

Clinical Trial Protocol

Iranian Registry of Clinical Trials

11 Sep 2026

Investigating the Impact of 8 Weeks of Virtual Reality Training on Motor Proficiency and Executive Function in Children with Developmental Coordination Disorder

Protocol summary

Study aim

The general objective of this study is to investigate the effect of 8 weeks of virtual reality training on motor competence and executive function in children with developmental coordination disorder.

Design

The study has a control group, an intervention group, is triple-blinded, targeted based on a score lower than 16 on the MABC test, randomized using a lottery program, and is single-phase on 30 patients.

Settings and conduct

The exercises in this study will be conducted in the sports hall of schools in Hamadan and will be free of any distracting visual and auditory stimuli. The children's exercise coach will be blind to the existence and level of visual impairment in the children, and in each training session, they will exercise with the children for 45 minutes, including specific warm-up and cool-down exercises.

Participants/Inclusion and exclusion criteria

Inclusion criteria: 1. DCD diagnosis based on (DSM-5) 2. Age 7 to 9 years Exclusion criteria: 1. Children who did not wish to continue participating in the research process. 2. Children who were required to use a specific medication.

Intervention groups

Virtual Reality Group: Received specific exercises using virtual reality headsets for two months. Control Group: Received normal school instruction during this time.

Main outcome variables

Motor competence, inhibition, working memory, attention, hot executive function

General information

Reason for update

Acronym

DCD

IRCT registration information

IRCT registration number: **IRCT20250122064475N1**

Registration date: **2025-07-26, 1404/05/04**

Registration timing: **retrospective**

Last update: **2025-07-26, 1404/05/04**

Update count: **0**

Registration date

2025-07-26, 1404/05/04

Registrant information

Name

Maryam Khoshniat

Name of organization / entity

The University of Abu Ali Sina

Country

Iran (Islamic Republic of)

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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2025-04-05, 1404/01/16

Expected recruitment end date

2025-05-22, 1404/03/01

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Investigating the Impact of 8 Weeks of Virtual Reality Training on Motor Proficiency and Executive Function in Children with Developmental Coordination Disorder	
Public title	Examining the effect of virtual reality training on children with developmental coordination disorder
Purpose	Supportive
Inclusion/Exclusion criteria	Inclusion criteria: Achieving a standard score on the DCD-Q (15 to 46 for 7-year-olds and 15 to 55 for 8 to 9-year-olds) Age 7 to 9 years Diagnosis of DCD based on (DSM-V) using the Movement Assessment Battery for Children-2 (MABC-2): a score less than or equal to the 16th percentile, (DSM-5, Criterion A); motor deficits severely and persistently interfere with a person's daily activities (Criterion B, DSM-5); parents of children confirm the onset of motor problems from early developmental periods (Criterion C). Children should not have any pathological damage. They should have the ability to understand and collaborate with the researcher. Be able to attend the intervention program regularly throughout the study period. Be able to walk independently without assistance. Have no prior experience participating in a virtual reality based program. Have normal or corrected-to-normal vision. Do not use psychiatric medication. All participants and their supervisors must provide written consent. They are right-handed. Exclusion criteria: Children who are absent for more than 3 training sessions during the study. Children who are forced to use a specific medication. Children who do not wish to continue participating in the research process.
Age	From 7 years old to 9 years old
Gender	Both
Phase	N/A
Groups that have been masked	• Outcome assessor • Data analyser
Sample size	Target sample size: 30
Randomization (investigator's opinion)	Randomized
Randomization description	After identifying 30 eligible participants, they were randomly divided into two groups, intervention and control (15 people in each group), using a simple random method through a draw. The names of the participants were written on identical cards and placed in an opaque container. To conceal the grouping, a person outside the research team drew the cards by lot. As soon as each card was drawn, the participant was assigned to one of the two groups, intervention or control; the first card drawn was placed in the intervention group, the second card in the control group, and this process continued until the last card. The results were immediately placed
	in sealed envelopes. The unit of allocation was the individual. Given the limited sample size and the homogeneity of the study population (in terms of age and severity of disorder), stratification was not used. The grouping sequence was also generated by a person outside the research team and recorded and kept in a separate document. The screening team remained unaware of the groups until the end of the grouping process.
	Blinding (investigator's opinion)
	Double blinded
	Blinding description
	Blinding in this study was applied at the level of outcome assessment and data analysis. Due to the nature of the intervention, blinding of participants is not possible, as the virtual reality-based exercises and their implementation differ between the two groups, which participants will notice. However, to prevent bias in data collection and evaluation, outcome assessors will be unaware of group allocation to ensure data is collected independently and without conscious influence. Furthermore, data analysts will be unaware of group allocation until the final processing is complete to avoid bias in the review of results. If necessary, allocation concealment methods, such as randomization lists and the use of data processing systems, will be used to maintain impartiality in the analysis. This level of control in allocation and data processing increases the validity of the results and prevents side effects caused by bias.
	Placebo
	Not used
	Assignment
	Parallel
	Other design features
	This study will be conducted by designing exercises for 12 sports, from simple to complex, with specialized warm-ups and 3 sessions of 45 minutes per week.
	Secondary Ids
	empty
	Ethics committees
	1
	Ethics committee
	Name of ethics committee
	Ethics Committee in Biomedical Research
	Street address
	Boulevard Ahmadijeh
	City
	Hamadan
	Province
	Hamadan
	Postal code
	6517683819
	Approval date
	2025-03-03, 1403/12/13
	Ethics committee reference number
	IR.BASU.REC.1403.042

