# Clinical Trial Protocol
# Iranian Registry of Clinical Trials

22 Nov 2026

## Effect of Eight Weeks of Corrective Exercises (NASM) With and Without Instrument-Assisted Soft Tissue Mobilization (Graston Technique) on Postural Structure, Respiratory Function, and Quality of Life in Men with Upper Crossed Syndrome

## Protocol summary


**Study aim**
To compare the effects of eight weeks of NASM corrective exercises alone and combined with the Graston technique on postural alignment, respiratory function, and quality of life in men with upper crossed syndrome.

**Design**
A two-arm, parallel-group randomized clinical trial with pre- and post-intervention assessments. Thirty participants will be individually randomized by lottery in a 1:1 ratio.

**Settings and conduct**
Participants will be recruited through purposive and convenience sampling from desk workers and corrective exercise centers in Isfahan Province, Iran. After informed consent and baseline assessment, participants will be randomly assigned to interventions, followed by post-intervention assessment.

**Participants/Inclusion and exclusion criteria**
Thirty men aged 20–45 years with upper crossed syndrome diagnosed by a physiotherapist or corrective exercise specialist, at least two postural abnormalities, and informed consent will be included. Exclusion criteria include diseases preventing exercise, sensitivity to massage, and recent neck, shoulder, or spinal surgery (within six months). Withdrawal criteria include complications, three consecutive or five nonconsecutive missed sessions, or voluntary withdrawal.

**Intervention groups**
Group 1 (n=15): NASM corrective exercises for 45 minutes per session. Group 2 (n=15): 45 minutes of NASM exercises followed by 15 minutes of the Graston technique. Both groups will receive three sessions weekly for eight weeks (24 sessions).

**Main outcome variables**
Forward head posture, rounded shoulders, thoracic kyphosis, respiratory function indices, and quality of life, assessed before and after eight weeks of intervention.


## General information

**Reason for update**

**Acronym**

**IRCT registration information**
IRCT registration number: **IRCT20261006071325N1**
Registration date: **2026-11-16, 1405/08/25**
Registration timing: **prospective**

Last update: **2026-11-16, 1405/08/25**
Update count: **0**

**Registration date**
2026-11-16, 1405/08/25

**Registrant information**


**Name**
Seyed Mehdi Taheri Ghafarokhi

**Name of organization / entity**
Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran.

**Country**
Iran (Islamic Republic of)

**Phone**
+98 31 3776 4375

**Email address**
seyedmehdi.taherigafarokhi@iau.ir


**Recruitment status**
**recruiting**

**Funding source**

**Expected recruitment start date**
2026-11-21, 1405/08/30

**Expected recruitment end date**

2027-03-19, 1405/12/28

**Actual recruitment start date**

empty

**Actual recruitment end date**

empty

**Trial completion date**

empty

**Scientific title**

Effect of Eight Weeks of Corrective Exercises (NASM) With and Without Instrument-Assisted Soft Tissue Mobilization (Graston Technique) on Postural Structure, Respiratory Function, and Quality of Life in Men with Upper Crossed Syndrome

**Public title**

Comparing corrective exercises alone with corrective exercises plus Graston therapy for improving posture, breathing, and quality of life in men with upper crossed syndrome

**Purpose**

Treatment

**Inclusion/Exclusion criteria**

**Inclusion criteria:**

Men aged 20 to 45 years with upper crossed syndrome diagnosed by a physiotherapist or corrective exercise specialist. Presence of at least two postural abnormalities: forward head posture, forward shoulder posture, or thoracic kyphosis. Providing informed consent to participate in the study. Absence of acute or chronic respiratory, cardiac, or neurological diseases that prevent participation in the exercise program. No sensitivity to massage.

**Exclusion criteria:**

History of surgery involving the spine, shoulder, or neck within the previous six months.

