

# Clinical Trial Protocol

## Iranian Registry of Clinical Trials

10 Jun 2026

### To compare the shoulder girdle exercises with and without electromyographic biofeedback on the electromyography activity of the shoulder girdle muscles in individuals with primary impingement syndrome: A randomized clinical trial

#### Protocol summary

##### Study aim

Determining the effect of exercises of shoulder girdle muscles with EMG biofeedback on electrical activity of this muscles

##### Design

controlled, parallel-group, single-blind, randomized clinical trial on 45 patients, Permutated block randomization

##### Settings and conduct

Study will be conducted at the Neuromuscular Rehabilitation Research Center of Semnan University of Medical Sciences People with primary shoulder impingement syndrome are randomly assigned to one of three intervention and control groups The evaluator will be blinded to allocation

##### Participants/Inclusion and exclusion criteria

inclusion criteria: age 18 to 35 normal BMI onset of shoulder pain less than a year pain in the anterior or lateral part of upper arm VAS <4 positive at least 3 (painful arc during flexion or abduction Neer Kennedy-Hawkins Jobe tests pain during resisted movement of external rotation or abduction) affected side is dominant continuous pain for at least one week in six months Past no limitation in shoulder ROM exclusion criteria: simultaneous pain in both shoulders positive drop arm test sulcus sign history of heart disease pregnancy person cannot work with EMG biofeedback other orthopedic diseases and surgery fracture dislocation subluxation in the upper quadrant of skeleton Systemic and neurological diseases use of corticosteroid drugs and rehabilitation of neck and shoulder girdle in last 6 months and any drug in last two weeks

##### Intervention groups

All three groups receive routine physiotherapy The intervention group perform specific progressive resistive exercises of external rotator muscles of arm and

stabilizer muscles of this movement with EMG biofeedback, at the end they receive cold pack. first control group perform the same exercises without feedback and second control group only receive routine physiotherapy

##### Main outcome variables

normalized muscle electrical activity; pain; DASH questionnaire score

#### General information

##### Reason for update

##### Acronym

##### IRCT registration information

IRCT registration number: **IRCT20240313061278N1**  
Registration date: **2024-04-03, 1403/01/15**  
Registration timing: **prospective**

Last update: **2024-04-03, 1403/01/15**

Update count: **0**

##### Registration date

2024-04-03, 1403/01/15

##### Registrant information

##### Name

Mehran Borjipour

##### Name of organization / entity

##### Country

Iran (Islamic Republic of)

##### Phone

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##### Email address

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##### Recruitment status

**Recruitment complete**

##### Funding source

**Expected recruitment start date**

2024-04-20, 1403/02/01

**Expected recruitment end date**

2024-07-22, 1403/05/01

**Actual recruitment start date**

empty

**Actual recruitment end date**

empty

**Trial completion date**

empty

**Scientific title**

To compare the shoulder girdle exercises with and without electromyographic biofeedback on the electromyography activity of the shoulder girdle muscles in individuals with primary impingement syndrome: A randomized clinical trial

**Public title**

The effect of electromyographic biofeedback on the electromyographic activity of the shoulder girdle muscles in primary impingement syndrome

**Purpose**

Treatment

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

Onset of shoulder pain less than a year ago Pain in the anterior or lateral part of the upper arm Shoulder pain in the range of VAS less than 4 (1 to 3) Positiveness of at least 3 of the following: painful arch during flexion or abduction movements - positive Neer test - positive Kennedy-Hawkins test - positive Jobe test - pain during resisted movement of external rotation or abduction The involved side is the dominant side of the person Persistent pain for at least one week in the past six months Without limitation in shoulder range of motion Age between 18 and 35 years Normal BMI (18.5 to 24.9)

**Exclusion criteria:**

Pain in both shoulders at the same time Positive drop arm test for complete rotator cuff tear Instability or hypermobility of the glenohumeral joint (sulcus sign) History of heart disease pregnancy Person cannot work with electromyographic biofeedback Other orthopedic diseases in the upper quadrant of the skeleton Systemic diseases Neurological diseases Surgery, fracture, dislocation or subluxation in the upper quadrant of the skeleton People who have taken corticosteroid drugs in the last six months People who have taken any medicine in the previous two weeks People who have received cervical or shoulder girdle rehabilitation in the last six months

**Age**From **18 years** old to **35 years** old**Gender**

Both

**Phase**

N/A

**Groups that have been masked**

- Outcome assessor

**Sample size**Target sample size: **45****Randomization (investigator's opinion)**

Randomized

**Randomization description**

The sample size in each group is 15 people (45 people in total). Permuted block randomization is used for randomization. For this, we use blocks of six in the following order. In each block, a means the intervention group (EMG biofeedback with exercise and routine physiotherapy), b (exercise therapy along with routine physiotherapy) and c (routine physiotherapy alone) means the control groups. First, a number is assigned to each of the blocks (aabbcc cabbac abcabc bacbac cbaabc bbaacc ccaabb aaccbb ccbbaa) randomly from 1 to 9, then people are placed in the blocks from block one and from the left. and based on the letter (a, b, and c) that is chosen for each person, the person enters the intervention or control groups. The participants, the therapist and the evaluator will be unaware of the grouping. To implement the generated random sequence, the method of hiding the box or coded cans is used. In this method, the cans will be numbered based on a random sequence, and inside the boxes, the intended intervention will be provided to the therapist with a sheet on which random allocation is written, with the condition that the boxes are sealed and completely confidential. and the therapist will assign them to the intervention and control groups based on the order of arrival of the patients.

