Clinical Trial Protocol
Iranian Registry of Clinical Trials

10 Jun 2026

Investigating the Impact of 8 Weeks of Comprehensive Corrective Water and Land Exercises on Females with Upper Crossed Syndrome

Protocol summary

Study aim

This study investigated the effectiveness of two eight-week comprehensive corrective exercise programs in water and land on women with UCS

Design

Clinical trial with three intervention groups, with parallel groups, Double-blinded, randomized, phase 1 on 60 women with UCS

Settings and conduct

The exercise groups performed comprehensive corrective exercises under the supervision of a corrective exercise specialist in a corrective exercise clinic and swimming pool in Qouchan for eight weeks, three sessions per week, 30-60 minutes per session. In contrast, the control group received no treatment intervention for eight weeks. In the first session, subjects were asked to inform the instructor if they had any problems attending sessions on time so that a make-up session could be scheduled. Missing two consecutive sessions or a total of 3 sessions would result in the individual being dropped from the research program. This study was conducted in full compliance with research ethics principles, written informed consent was obtained from all participants, and their confidentiality was maintained.

Participants/Inclusion and exclusion criteria

In order to participate in the study, participants needed to have simultaneous postural abnormalities such as kyphosis, FH, and RS and express a willingness to participate. Those with signs of illness, fractures, surgeries, joint problems, injuries in the spine, skeletal-muscular imbalances, lower limb cross syndrome, abnormal BMI, or engaging in regular physical activity for at least 6 hours per week were not eligible to participate.

Intervention groups

land-based comprehensive corrective exercises (N=20), water-based comprehensive corrective exercises (N=20), and a control group (N=20)

Main outcome variables

Upper cross syndrome

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20110803007211N2**
Registration date: **2024-12-30, 1403/10/10**
Registration timing: **prospective**

Last update: **2024-12-30, 1403/10/10**
Update count: **0**

Registration date

2024-12-30, 1403/10/10

Registrant information

Name

Name of organization / entity

Country

Iran (Islamic Republic of)

Phone

05714413512

Email address

mseyedahmadi@gmail.com

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2025-01-09, 1403/10/20

Expected recruitment end date

2025-01-20, 1403/11/01

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title
Investigating the Impact of 8 Weeks of Comprehensive Corrective Water and Land Exercises on Females with Upper Crossed Syndrome

Public title
Investigating the Impact of 8 Weeks of Comprehensive Corrective Water and Land Exercises on Females with Upper Crossed Syndrome

Purpose
Supportive

Inclusion/Exclusion criteria

Inclusion criteria:
Participants had to simultaneously have postural abnormalities such as kyphosis, Forward Head Posture, and Rounded Shoulders and express a willingness to participate.

Exclusion criteria:

Age
From **30 years** old to **40 years** old

Gender
Female

Phase
N/A

Groups that have been masked

- Participant
- Outcome assessor
- Data analyser

Sample size
Target sample size: **60**

Randomization (investigator's opinion)
Randomized

Randomization description
In the initial screening, 108 women with suspected signs of forward head, forward shoulder, and increased kyphosis postures will be identified through observation of posture using a checkerboard from the side view. The subjects' abnormalities (forward head angle, forward shoulder angle, and kyphosis angle) will then be evaluated using specialized tools and methods. Of these, 74 women who simultaneously have a forward head angle of more than 46 degrees, a forward shoulder angle of more than 52 degrees, and a kyphosis angle of more than 54 degrees will be considered to have UCS. A total of 60 women with UCS will be randomly selected and divided into three groups: land-based comprehensive corrective exercises (N=20), water-based comprehensive corrective exercises (N=20), and a control group (N=20).

Blinding (investigator's opinion)
Double blinded

Blinding description
Participants, evaluators, and analysts will be blinded to study group allocation, while researchers will be aware of the specific exercises each group will receive

Placebo
Not used

Assignment
Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee
Human Ethics Research Committee of the Sport Sciences Research Institute of Iran

Street address
No. 3, 5th Alley, Miremad Street, Motahhari Street, Tehran, Iran.

