Clinical Trial Protocol
Iranian Registry of Clinical Trials

22 Nov 2026

Effects of a plyometric training program on neuromuscular performance in high-altitude amateur football players: a randomized controlled trial

Protocol summary

Study aim
Effects of Plyometric Training on Neuromuscular Performance in High-Altitude Amateur Footballers

Design
Randomized controlled trial (RCT) with a parallel-group design and a pre-test/post-test approach. This study included 20 amateur football players who were randomly assigned to two equal groups (10 participants in the experimental group and 10 participants in the control group). Randomization was performed using the random number generator function in Microsoft Excel

Settings and conduct
This randomized controlled trial (n=20) was conducted in Skardu, Pakistan (2,230m) to evaluate the effects of an 8-week plyometric training program on neuromuscular performance in amateur football players. Participants were randomized into an experimental group (plyometric + routine football) and a control group (routine football only). Outcome assessments were performed by a blinded assessor.

Participants/Inclusion and exclusion criteria
Inclusion criteria: male football players aged 18–30 years, training at an altitude of ≥2,000m; affiliated with an official football club. Exclusion criteria: lower-limb injury in the preceding 3 months; conditions affecting balance or coordination; inability to attend ≥90% of training sessions.

Intervention groups
Experimental group: participants in this group performed an 8-week plyometric training program (consisting of bounding, hurdling, and drop jumping exercises) three times per week, in addition to their routine football club training. Control group: participants in the control group did not receive any additional plyometric training during the 8-week period and continued their routine football training and regular matches according to their normal club schedule.

Main outcome variables
Agility; balance; neuromuscular coordination; reaction time

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20260920071124N2**
Registration date: **2026-10-20, 1405/07/28**
Registration timing: **retrospective**

Last update: **2026-10-20, 1405/07/28**
Update count: **0**

Registration date
2026-10-20, 1405/07/28

Registrant information

Name
Abdossaleh Zar

Name of organization / entity
Persian Gulf University

Country
Iran (Islamic Republic of)

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+98 77 3122 2710

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Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2026-03-01, 1404/12/10

Expected recruitment end date
2026-03-05, 1404/12/14

Actual recruitment start date
2026-03-05, 1404/12/14

Actual recruitment end date
2026-03-05, 1404/12/14

Trial completion date
2026-05-15, 1405/02/25

Scientific title
Effects of a plyometric training program on neuromuscular performance in high-altitude amateur football players: a randomized controlled trial

Public title
Investigation of the Effects of Plyometric Training on Neuromuscular Performance in Amateur Football Players

Purpose
Other

Inclusion/Exclusion criteria

Inclusion criteria:
Men aged 18–30 years registered with a club affiliated with DFA Skardu. Active training and competition at an altitude of ≥2,000 meters for at least six months prior to the study. Free from musculoskeletal injuries or cardiovascular, neurological, or respiratory diseases that contraindicate plyometric training.

Exclusion criteria:
Sustained a lower-limb injury in the three months preceding the study;Presence of any medical condition affecting balance or coordination Inability to attend at least 90% of the training sessions.

Age
From **18 years** old to **30 years** old

Gender
Male

Phase
N/A

Groups that have been masked
No information

Sample size
Target sample size: **20**
Actual sample size reached: **20**

Randomization (investigator's opinion)
Randomized

Randomization description
Participants were randomly allocated to the Experimental Group and Control Group using a computer-generated random number sequence. To ensure allocation concealment, this process was performed by a member of the research team who was not involved in outcome assessmen

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
Department of Sports Sciences and Physical Education, University of the Punjab, Lahore

Street address
Wahdat Road

City
Lahore

Postal code
54590

Approval date
2025-10-02, 1404/07/10

Ethics committee reference number
658/SPS

Health conditions studied

1

Description of health condition studied
Athletic Performance

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description
Agility:Agility performance assessed by the T-test, recorded in seconds

Timepoint
Baseline (before the start of the intervention) and immediately after the 8-week training period.

Method of measurement
Time taken to complete the T-test agility drill, measured in seconds

2

Description
Balance:Postural stability and dynamic balance measured by the Y-Balance test, measured in centimeters

Timepoint
Baseline (before the start of the intervention) and immediately after the 8-week training period.

Method of measurement
measured by the Y-Balance test, measured in centimeters

3

Description
Neuromuscular coordination performance score assessed by , measured in points/score

Timepoint
Baseline (before the start of the intervention) and immediately after the 8-week training period.

Method of measurement
Neuromuscular coordination performance score assessed

by measured in points/score

4

Description
Reaction time :Reaction time to visual/auditory stimuli, measured in milliseconds
Timepoint
Baseline (before the start of the intervention) and immediately after the 8-week training period.
Method of measurement
Reaction time to visual/auditory stimuli, measured in milliseconds

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group: Participants undergo an 8-week plyometric training program, 3 sessions per week, in addition to their routine football training. Exercises include bounding, hurdle jumps, and drop jumps, with progressive intensity.Control group: Participants engage solely in their routine football training without any additional exercise intervention
Category
N/A

2

Description
Control group: Participants engage solely in their routine football training without any additional exercise intervention
Category
N/A

Recruitment centers

1

Recruitment center
Name of recruitment center
District football association, skardu
Full name of responsible person
Muhammad Saqib Yousaf
Street address
Main bazar road
City
Skardu
Postal code
26100
Phone
+92 346 5349853
Email
xavijan453@gmail.com
Web page address
https://www.linkedin.com/in/saqib-yousuf-9b55a9171?utm_source=share_via&utm_content=profile&utm_medium=member_android

Sponsors / Funding sources

1

Sponsor
Name of organization / entity
University of the punjab
Full name of responsible person
M. Saqib Yousaf
Street address
Main bazar road
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Phone
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Web page address
https://www.linkedin.com/in/saqib-yousuf-9b55a9171?utm_source=share_via&utm_content=profile&utm_medium=member_android
Grant name
M saqib yousaf
Grant code / Reference number
not applcable
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
University of the punjab
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
University of the punjab
Full name of responsible person
M saqib yousaf
Position
Student
Latest degree
Master
Other areas of specialty/work
Sport Medicine
Street address

Main bazar road
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Person responsible for scientific inquiries

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Person responsible for updating data

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Web page address
https://www.linkedin.com/in/saqib-yousuf-9b55a9171?utm_source=share_via&utm_content=profile&utm_medium=member_android

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
Deidentified individual participant data (IPD) including baseline demographics (age, height, weight) and pre- and post-intervention scores for agility, balance, coordination, and reaction time of the experimental and control groups.
When the data will become available and for how long
Available starting from the date of publication and accessible for a period of 3 years
To whom data/document is available
Researchers, academic researchers, and sports science professionals interested in meta-analysis or replication studies
Under which criteria data/document could be used
Data can be used for secondary analyses, systematic reviews, and meta-analyses upon reasonable request and with approval from the corresponding author
From where data/document is obtainable
Requests can be sent via email to the corresponding author (Department of Sports Sciences and Physical Education, University of the Punjab, Lahore)
What processes are involved for a request to access data/document
Applicants should submit a formal email detailing their research proposal and intended use of data. Requests will be reviewed within 2 to 4 weeks, and upon approval, deidentified datasets will be shared securely
Comments
Additional supporting documents, including study protocols and statistical analysis outputs, are available

upon request.