**Blinding (investigator's opinion)**

Single blinded

**Blinding description**

A physiotherapist will be in charge of the treatment process and another physiotherapist will evaluate the desired variables. For this reason, the study will be a single-blind study from the evaluator.

**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

**Street address**

Basij Blvd, Semnan University of Medical Sciences

**City**

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**Postal code**

3514799442

**Approval date**

**Ethics committee reference number**

IR.SEMUMS.REC.1402.312

**Health conditions studied**

**1**

**Description of health condition studied**

Primary shoulder impingement syndrome

**ICD-10 code**

M75.4

**ICD-10 code description**

Impingement syndrome of shoulder

**Primary outcomes**

**1**

**Description**

Normalized muscle electrical activity

**Timepoint**

Before and After of the Intervention

**Method of measurement**

Surface EMG

**Secondary outcomes**

**1**

**Description**

Pain

**Timepoint**

Before and After of the Intervention

**Method of measurement**

Visual analogue scale (VAS)

**2**

**Description**

Functional disability

**Timepoint**

Before and After of the Intervention

**Method of measurement**

The disabilities of the arm, shoulder and hand (DASH) questionnaire

**Intervention groups**

**1**

**Description**

Intervention group: Treatment in the intervention group (15 people) includes 24 sessions (8 weeks, 3 days a week, every other day). At the beginning of the treatment sessions, 20 minutes of hot pack, 20 minutes of conventional transcutaneous electrical nerve stimulation (TENS) and 5 minutes of 1 MHz and 1.5 intensity ultrasound are performed. Then, before doing the exercises, the people of this group perform upper limb cycling exercises without resistance for 5 minutes,

then, based on the standard shoulder exercise protocol, progressive resistance exercises of the external rotator muscles of the arm (infraspinatus and teres minor) including external rotation exercises of the arm in the neutral position, 45 degrees of abduction, 90 degrees of abduction and in the weight bearing position and progressive resistance exercises of the stabilizer muscles of the movement of the external rotation of the arm (middle and lower trapezius) including scapular retraction and T and Y exercises with EMG biofeedback and under external resistance by Theraband. The amount of resistance applied by Theraband (Theraband color) is increased and determined as a percentage of the maximal voluntary isometric contraction (MVIC) of each muscle according to the desired week from 50% to 80% of MVIC. This resistance is determined weekly. Also, the exercises are done in 10 repetition in each set, and the number of sets increases from 2 sets to 3 sets according to the desired week. Also, oscillation is added to the end of the exercises to apply more resistance along with the progress of the exercises. At the end, a cold pack is used for 10 minutes to prevention of pain and inflammation after the exercises. Range of motion exercises are repeated ten times a day and stretching exercises are performed five times a day.

**Category**

Treatment - Devices

**2**

**Description**

Control group: The treatment in the first control group (15 people) includes 24 sessions (8 weeks, 3 days a week, every other day). The treatment in this group will be the same as the intervention group, with the difference that this group will perform exercises without EMG biofeedback. exercise resistance is also determined by Theraband and based on the percentage of MVIC at the beginning of each week (Theraband color), then the people of this group perform the exercises with the determined Theraband and without EMG biofeedback.

**Category**

N/A

**3**

**Description**

Control group: The treatment in the second control group (15 people) includes 24 sessions (8 weeks, 3 days a week, every other day). In this group, only routine physiotherapy including 20 minutes of hot pack, 20 minutes of conventional transcutaneous electrical nerve stimulation (TENS) and 5 minutes of 1 MHz and 1.5 intensity ultrasound is performed, and this group does not perform therapeutic exercise intervention. At the end of the study, the results will be evaluated and compared with other groups.

**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**

Mehran Borjipour

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Neuromuscular Rehabilitation Research Center, Quds  
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### Sponsors / Funding sources

## 1

### Sponsor

**Name of organization / entity**

Semnan University of Medical Sciences

**Full name of responsible person**

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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**

Semnan University of Medical Sciences

**Full name of responsible person**

Mehran Borjipour

**Position**

Master student

**Latest degree**

Bachelor

**Other areas of specialty/work**

Physiotherapy

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### Person responsible for scientific inquiries

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### Person responsible for updating data

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**Latest degree**

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**Other areas of specialty/work**

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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