City
Tehran

Province
Tehran

Postal code
1587958711

Approval date
2024-11-05, 1403/08/15

Ethics committee reference number
IR.SSRC.REC.1403.069

Health conditions studied

1

Description of health condition studied
Upper crossed syndrome (UCS)

ICD-10 code
M95.8

ICD-10 code description
Other acquired deformities of musculoskeletal system and connective tissue

Primary outcomes

1

Description
Upper crossed syndrome (UCS)

Timepoint
At the beginning of the study (before the start of the intervention) and at the end of the study (8 weeks after the intervention)

Method of measurement
Thoracic Kyphosis Angle: The Corrective Exercise Specialist will take measurements to assess the thoracic kyphosis angle. They will use a 50 cm long and 2 cm wide flexible ruler to measure the T2 and T12 vertebrae angle (24, 25). To find the T2 vertebra, the specialist will ask the participant to bend their head, identifying the spinous process of the T2 vertebra by first locating the C7 spinous process. They will mark the starting point of the kyphosis curve at the T2 vertebra and will use the Hoppenfeld method to determine the T12 vertebra (26). Individuals with a kyphotic angle greater than 46.83 degrees will be classified as having an increased kyphotic deformity. Rounded Shoulder Angle: The

rounded shoulder angle (RSA) will be measured from the vertically posterior line to a line connecting the C7 and acromial markers (27). A shoulder angle of more than 52 degrees will be considered an RS deformity (22). Forward Head Angle: The forward head angle (FHA) will be measured from the vertical anterior to a line connecting the tragus and the C7 marker. In this method, an ideal head angle will be considered less than 36 degrees, while an angle of more than 46 degrees will be regarded as an abnormality (22) (Figure 2). The intraday reliability for FHA and RSA will show acceptable within-day reliability (FHA: Intraclass Correlation Coefficient (ICC)(2,1) = 0.92, Standard Error of the Mean (SEM) = 2; RSA ICC(2,1) = 0.89, SEM = 5) based on this sub-sample (28).

Secondary outcomes

empty

Intervention groups

1

Description

The first intervention group: Land-based Comprehensive Corrective Exercise Program: The 8-week land-based comprehensive corrective exercise program will consist of 3 weekly sessions, each lasting 30-60 minutes. It will be performed under the supervision of a corrective exercise specialist in a corrective exercise clinic. Each session will include four types of combination exercises (strengthening, stretching, and mobility). Five minutes will be dedicated to warming up and cooling down before and after each session. The exercises will be designed based on the individual characteristics of each person. They will follow the principle of gradual overload, meaning that the number of repetitions and the duration of each movement will gradually increase over eight weeks. Specifically, the duration of holding the movements will increase from 5 to 15 seconds, and the number of repetitions per set will increase from 6 to 12. Additionally, the diameter of the foam rolls will increase from 15 cm to 20 cm and finally to 30 cm

Category

Rehabilitation

2

Description

Intervention group 2: Water-based comprehensive corrective exercises: The 8-week water-based corrective exercise protocol was designed based on the findings of Vladimir Janda's studies. These corrective exercises were performed in water for women with UCS under the supervision of a corrective exercise specialist. Based on previous research, the treatment of muscle imbalance was carried out in three stages in the pool(31). In the environmental normalization (inhibition) stage, trigger points were treated with water massage and myofascial release of tight muscles using foam rolling. In the muscle balance restoration stage, static stretches addressed muscle tightness and corrective breathing pattern exercises for the respiratory muscles (pectoralis major and scalenes) that become tight in UCS. Then, strengthening exercises were performed to address muscle weakness, as well as proprioceptive and motor exercises for the joints of the neck and shoulder area. The last stage of the exercise was the functional (integration) stage, in which individuals participated in a ball game in the water while maintaining correct posture. The exercise program was conducted for eight weeks and consisted of three sessions per week. Each session included 10-15 minutes of warm-up, 35-45 minutes of comprehensive corrective exercise, and 5-10 minutes of cool-down

Category

Rehabilitation

3

Description

Control group: Control group continued their usual daily activities. At the end of the intervention, measurements were repeated, and the data were analyzed.

Category

Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center
Corrective Exercise clinic

Full name of responsible person
Karim Khalaghi

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity
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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?
No

Title of funding source
Educational and Research Affairs, Hakim Nizami Qochan Institute of Higher Education

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
Academic

Person responsible for general inquiries

Contact

Name of organization / entity
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Sharing plan

Deidentified Individual Participant Data Set (IPD)
Yes - There is a plan to make this available

Study Protocol
Yes - There is a plan to make this available

Statistical Analysis Plan
Not applicable

Informed Consent Form
Yes - There is a plan to make this available

Clinical Study Report
Not applicable

Analytic Code
Not applicable

Data Dictionary

Not applicable

Title and more details about the data/document

The data files will be available to researchers after the publication of the abstracted article

When the data will become available and for how long

After publication the article

To whom data/document is available

Other researchers

Under which criteria data/document could be used

There are no special conditions

From where data/document is obtainable

All researchers

What processes are involved for a request to access data/document

Upon receiving a formal request for data or documentation, the process will involve review and approval by the corresponding author. Once the request is approved, the required data and documents will be prepared and provided to the requester within one week. This process includes thoroughly reviewing the request, preparing the data, and ensuring that the information provided aligns with the original request.

Comments