title**

Effect of whole body vibration training, on the lower limb muscles' electromyography and timing of activation in patients with knee osteoarthritis during functional activity

**Purpose**

Treatment

**Inclusion/Exclusion criteria****Inclusion criteria:**

Complete satisfaction to participate in this study Age between 55 and 75 years Kellgren-Lawrence grade two and three knee osteoarthritis in plain imaging VAS < 4

**Exclusion criteria:**

Acute symptomatic OA Previous or concomitant injury on the knee and other lower extremity joints Previous history of serious knee trauma, surgery and arthroplasty History of knee intra-articular injection of hyaluronic acid or steroid in the last 6 months History of medical problems such as cardiopulmonary disease, neurologic disease, malignant disease, chronic disease such as diabetes History of newly repaired fracture and bone implants Having a pace maker Taking any medication Incomplete treatment and assessment History of WBVT contraindications (epilepsy, vertigo, uncontrolled hypertension, acute hernia, serious cardiovascular disease, pacemaker, acute thrombosis, tumors, recent surgery) WBVT intolerance

**Age**

From **55 years** old to **75 years** old

**Gender**

Both

**Phase**

N/A

**Groups that have been masked**

- Participant

**Sample size**

Target sample size: **68**

**Randomization (investigator's opinion)**

Randomized

**Randomization description**

In this study, Permuted block randomization will be used for randomization, which includes 4 blocks (2 participants in the intervention group and 2 participants in the control group). Random allocation software is also used for randomization tools. In order to create an allocation concealment, each random sequence created is recorded on a card and the cards are placed in sealed opaque envelopes, respectively. In order to maintain a

random sequence, the envelopes are numbered in the same way on the outer surface. At the beginning of the registration of participants, according to the order of arrival, one of the envelopes is opened in order and the assigned group of that participant is identified.

**Blinding (investigator's opinion)**

Single blinded

**Blinding description**

In this study, blindness will be done in the participants. Participants from both groups will be admitted at different times for evaluation and intervention and will not be aware of the type of intervention of the other group.

**Placebo**

Not used

**Assignment**

Parallel

**Other design features****Secondary Ids**

empty

**Ethics committees****1****Ethics committee****Name of ethics committee**

Ethics committee of Semnan University of Medical Sciences

**Street address**

Semnan, km 5 of Damghan road, Semnan University of Medical Sciences

**City**

Semnan

**Province**

Semnan

**Postal code**

3519899951

**Approval date**

2021-10-04, 1400/07/12

**Ethics committee reference number**

IR.SEMUMS.REC.1400.155

**Health conditions studied****1****Description of health condition studied**

knee osteoarthritis

**ICD-10 code**

M17

**ICD-10 code description**

Osteoarthritis of knee

**Primary outcomes****1****Description**

Onset time of muscle activity during stance phase of a

gait cycle

### **Timepoint**

Before and after one month of intervention

### **Method of measurement**

Surface EMG system and force plate

## 2

### **Description**

RMS of muscle activity during stance phase of a gait cycle

### **Timepoint**

Before and after one month of intervention

### **Method of measurement**

Surface EMG system

## **Secondary outcomes**

## 1

### **Description**

Active time of muscle activity during stance phase of a gait cycle

### **Timepoint**

Before and after one month of intervention

### **Method of measurement**

Surface EMG system and force plate

## 2

### **Description**

Peak time of muscle activity during stance phase of a gait cycle

### **Timepoint**

Before and after one month of intervention

### **Method of measurement**

Surface EMG system and force plate

## **Intervention groups**

## 1

### **Description**

Control group: routine physiotherapy including TENS, Continuous US, hot packs and strengthening exercises three days a week for 4 weeks

### **Category**

Rehabilitation

## 2

### **Description**

Intervention group: routine physiotherapy including TENS, Continuous US, hot packs and strengthening exercises and WBVT exercises with 3 mm amplitude and 30 Hz frequency three days a week for 4 weeks

### **Category**

Rehabilitation

## **Recruitment centers**

## 1

### **Recruitment center**

#### **Name of recruitment center**

Neuromuscular Research Center of Semnan  
University of Medical Sciences

#### **Full name of responsible person**

Ziaeddin safavi farrokhi

#### **Street address**

Semnan, Mashahir Square, in front of the Red  
Crescent Center of Semnan

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3513138111

#### **Phone**

+98 23 3365 4180

#### **Email**

ziasafavi@yahoo.com

## **Sponsors / Funding sources**

## 1

### **Sponsor**

#### **Name of organization / entity**

Semnan University of Medical Sciences

#### **Full name of responsible person**

Parviz Kookhaei

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p-kokha@yahoo.com

### **Grant name**

### **Grant code / Reference number**

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

No

### **Title of funding source**

Vice Chancellor for Research and Technology, 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**

Semnan University of Medical Sciences

**Full name of responsible person**

Ziaeddin Safavi Farrokhi

**Position**

PhD, Assistant Professor

**Latest degree**

Ph.D.

**Other areas of specialty/work**

Physiotherapy

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## Person responsible for updating data

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## Person responsible for scientific inquiries

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**Full name of responsible person**

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**Position**

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**Latest degree**

Ph.D.

**Other areas of specialty/work**

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**Phone**

## Sharing plan

**Deidentified Individual Participant Data Set (IPD)**

Undecided - It is not yet known if there will be a plan to make this available

**Study Protocol**

Undecided - It is not yet known if there will be a plan to make this available

**Statistical Analysis Plan**

Not applicable

**Informed Consent Form**

Undecided - It is not yet known if there will be a plan to make this available

**Clinical Study Report**

Undecided - It is not yet known if there will be a plan to make this available

**Analytic Code**

Not applicable

**Data Dictionary**

Undecided - It is not yet known if there will be a plan to make this available