

# Clinical Trial Protocol

## Iranian Registry of Clinical Trials

09 Jun 2026

### The effect of corrective exercises on ground reaction forces in male students with upper crossed syndrome during throwing

#### Protocol summary

##### Study aim

The purpose of this study was to assess the effect of corrective exercises on ground reaction forces in male student handball players with upper-crossed syndrome during throwing.

##### Design

Clinical trial with intervention and control group, with parallel groups, double-blind, randomized, phase 2 on 30 patients.

##### Settings and conduct

Measurements were performed at Hamadan Azad University. Exercises were performed at the Enghlab sports complex.

##### Participants/Inclusion and exclusion criteria

The eligibility criteria were as follows aged between 14 and 20 years, shoulder angle (SA > 49°), cervical angle (CA > 44°), thoracic kyphosis angle (tkA > 42°)

##### Intervention groups

The experimental group (n=15) received an 8-week corrective exercise (CE) programme. The control group was asked to maintain their ordinary daily activities and not to participate in any exercise programs.

##### Main outcome variables

The time to reach the maximum ground reaction force for the left and right leg, anterior, posterior, vertical. The mean and standard deviation of ground reaction force for the left and right leg, anterior, posterior, vertical.

#### General information

##### Reason for update

##### Acronym

##### IRCT registration information

IRCT registration number: **IRCT20200622047888N2**

Registration date: **2023-08-30, 1402/06/08**

Registration timing: **retrospective**

Last update: **2023-08-30, 1402/06/08**

Update count: **0**

##### Registration date

2023-08-30, 1402/06/08

##### Registrant information

###### Name

Aynollah Sakinepoor

###### Name of organization / entity

Kharazmi University, Tehran, Iran

###### Country

Iran (Islamic Republic of)

###### Phone

+98 83 4522 6103

###### Email address

asakenapoor@yahoo.com

##### Recruitment status

**Recruitment complete**

##### Funding source

##### Expected recruitment start date

2023-07-08, 1402/04/17

##### Expected recruitment end date

2023-07-15, 1402/04/24

##### Actual recruitment start date

2023-07-08, 1402/04/17

##### Actual recruitment end date

2023-07-15, 1402/04/24

##### Trial completion date

2023-07-15, 1402/04/24

##### Scientific title

The effect of corrective exercises on ground reaction forces in male students with upper crossed syndrome during throwing

##### Public title

The effect of corrective exercises on ground reaction forces

##### Purpose

Prevention

##### Inclusion/Exclusion criteria

**Inclusion criteria:**

No other abnormalities (except upper crossed syndrome)  
Aged between 14 and 20 years  
Normal body mass index  
Male  
Activity history between 2 to 5 years  
Having a forward head deformity greater than 46 degrees  
Shoulder forward greater than 52 degrees  
Kyphosis greater than 42 degrees

**Exclusion criteria:**

Having significant neurologic or cardiovascular disorders  
A history of surgery on the upper limbs in the previous six months  
The beginning of any analgesic intervention for musculoskeletal pain within the previous six weeks

**Age**

From **14 years** old to **20 years** old

**Gender**

Male

**Phase**

N/A

**Groups that have been masked**

- Participant
- Data analyser

**Sample size**

Target sample size: **34**

Actual sample size reached: **30**

**Randomization (investigator's opinion)**

Randomized

**Randomization description**

Participants were randomized by the slot-drawing method to experimental and control groups. The randomization sequence was not disclosed until participants had completed their baseline assessments. Allocation was by sealed opaque envelopes. Participants were assigned to each (experimental or control) group by a sealed envelope containing the name of one of the two groups.

**Blinding (investigator's opinion)**

Double blinded

**Blinding description**

Participants were randomized by the slot-drawing method to experimental and control groups. The randomization sequence was not disclosed until participants had completed their baseline assessments. Allocation was by sealed opaque envelopes. Participants were assigned to each (experimental or control) group by a sealed envelope containing the name of one of the two groups.

**Placebo**

Not used

**Assignment**

Parallel

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

empty

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

Research Ethics Committees of Hormozgan University of Medical Sciences

**Street address**

Mofateh

**City**

EslamAbad Garb

**Province**

Kermanshah

**Postal code**

6761753164

**Approval date**

2023-07-07, 1402/04/16

**Ethics committee reference number**

IR.HUMS.REC.1402.135

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

Upper crossed syndrome

**ICD-10 code****ICD-10 code description****Primary outcomes****1****Description**

Ground reaction forces

**Timepoint**

The ground reaction forces were measured before and eight weeks after the exercises

**Method of measurement**

The ground reaction forces is measured by force plate device

**Secondary outcomes****1****Description**

Forward head and protracted shoulder angles were measured by photogrammetric method. Thoracic kyphosis angle were measured by Flexicurve method

**Timepoint**

Forward head and protracted shoulder and kyphosis angles were measured before and after the eight the corrective exercises

**Method of measurement**

Forward head and protracted shoulder angles were measured by photogrammetric method. Thoracic kyphosis angle were measured by Flexicurve method

**Intervention groups**

## 1

### Description

Intervention group 1: In this group the ground reaction forces is measured by force plate Then Subjects receive corrective exercise for eight weeks, and then at the end of the eight weeks the ground reaction forces is measured again. Training sessions consist of eight weeks with three training sessions per week for one hour.

### Category

Prevention

## 2

### Description

Control group: The control group was asked to maintain their ordinary daily activities and not to participate in any exercise programs

### Category

Prevention

## Recruitment centers

## 1

### Recruitment center

#### Name of recruitment center

Enghelab Sport Complex

#### Full name of responsible person

Ainollah Sakinehpoor

#### Street address

Street Hor

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Eslam Abad Garb

#### Province

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#### Postal code

6761753164

#### Phone

+98 83 4522 6103

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asakenapoor@yahoo.com

## Sponsors / Funding sources

## 1

### Sponsor

#### Name of organization / entity

Kharazmi University

#### Full name of responsible person

Ainollah Sakinepoor

#### Street address

Alley 5, HOR Street

#### City

Eslam Abad Garb

#### Province

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#### Phone

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### Email

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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

It is a personal financial source

### Proportion provided by this source

100

### 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

Persons

## Person responsible for general inquiries

### Contact

#### Name of organization / entity

Bandare-abbas University of Medical Sciences

#### Full name of responsible person

Ainollah Sakinepoor

#### Position

PhD, sport injury and corrective exercises

#### Latest degree

Ph.D.

#### Other areas of specialty/work

Sport injury and corrective exercises

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## Person responsible for scientific inquiries

### Contact

#### Name of organization / entity

The University of Kharazmi

#### 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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## Person responsible for updating data

### Contact

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The University of Kharazmi  
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**Position**  
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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 more 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