Clinical Trial Protocol
Iranian Registry of Clinical Trials

22 Nov 2026

Comparison of the effects of Total Body Resistance Exercise (TRX) , corrective exercises, and play therapy on improving posture and balance in adolescent girls with upper cross syndrome

Protocol summary

Study aim

Comparison of the effects of full-body resistance training (TRX) , corrective exercises, and play therapy on improving posture and balance in adolescent girls with upper cross syndrome.

Design

A clinical trial with a control group, using parallel groups, randomized, involving 60 participants. Randomization will be performed using the RAND function in Excel."

Settings and conduct

The research protocol will be conducted in schools in Zarand County. The TRX exercise group, the corrective exercise group, and the corrective games group will participate for a duration of eight weeks. The control group will not perform any exercise. Before and after the exercise intervention, the angles of forward head and forward shoulder will be assessed using lateral photography, and the degree of kyphosis will be measured with a flexible ruler. Static balance will be evaluated using the stork test, and dynamic balance will be assessed using the Y test.

Participants/Inclusion and exclusion criteria

Inclusion criteria: with a forward head angle greater than 46 degrees, forward shoulder angle of 52 degrees, and kyphosis between 46 and 83 degrees. Exclusion criteria: Cardiovascular and respiratory disorders, chronic pain in the upper limbs, history of fractures, surgeries, and joint diseases in the spine."

Intervention groups

Three exercise groups: Full-body resistance exercises, corrective exercises, and play therapy will conduct their training under the supervision of a coach. The control group will not engage in any physical activity and will continue with their daily lives.

Main outcome variables

Before and after the exercise intervention, the angles of forward head and forward shoulder will be assessed using lateral photography, and the degree of kyphosis will be measured with a flexible ruler. Static balance will be evaluated using the stork test, and dynamic balance will be assessed using the Y test.

General information

Reason for update

Acronym

UCS

IRCT registration information

IRCT registration number: **IRCT20211201053244N3**
Registration date: **2024-12-31, 1403/10/11**
Registration timing: **registered_while_recruiting**

Last update: **2024-12-31, 1403/10/11**
Update count: **0**

Registration date

2024-12-31, 1403/10/11

Registrant information

Name

Mohammadreza Rezaeipour

Name of organization / entity

University of Sistan and Baluchestan

Country

Iran (Islamic Republic of)

Phone

+98 54 3113 2241

Email address

rezaeipour@ped.usb.ac.ir

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2024-12-05, 1403/09/15

Expected recruitment end date

2025-01-04, 1403/10/15

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Comparison of the effects of Total Body Resistance Exercise (TRX) , corrective exercises, and play therapy on improving posture and balance in adolescent girls with upper cross syndrome

Public title

Upper cruciate syndrome

Purpose

Supportive

Inclusion/Exclusion criteria

Inclusion criteria:

Be Adolescent Girls Aged Between 13 And 16 Years. Simultaneously Suffer From Forward Head Posture, Rounded Shoulders, And Kyphosis. In Addition To The Adolescent's Consent, Written Consent From The Parents Or Legal Guardian Is Also Required. In Order To Assess The Severity Of These Abnormalities, The Forward Head Angle, Rounded Shoulders, And Kyphosis Will Be Measured. Based On The Results Of These Measurements, Individuals Whose Forward Head Angle Is More Than 46 Degrees, Rounded Shoulder Angle Is Greater Than 52 Degrees, And Kyphosis Angle Is More Than 46.83 Degrees Will Be Considered To Have Severe Forward Head Posture, Rounded Shoulders, And Kyphosis, Respectively.

Exclusion criteria:

Participants Who Do Not Attend More Than Three Sessions In The Training. Become Infected With Contagious Diseases. Have Heart Or Respiratory Disorders. Have Chronic Pain In The Neck And Upper Limbs. Have A History Of Fractures, Surgeries, Or Joint Diseases, Especially In The Spine, Shoulder Girdle, And Pelvis. Have Musculoskeletal Misalignment In The Knee And Ankle. Their Body Mass Index (BMI) Is Less Than 18 Or Greater Than 25.