**Age**

From **20 years** old to **45 years** old

**Gender**

Male

**Phase**

N/A

**Groups that have been masked**

*No information*

**Sample size**

Target sample size: **30**

**Randomization (investigator's opinion)**

Randomized

**Randomization description**

Following purposive and convenience sampling and assessment of the inclusion and exclusion criteria, 30 men aged 20–45 years with upper crossed syndrome will be enrolled in the study. After baseline assessments, participants will be randomly allocated to two groups of 15 participants each using a lottery method with a 1:1 allocation ratio. The first group will receive NASM corrective exercises combined with instrument-assisted soft tissue mobilization (Graston technique), while the second group will receive NASM corrective exercises alone. The unit of randomization will be the individual participant, and no stratification will be applied. For random allocation, 30 identical slips of paper will be prepared, with 15 labeled as Group 1 and 15 as Group 2. All slips will be folded identically, thoroughly mixed, and placed in an opaque container. After confirmation of eligibility and completion of baseline assessments, one slip will be drawn for each participant without replacement to determine group allocation. To ensure allocation concealment, the contents of the slips will remain hidden until the time of drawing, and neither participants nor assessors will know the assigned group before allocation.

**Blinding (investigator's opinion)**

Not blinded

**Blinding description**

**Placebo**

Not used

**Assignment**

Parallel

**Other design features**

## Secondary Ids

empty

## Ethics committees

### 1

**Ethics committee**

**Name of ethics committee**

Ethics Committee of Islamic Azad University, Isfahan (Khorasgan) Branch

**Street address**

University Boulevard, Arghavanieh, East Jey Street, Isfahan, Iran

**City**

Isfahan

**Province**

Isfehan

**Postal code**

8155139998

**Approval date**

2026-09-15, 1405/06/24

**Ethics committee reference number**

IR.IAU.KHUISF.REC.1405.407

## Health conditions studied

### 1

**Description of health condition studied**

Upper Crossed Syndrome (UCS)

**ICD-10 code**

M40.0

**ICD-10 code description**

Postural kyphosis

### 2

**Description of health condition studied**

Upper Crossed Syndrome (UCS)

**ICD-10 code**

R29.3

**ICD-10 code description**
Abnormal posture

## Primary outcomes

### 1

**Description**
Change in pulmonary function from baseline to the end of the 8-week intervention, assessed using forced vital capacity (FVC), forced expiratory volume in one second (FEV1), the FEV1/FVC ratio, and vital capacity (VC).
**Timepoint**
At baseline (before the intervention) and immediately after completion of the 8-week intervention (24 sessions).
**Method of measurement**
Pulmonary function will be assessed using a digital spirometer (Spirolab MIR, Italy). The measured indices will include forced vital capacity (FVC), forced expiratory volume in one second (FEV1), the FEV1/FVC ratio, and vital capacity (VC). The device will be calibrated using a standard 3-liter syringe. Participants will be tested in a seated position after receiving instructions on proper breathing maneuvers. At least three spirometry trials will be performed, and the mean value of each respiratory index will be recorded. All tests will be conducted according to ATS/ERS standardized guidelines.

## Secondary outcomes

### 1

**Description**
Forward head posture angle
**Timepoint**
At baseline (before the intervention) and immediately after completion of the 8-week intervention.
**Method of measurement**
Forward head posture was assessed using photogrammetry and Kinovea software (version 2025.2). A Samsung Galaxy A12 smartphone camera mounted on a tripod was positioned 1.5 meters from the participant, with the lens center approximately at the level of the seventh cervical vertebra (C7) and perpendicular to the sagittal plane. The C7 spinous process and the midpoint of the ear tragus were identified by palpation and marked with skin markers. Participants stood in a natural, relaxed position, with their feet shoulder-width apart and arms hanging freely at their sides. A lateral photograph was taken without conscious correction of head or neck posture. The image was analyzed using the angle measurement tool in Kinovea. The angle vertex was placed at C7, and the acute angle between a vertical line passing upward through C7 and a line connecting C7 to the midpoint of the ear tragus was measured in degrees. Each image was analyzed three times, and the mean of the three measurements was recorded as the final value.