Health conditions studied

1

Description of health condition studied

Developmental Coordination Disorder

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description

Motor Proficiency

Timepoint

7 days before the study

Method of measurement

Movement Assessment Battery for Children- Second Edition

Secondary outcomes

1

Description

Motor Competence

Timepoint

Before the intervention and 24 sessions after the start of the intervention

Method of measurement

MABC-2 Test

2

Description

executive functions

Timepoint

Before the intervention and 24 sessions after the start of the intervention

Method of measurement

Stroop, go/no-go, n-back, hungry donkey tests

3

Description

Impact of virtual reality training

Timepoint

24 sessions after the start of the intervention

Method of measurement

The extent of progress in cognitive and motor functions

Intervention groups

1

Description

Warm-up for 10 minutes, exercise for 30 minutes, cool-down for 5 minutes. Week 1, Session 1, Warm-up: running, shoulder rotations, stretching the arm, forearm, triceps muscles, wrist rotations, rope skipping, boxing shadow boxing. Exercises: darts, boxing. Cool-down:

overhead stretch, down, left and right. Session 2, Warm-up: running, shoulder rotations, stretching the arm, forearm, triceps muscles, wrist rotations, rope skipping, boxing shadow boxing. Exercises: darts, boxing. Cool-down: hip flexion, triceps stretch, shoulder stretch. Session 3, Warm-up: running, shoulder rotations, stretching the arm, forearm, triceps muscles, wrist rotations, rope skipping, boxing shadow boxing. Exercises: darts, boxing. Cool-down: bending forward as much as possible, neck stretch. Week 2, Session 1: running, lateral lunge with inner thigh stretch, arm rotations, knee-to-chest jumps, ankle circles, stationary dribbling, stretching back and waist muscles, ball release exercise, stretching shoulders and triceps, wrists and forearms - basketball, bowling - overhead stretch, down, left and right. Session 2: running, lateral lunge with inner thigh stretch, arm rotations, knee-to-chest jumps, ankle circles, stationary dribbling, stretching back and waist muscles, ball release exercise, stretching shoulders and triceps, wrists and forearms - basketball, bowling - hip flexion, triceps stretch, shoulder stretch. Session 3: running, lateral lunge with inner thigh stretch, arm rotations, knee-to-chest jumps, ankle circles, stationary dribbling, stretching back and waist muscles, ball release exercise, stretching shoulders and triceps, wrists and forearms - basketball, bowling - bending forward as much as possible, neck stretch. Week 3: Session 1: rope skipping, boxing shadow boxing, paw boxing, short runs with change of direction, trunk rotation with racket, leg and hamstring stretches, service practice without ball, zigzag jumping - boxing, clay tennis - overhead stretch, down, left and right. Session 2: rope skipping, boxing shadow boxing, paw boxing, short runs with change of direction, trunk rotation with racket, leg and hamstring stretches, service practice without ball, zigzag jumping - boxing, clay tennis - hip flexion, triceps stretch, shoulder stretch. Session 3: rope skipping, boxing shadow boxing, paw boxing, short runs with change of direction, trunk rotation with racket, leg and hamstring stretches, service practice without ball, zigzag jumping - boxing, clay tennis - bending forward as much as possible, neck stretch. Week 4, Session 1: jogging in place, stretching back and shoulders, neck and shoulder rotations, deep breathing exercise, wrist and forearm stretches, fast lateral movement, wrist rotation with racket, ball dribbling with racket - archery, table tennis - overhead stretch, down, left and right. Session 2: jogging in place, stretching back and shoulders, neck and shoulder rotations, deep breathing exercise, wrist and forearm stretches, fast lateral movement, wrist rotation with racket, ball dribbling with racket - archery, table tennis - hip flexion, triceps stretch, shoulder stretch. Session 3: jogging in place, stretching back and shoulders, neck and shoulder rotations, deep breathing exercise, wrist and forearm stretches, fast lateral movement, wrist rotation with racket, ball dribbling with racket - archery, table tennis - bending forward as much as possible, neck stretch. Week 5 Session 1: Lateral movements with speed, dynamic lunges with change of direction, shoulder and arm rotation, wrist exercises with racket, vertical jumps, hitting the ball in the air Badminton, Golf Stretching overhead, down, left and right. Session 2: Lateral