Age

From **13 years** old to **16 years** old

Gender

Female

Phase

N/A

Groups that have been masked

No information

Sample size

Target sample size: **60**

Randomization (investigator's opinion)

Randomized

Randomization description

Statistical sample of female students from middle school high schools for the academic year 1404-1403. In this research, a cluster sampling method will be used. Initially, through the education department of Zarand County, two schools from among six first-cycle girls' high schools in the county were randomly selected from different areas of the city. Our cluster sampling is one-stage; after being introduced to the schools, random and cluster sampling will be conducted from various areas of the city. In subsequent stages, for the division into intervention and control groups, simple randomization will be used. (After the necessary evaluations and tests, individuals diagnosed with upper cross syndrome who meet the entry and exit criteria will be divided into intervention and control groups). Through a lottery in the presence of the individuals, each person will be assigned a number from 1 to 60. The numbers will be written on paper, folded, and placed in a container (Container No. 1). Then, in another container, the names of the groups (15 slips for each group) will be folded and placed inside (Container No. 2). A lottery will then be conducted in the presence of the participants. One person will draw the number and group, and another person will record and write down the results. (One slip will be drawn from Container No. 1 and one slip from Container No. 2. For example, number 25 for the control group, number 13 for the corrective exercises group, etc.). All individuals will be grouped in this manner. The total sample size is 60 individuals.

Blinding (investigator's opinion)

Not blinded

Blinding description

Placebo

Not used

Assignment

Parallel

Other design features

In this research, three training protocols will be used to examine the effects of these exercises on the improvement of posture and balance in adolescent girls. Additionally, the study will compare these three methods to determine the best training protocol for improving posture and balance in adolescent girls. In previous studies, only one or two types of training protocols have been used, and a comparison has been made. However, according to the researcher's knowledge, no study has yet been found that examines and compares these three training methods together. We are seeking the best approach to correct this disorder.

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Ethics Committee of the University of Sistan and Baluchestan

Street address

University Street.

City

Zahedan

Province

Sistan-va-Balouchestan

Postal code

9816745785

Approval date

2024-11-09, 1403/08/19

Ethics committee reference number

IR.USB.REC.1403.024

Health conditions studied

1

Description of health condition studied

Acquired deformities of limbs

ICD-10 code

M21

ICD-10 code description

Other acquired deformities of limbs

Primary outcomes

1

Description

Posture correction

Timepoint

Before the start of the exercise protocol (pre-test), after the completion of the exercise protocol (post-test).

Method of measurement

Ad evaluandum angulum anomaliarum capitis et humeri ad frontem, camera photographica adhibebitur, quae post photographiam, (puncta pertinentia signabuntur et determinabuntur) anguli pertinentes per software AutoCAD obtinebuntur. Ad evaluandum kyphosim dorsalem, regula flexibili adhibebitur, et calculatio arcus per software Excel perficietur. Ad mensurandum altitudinem, mensura tape adhibebitur et ad pondus, scala digitalis adhibebitur.

2

Description

Melius aequilibrium

Timepoint

Before the start of the exercise protocol (pre-test), after the completion of the exercise protocol (post-test)

Method of measurement

Ad evaluandum aequilibrium staticum, testis lacertae adhibebitur, et ad evaluandum aequilibrium dynamicum, examen aequilibrii Y adhibebitur.

Secondary outcomes

empty

Intervention groups

1

Description

Intervention Group:TRX ExercisesThe number of participants in this group is 15. The duration of the exercises is 8 weeks, with 3 sessions per week, and each session lasting 1 hour. Each session will consist of 10 minutes of warm-up, 45 minutes of targeted exercises, and 5 minutes of cool-down. TRX straps will be used for the TRX exercises. TRX exercises (suspension training) are an efficient and effective method for strengthening and correcting physical issues, including upper cross syndrome. This condition is typically associated with problems such as neck, shoulder, and back pain, as well as limited mobility. TRX exercises help strengthen weak muscles and stretch tight muscles by using body weight for resistance. TRX exercises can be very beneficial in correcting upper cross syndrome, as they strengthen the weak muscles of the back and shoulders while stretching the chest and neck muscles. By combining strengthening and stretching exercises, you can improve your posture and prevent chronic pain. TRX exercises, which include full-body resistance training or suspension training, consist of a series of upper and lower body exercises. The use of these exercises as a strength training method has gained more attention from trainers and athletes in recent years due to their compactness, low cost, and safety.Weeks 1 and 2:Forearm Plank: Each set will be performed for 60 seconds, with 90 seconds of rest between sets. Three sets should be completed.- Single-Leg Squat:Each set consists of 12 repetitions, with 90 seconds of rest between sets. Three sets of this exercise should be performed.- Overhead Stretch: Each set consists of 12 repetitions, with 90 seconds of rest between sets. This exercise will also be performed in three sets.- Side Plank on Two Hands: Each set will be for 60 seconds, with three sets and 90 seconds of rest between sets.- Knee Roll-Out: 12 repetitions in each set, with 90 seconds of rest between sets. Three sets of this exercise should be performed.- Hamstring-Hip Up Stretch: Each set consists of 12 repetitions, and it will be performed three times with 90 seconds of rest between sets.Weeks 3 and 4:In these weeks, some exercises will have reduced repetitions and time:- Forearm Plank:The exercise time will be reduced to 45 seconds. Other specifications remain the same as the previous weeks.- Single-Leg Squat and Overhead Stretch: Both will be performed with 10 repetitions in each set and three sets.- Other exercises are similar to weeks 1 and 2, but the time or number of repetitions will be slightly reduced.Weeks 5 and 6:The intensity of the exercises will increase, and the number of sets will be raised to 4 sets:- Forearm Plank: Each set will be performed for 60 seconds, with 75 seconds of rest between sets. Four sets will be completed.- Single-Leg Squat:12 repetitions in each set, with 75 seconds of rest between each set. This exercise will be performed in four sets.- Overhead Stretch and other exercises will be similar to previous weeks, but the number of sets will increase to 4, and the rest between sets will be reduced to 20 seconds.Weeks 7 and 8:In these weeks, repetitions and intensity of the exercises will increase:- Side Plank on Two Hands:Each set will be performed for 60 seconds, with 75 seconds of rest. Four sets of this exercise will be executed.- Single-Leg Squat: The number of repetitions will be 14 in week 7 and 12 in week 8.- Other exercises will be similar to previous weeks, but the time or number of repetitions