### 2

**Description**
Forward shoulder posture angle (Rounded Shoulder Angle)
**Timepoint**
At baseline (before the intervention) and immediately after completion of the 8-week intervention.
**Method of measurement**
Forward shoulder posture was assessed using photogrammetry and Kinovea software (version 2025.2). A Samsung Galaxy A12 smartphone camera mounted on a tripod was positioned 1.5 meters from the participant, with the lens center approximately at the level of C7 and the shoulder, perpendicular to the participant's sagittal plane. The spinous process of the seventh cervical vertebra (C7) and the acromion process on the side being evaluated were identified by palpation and marked with skin markers. Participants stood naturally and comfortably in a lateral position, with the evaluated side facing the camera, feet shoulder-width apart, and arms hanging freely at their sides. A lateral photograph was taken without conscious correction of shoulder posture. The image was analyzed using the angle measurement tool in Kinovea. The angle vertex was placed at C7, and the angle between a vertical line extending downward from C7 and a line connecting C7 to the acromion process was measured in degrees. Each image was analyzed three times, and the mean of the three measurements was recorded as the final value.

### 3

**Description**
Thoracic kyphosis angle
**Timepoint**
At baseline (before the intervention) and immediately after completion of the 8-week intervention.
**Method of measurement**
Thoracic kyphosis was assessed using a 60-cm flexible ruler (Flexicurve, Kearing model). Participants stood in a natural and comfortable position, with their feet shoulder-width apart, knees extended, arms hanging naturally at their sides, and eyes looking straight ahead. The spinous processes of the seventh cervical vertebra (C7) and the twelfth thoracic vertebra (T12) were identified by palpation. The measurement range extended from T1 to T12. The flexible ruler was gently placed along the thoracic spine without applying additional pressure, following the natural spinal curvature. The ruler was molded three times to ensure an accurate fit. It was then removed without altering its shape and transferred onto a white A4 sheet. The inner contour of the ruler was traced using a fine pen. The kyphosis angle was calculated using the standard two-curve method by drawing two tangent lines to the upper and lower portions of the curve and measuring the angle between the perpendiculars to these tangent lines. The measurement procedure was repeated three times, and the mean value was recorded as the final thoracic kyphosis angle.

**4**

**Description**
Health-related quality of life assessed using the Persian version of the 36-Item Short Form Health Survey (SF-36).

**Timepoint**
At baseline (before the intervention) and immediately after completion of the 8-week intervention.

**Method of measurement**
Health-related quality of life was assessed using the Persian version of the 36-Item Short Form Health Survey (SF-36). The questionnaire consists of 36 items covering eight domains: physical functioning, role limitations due to physical health problems, bodily pain, general health, vitality, social functioning, role limitations due to emotional problems, and mental health. One additional item assesses perceived changes in health compared with the previous year and is not included in the calculation of the eight domain scores. The questionnaire was administered before the intervention and after completion of the 8-week intervention in a quiet environment, using standardized instructions. Participants completed the questionnaire based on their physical, psychological, and social status. Any necessary clarification was provided without influencing their responses. Scoring followed the SF-36 guidelines. Responses were coded according to item direction, and reverse-coded items were recoded accordingly. Scores were transformed to a 0–100 scale, with higher scores indicating better health-related quality of life. The mean score for each of the eight domains was calculated. The overall quality-of-life score was obtained by calculating the arithmetic mean of the eight domain scores.

## Intervention groups

**1**

**Description**
Participants in this group received a NASM-based corrective exercise program without Graston technique. The intervention consisted of 24 supervised sessions over 8 weeks, with three sessions per week. Each session lasted approximately 45 minutes and included warm-up, main corrective exercises, and cool-down. The exercise program followed the NASM corrective exercise protocol.