movements with speed, dynamic lunges with change of direction, shoulder and arm rotation, wrist exercises with racket, vertical jumps, hitting the ball in the air - Badminton, Golf - Hip flexion, triceps stretch, shoulder stretch. Session 3 Lateral movements with speed, dynamic lunges with change of direction, shoulder and arm rotation, wrist exercises with racket, vertical jumps, hitting the ball in the air Badminton, Golf Bending forward as much as possible, stretching the neck and head. Week 6: Session 1: Running, multi-directional lunge movements, footwork training with agility ladder, torso rotation with racket, dynamic stretches for shoulder and wrist, vertical jumps, fast lateral movements, shoulder and arm rotations, stretching triceps and wrist Squash, Volleyball Stretching overhead, down, left and right. Session 2 Running, multi-directional lunge movements, footwork training with agility ladder, torso rotation with racket, dynamic stretches for shoulder and wrist, vertical jumps, fast lateral movements, shoulder and arm rotations, stretching triceps and wrist-Squash, Volleyball-Hip flexion, triceps stretch, shoulder stretch. Session 3: Running, multi-directional lunge movements, footwork training with agility ladder, torso rotation with racket, dynamic stretches for shoulder and wrist, vertical jumps, fast lateral movements, shoulder and arm rotations, stretching triceps and wrist Squash, Volleyball Bending forward as much as possible, stretching the neck and head Week 7. Session 1 Short runs with change of direction, torso rotation with racket, leg and hamstring stretches, serving practice without ball, zigzag jumping, stretching back and lumbar muscles, ball release practice, stretching shoulders and triceps, wrists and forearms - Clay court tennis, Bowling - Stretching overhead, down, left and right. Session 2: Short runs with change of direction, torso rotation with racket, leg and hamstring stretches, serving practice without ball, zigzag jumping, stretching back and lumbar muscles, ball release practice, stretching shoulders and triceps, wrists and forearms - Clay court tennis, Bowling - Hip flexion, triceps stretch, shoulder stretch Session 3: Short runs with change of direction, torso rotation with racket, leg and hamstring stretches, serving practice without ball, zigzag jumping, stretching back and lumbar muscles, ball release practice, stretching shoulders and triceps, wrists and forearms - Clay court tennis, Bowling - Bending forward as much as possible, stretching the neck and head. Week 8: Session 1: Running, multi-directional lunge movements, footwork training with agility ladder, torso rotation with racket, dynamic stretches for shoulder and wrist, vertical jumps, fast lateral movements, shoulder and arm rotations, stretching triceps and wrist - Volleyball, Squash - Stretching overhead, down, left and right. Session 2: Running, multi-directional lunge movements, footwork training with agility ladder, torso rotation with racket, dynamic stretches for shoulder and wrist, vertical jumps, fast lateral movements, shoulder and arm rotations, stretching triceps and wrist - Volleyball, Squash - Hip flexion, triceps stretch, shoulder stretch Session 3 Running, multi-directional lunge movements, footwork training with agility ladder, torso rotation with racket, dynamic stretches for shoulder and wrist, vertical jumps, fast lateral movements, shoulder

and arm rotations, stretching triceps and wrist - Volleyball, Squash - Bending forward as much as possible, stretching the neck and head.

Category

Behavior

2

Description

Control group: This group will continue their normal life routine throughout the study and will only participate in school programs that are the same for everyone.

Category

Behavior

Recruitment centers

1

Recruitment center

Name of recruitment center

General Directorate of Education of Hamadan Province

Full name of responsible person

Rasul Sheydayi

Street address

Taleghani Street, Farhang Street

City

Hamedan

Province

Hamadan

Postal code

6515738448

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

non

Full name of responsible person

non

Street address

non

City

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1234567899

Phone

+98 81 3429 0804

Email

khoshniat.basu.ac.ir@gmail.com

Grant name

Grant code / Reference number

Is the source of funding the same sponsor

organization/entity?

No

Title of funding source

non

Proportion provided by this source

1

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**

Other

Person responsible for general inquiries**Contact****Name of organization / entity**

Bu-Ali Sina University

Full name of responsible person

Maryam Khoshniat

Position

Student

Latest degree

Bachelor

Other areas of specialty/work

Motor behavior

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Shariati Square

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Person responsible for scientific inquiries**Contact****Name of organization / entity**

Bu-Ali Sina university

Full name of responsible person

Seyedeh Manizheh Arabi

Position

Assistant Professor

Latest degree

Ph.D.

Other areas of specialty/work

Motor development

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Person responsible for updating data**Contact****Name of organization / entity**

Buali Sina University

Full name of responsible person

Manijeh Arabi

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Assistant Professor

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Web page address**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

Yes - There is a plan to make this available

Informed Consent Form

Yes - There is a plan to make this available

Clinical Study Report

Yes - There is a plan to make this available

Analytic Code

Yes - There is a plan to make this available

Data Dictionary

Yes - There is a plan to make this available

Title and more details about the data/document

The data will be shared after individuals are anonymized.

When the data will become available and for how long

The course starts with 6 months access after the publication of the article.

To whom data/document is available

Researchers of academic institutions

Under which criteria data/document could be used

In review studies

From where data/document is obtainable

People can contact Maryam Khoshniat at the email

address khoshniat.basu.ac.ir@gmail.com

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

In a letter, provide a complete introduction of yourself

and your resume, stating your purpose and how you intend to use it, and email it to Ms. Khoshniyat. She will announce the result to you within a 6-month timeframe.

Comments