will increase.This TRX training program will continuously increase the intensity of the exercises and reduce rest periods to challenge the body and gradually promote progress.

Category

Rehabilitation

2

Description

Intervention Group: Corrective ExercisesThe number of participants in this group is 15. The duration of the exercises is 8 weeks, with 3 sessions per week, and each session lasting 1 hour. Each session will consist of 10 minutes of warm-up, 45 minutes of targeted exercises, and 5 minutes of cool-down. For corrective exercises, auxiliary tools such as medicine balls, 2-meter Pilates bands, etc., will be used. The goal of corrective exercises is to restore balance to the body's muscles. These exercises are divided into two main parts: 1. Stretching tight muscles 2. Strengthening weak muscles. To correct upper cross syndrome, corrective exercises should include a combination of stretching the chest and neck muscles and strengthening the muscles of the upper back, lower back, and neck. Regularly performing these exercises will improve posture, reduce pain, and increase the range of motion in the neck and shoulders. It is important that the exercises gradually increase in intensity and are performed alongside maintaining proper posture in daily activities.The comprehensive corrective exercise program is the foundation of a new approach (the comprehensive approach) that seeks innovation by utilizing the strengths and weaknesses of previous approaches. In fact, the comprehensive approach is based on a systems perspective, which is responsible for conveying important information about the overall performance and behavior of the system through the interaction between different parts of a system. In a complex system such as the human movement system, there is interaction between the nervous, muscular, and joint subsystems in producing movement. Therefore, it is essential to consider the interactions between these subsystems when evaluating and correcting musculoskeletal disorders such as upper cross syndrome, as they ultimately provide the performance and overall behaviors of the system.In this study, participants will undergo a regular program of corrective exercises for eight weeks, three times a week, for 45 minutes each session. Each exercise session will begin with warming up the muscles, followed by a series of strengthening and stretching exercises at an appropriate intensity. The exercises will be performed in a static position and will gradually progress from simple to more complex exercises. The intensity of the exercises will be adjusted to ensure they are tolerable for the participants. At the end of each session, cool-down exercises will be performed. All exercise sessions will be conducted under the direct supervision of a corrective exercise specialist.