**Category**
Rehabilitation

**2**

**Description**
Intervention group: Participants in this group receive a NASM-based corrective exercise program combined with instrument-assisted soft tissue mobilization using the Graston technique. Each session consists of 45 minutes of NASM corrective exercises followed by 15 minutes of Graston technique. The intervention comprises 24 sessions over 8 weeks, with three sessions per week. The total duration of each session is 60 minutes.

**Category**
Rehabilitation

## Recruitment centers

**1**

**Recruitment center**

**Name of recruitment center**
Sepanta Corrective Exercise Center

**Full name of responsible person**
Maryam Darvishi

**Street address**
Hakim Nezami St., Between Khaghani St. and Nazar-e Gharbi St., Sepanta Corrective Exercise Center, Isfahan, Isfahan Province, Iran

**City**
Isfehan

**Province**
Isfehan

**Postal code**
8175797518

**Phone**
+98 913 192 8782

**Email**
M.darvishi3258@gmail.com

**2**

**Recruitment center**

**Name of recruitment center**
Rameshnejad Academy

**Full name of responsible person**
Pouria Ramesh Nejad

**Street address**
Ahmadabad, Ahmadabad Square, Golzar Esfahani St., End of the Street, Rameshnejad Academy, Isfahan, Isfahan Province, Iran

**City**
Isfehan

**Province**
Isfehan

**Postal code**
8154948774

**Phone**
+98 913 366 3595

**Email**
Pouria.rn69@gmail.com

## Sponsors / Funding sources

**1**

**Sponsor**

**Name of organization / entity**
Islamic Azad University

**Full name of responsible person**
Dr.Majid Toghiani

**Street address**
East Jey Street, Arghavanieh, University Boulevard, Islamic Azad University, Isfahan (Khorasgan) Branch, Isfahan, Iran

**City**
Isfehan

**Province**

Isfehan
**Postal code**
8155139998
**Phone**
+98 31 3500 2000
**Fax**
+98 31 3535 4033
**Email**
Research@khuisf.ac.ir
**Grant name**
**Grant code / Reference number**
**Is the source of funding the same sponsor organization/entity?**
No
**Title of funding source**
Self-funded by the researcher
**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**
Islamic Azad University
**Full name of responsible person**
Mehdi Taheri
**Position**
Master's Student in Sports Pathology and Corrective Exercises
**Latest degree**
Bachelor
**Other areas of specialty/work**
Sport Medicine
**Street address**
isfehan-Kheshavarzi
**City**
Isfehan
**Province**
Isfehan
**Postal code**
8174739852
**Phone**
+98 916 032 5736
**Email**
mehditaheri81007@gmail.com

## Person responsible for scientific inquiries

**Contact**
**Name of organization / entity**
Islamic Azad University
**Full name of responsible person**
Mehdi Taheri
**Position**
Master's Student in Sports Pathology and Corrective Exercises
**Latest degree**
Bachelor
**Other areas of specialty/work**
Sport Medicine
**Street address**
Iran-Isfehan-Kheshavarzi
**City**
Isfehan
**Province**
Isfehan
**Postal code**
8174739852
**Phone**
+98 916 032 5736
**Email**
mehditaheri81007@gmail.com

## Person responsible for updating data

**Contact**
**Name of organization / entity**
Islamic Azad University
**Full name of responsible person**
Mehdi Taheri
**Position**
Master's Student in Sports Pathology and Corrective Exercises
**Latest degree**
Bachelor
**Other areas of specialty/work**
Sport Medicine
**Street address**
Iran-Isfehan-Kheshavarzi
**City**
isfehan
**Province**
Isfehan
**Postal code**
8174739852
**Phone**
+98 916 032 5736
**Fax**
**Email**
mehditaheri81007@gmail.com
**Web page address**

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

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

**Data Dictionary**

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