Category

Rehabilitation

3

Description

Intervention Group: Corrective GamesThe number of participants in this group is 15, and the duration of the training is 8 weeks, with 3 sessions each week, and each session lasting 1 hour. Each session will include 10 minutes of warm-up, 45 minutes of the designated games, and 5 minutes of cool-down. For the corrective games, tools such as a medicine ball, disposable spoons, tennis balls, cone-shaped obstacles, etc., will be used. To treat and correct this syndrome, therapeutic games can also be utilized, which not only help strengthen muscles and correct posture but also increase motivation, enjoyment, and patient interaction. Therapeutic games in physiotherapy and rehabilitation are considered an effective and engaging method for treating and rehabilitating injured muscles. These games can be designed in various forms, including balance games, strengthening exercises, flexibility activities, and intelligent games that require thinking. Therapeutic games for upper cross syndrome typically focus on improving the strength of weak muscles (such as the shoulder girdle muscles, trapezius, and rotator cuff) and stretching tight muscles (like the chest and neck muscles). Therapeutic games can play a significant role as an engaging and effective method for correcting upper cross syndrome. These games not only help strengthen and stretch the muscles associated with this syndrome but also enhance motivation and improve interaction during the treatment process. Combining these games with corrective exercises can help improve posture, reduce pain, and enhance movement in individuals with upper cross syndrome. Appropriate movement and exercise programs that align with the structural and psychological characteristics of humans, especially during childhood and adolescence, not only promote physical and mental health but also prepare individuals for a better life in society. In today's society, the importance and value of play during childhood have been thoroughly validated through extensive research. Play impacts children's emotional, cognitive, educational, personality, and social development and has diagnostic and therapeutic value. Play is not an activity devoid of thought or structure; rather, it is an integral part of our lives and an effective means for better functioning in adulthood and cognitive growth. One of the methods currently used to correct postural abnormalities in advanced societies is play. The corrective games program will be implemented over eight weeks, with each session lasting 45 minutes and including a 5-minute cool-down. This program consists of a variety of games, with increasing complexity from the first to the eighth week. In the initial weeks, games such as wooden house, tray lifting, and airplane will be used to strengthen core muscles and balance. As the program progresses, more dynamic games like tug-of-war, broken knee, and tennis ball carrying will be added to enhance strength and coordination. In the final weeks, a combination of previous games along with new ones such as station games, crab walking, and cat and mouse will be implemented to engage all muscle groups and improve motor skills. This play-centered program will not only

enhance physical strength but also improve social interactions and increase the motivation of participants.

Category
Rehabilitation

4

Description
Control group: This group will not engage in any physical activity and will continue with their daily lives. The number of individuals in this group is 15, for a duration of 8 weeks. They do not require any tools or exercises.

Category
N/A

Recruitment centers

1

Recruitment center

Name of recruitment center
First Cycle of Secondary School of Hazrat Masoumeh

Full name of responsible person
Tahereh Motazadeh

Street address
Shahid Modarres Street

City
Zarand

Province
Kerman

Postal code
7761853599

Phone
+98 34 3343 9390

Email
fatmhglstany089@gmail.com

2

Recruitment center

Name of recruitment center
Bint Al-Huda Sadr Girls' First Cycle Secondary School

Full name of responsible person
Mahin Iranmanesh

Street address
Shahid Izadi Street

City
Zarand

Province
Kerman

Postal code
7761788484

Phone
+98 34 3342 0122

Email
fatmhglstany089@gmail.com

Sponsors / Funding sources

1

Sponsor

Name of organization / entity
University of Sistan and Baluchistan

Full name of responsible person
Dr. Nour Mohammad Yaghoubi

Street address
University Street.

City
Zahedan.

Province
Sistan-va-Balouchestan

Postal code
98167-45845

Phone
+98 54 3113 6245

Fax
+98 54 3343 1067

Email
yaghoubi@mgmt.usb.ac.ir

Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?
Yes

Title of funding source
University of Sistan and Baluchistan

Proportion provided by this source
20

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
University of Sistan and Baluchistan

Full name of responsible person
Mohammad Reza Rezaei Pour.

Position
Assoc.Prof.Dr

Latest degree
Ph.D.

Other areas of specialty/work
Sport Medicine

Street address
University Professors' Neighborhood of Sistan and Baluchestan University.

City
Zahedan

Province
Sistan-va-Balouchestan

Postal code
9816745639

Phone
+98 54 3113 2674

Email

rezaeipour@ped.usb.ac.ir

Person responsible for scientific inquiries

Contact

Name of organization / entity
University of Sistan and Baluchistan

Full name of responsible person
Mohammad Reza Rezaei Pour.

Position
Assoc.Prof.Dr

Latest degree
Ph.D.

Other areas of specialty/work
Sport Medicine

Street address
University Professors' Neighborhood of Sistan and Baluchestan University

City
Zahedan

Province
Sistan-va-Balouchestan

Postal code
9816745639

Phone
+98 54 3113 2674

Email
rezaeipour@ped.usb.ac.ir

Person responsible for updating data

Contact

Name of organization / entity
University of Sistan and Baluchistan

Full name of responsible person
Mohammad Reza Rezaei Pour

Position
Assoc.Prof.Dr

Latest degree
Ph.D.

Other areas of specialty/work
Sport Medicine

Street address
University Professors' Neighborhood of Sistan and Baluchestan University.

City
Zahedan.

Province
Sistan-va-Balouchestan

Postal code
9816745639

Phone
+98 54 3113 2674

Email
rezaeipour@ped.usb.ac.ir

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
It is necessary to review and obtain the required permissions, including from the patients.

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