

Clinical Trial Protocol

Iranian Registry of Clinical Trials

12 Sep 2026

Comprehensive Evaluation of Three Training Modalities: Plyometric, Traditional, and Combined, on Reducing the Incidence and Severity of Lower and Upper Limb Injuries, Improving Performance, and Enhancing Quality of Life in Male Professional Volleyball Players

Protocol summary

Study aim

Comparing the effects of eight weeks of plyometric, traditional, and combined training on reducing the incidence and severity of upper and lower limb injuries, improving sports performance, and enhancing quality of life in professional male volleyball players aged 18-30 years.

Design

Randomized controlled trial, single-blind (outcome assessors), parallel three-intervention-group, pre-test/post-test, sample size 45, software randomization, phase not applicable.

Settings and conduct

Professional volleyball clubs. After screening and consent, 8-week intervention in standard hall under expert trainer supervision. Assessments by blinded assessors at pre-test and post-test.

Participants/Inclusion and exclusion criteria

Inclusion: male volleyball players 18-30 years; at least 3 years of professional league experience; no acute injury in last 4 weeks; medical clearance; consent. Exclusion: history of knee, ankle, shoulder, or spine surgery in last 12 months; uncontrolled chronic disease; use of stimulants or steroids; inability to balance for 30s.

Intervention groups

Plyometric group: 8 weeks, 3×45min/week, explosive exercises including vertical jumps, box jumps, single-leg hops, and rapid bounding with emphasis on landing technique. Traditional group: 8 weeks, 3×45min/week, strength training with weights including squats, lunges, bench press, and rotator cuff exercises. Combined group: 8 weeks, 3×45min/week, 50% plyometric and 50% traditional training.

Main outcome variables

Incidence and severity of upper and lower limb injuries using injury registration form and OSTRC questionnaire;

shoulder pain and functional disability using SPADI; foot and ankle pain and functional disability using FADI; sports performance using vertical jump test and T-test agility; quality of life using SF-36 questionnaire.

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20260624069940N5**

Registration date: **2026-08-20, 1405/05/29**

Registration timing: **prospective**

Last update: **2026-08-20, 1405/05/29**

Update count: **0**

Registration date

2026-08-20, 1405/05/29

Registrant information

Name

Atiye Gholizadeh

Name of organization / entity

Tarbiat modares university

Country

Iran (Islamic Republic of)

Phone

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Email address

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Recruitment status

recruiting

Funding source

Expected recruitment start date

2026-09-01, 1405/06/10

Expected recruitment end date

2026-10-27, 1405/08/05

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Comprehensive Evaluation of Three Training Modalities: Plyometric, Traditional, and Combined, on Reducing the Incidence and Severity of Lower and Upper Limb Injuries, Improving Performance, and Enhancing Quality of Life in Male Professional Volleyball Players

Public title

Comparison of Three Training Methods on Injury Reduction and Performance Improvement in Professional Volleyball Players

Purpose

Prevention

Inclusion/Exclusion criteria**Inclusion criteria:**

Male professional volleyball players aged 18 to 30 years
At least 3 years of professional league experience
No acute or symptomatic injury in upper or lower limbs within 4 weeks prior to the study
Obtaining medical clearance from the team physician or project physician
Ability to understand and cooperate in performing tests and exercises
Signed written informed consent to participate in the study

Exclusion criteria:

History of invasive surgery on knee, ankle, shoulder, or spine joints within the last 12 months
Uncontrolled chronic diseases such as type 2 diabetes, hypertension (resting blood pressure >140/90 mmHg), cardiovascular diseases, severe respiratory disorders, or neuromuscular diseases
Use of stimulant drugs, anabolic steroids, or narcotics within the past 6 months
Inability to maintain standing balance for at least 30 seconds without assistance

Age

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

Gender

Male

Phase

N/A

Groups that have been masked

- Outcome assessor

Sample size

Target sample size: **45**

Randomization (investigator's opinion)

Randomized

Randomization description

After initial screening and confirmation of eligibility, eligible participants will be randomly assigned to three intervention groups (Plyometric, Traditional, and Combined) using randomization software. The randomization method is simple randomization with individual as the unit of randomization. No stratification

is used. The random sequence is generated by software. Allocation concealment is ensured using sealed envelopes.

Blinding (investigator's opinion)

Single blinded

Blinding description

In this study, due to the nature of the exercise intervention, complete blinding is not possible. However, outcome assessors who are responsible for administering the questionnaires and assessments related to injury, pain, functional disability, sports performance, and quality of life will be blinded to participants' group allocation. Participants, the principal investigator, and trainers are aware of the intervention type. Outcome assessors are blinded through participant coding and lack of access to group allocation information.

Placebo

Not used

Assignment

Parallel

Other design features

Randomized controlled trial, single-blind (outcome assessors), with three parallel groups and pre-test/post-test design

Secondary Ids

empty

Ethics committees**1****Ethics committee****Name of ethics committee**

Research Ethics Committee of Tarbiat Modares University

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Tarbiat Modares University, Shahid Chamran Blvd., Tehran, Iran

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Approval date

2026-07-18, 1405/04/27

Ethics committee reference number

IR.MODARES.REC.1405.119

Health conditions studied**1****Description of health condition studied**

Volleyball injuries

ICD-10 code

Y93.68

ICD-10 code description

Activity, volleyball (beach) (court) (البيات، واليبال)

Primary outcomes

1

Description

Incidence of Upper and Lower Limb Injuries

Timepoint

Before the intervention and after 8 weeks of intervention

Method of measurement

Volleyball Injury Registration Form (including injury type, anatomical site, mechanism, date of occurrence, and time loss from training and competition)

2

Description

Severity of Upper and Lower Limb Injuries

Timepoint

Before the intervention and after 8 weeks of intervention

Method of measurement

Oslo Sports Trauma Research Center Overuse Injury Questionnaire (4 main questions regarding severity of problem, performance reduction, pain, and impact on training and competition; scored 0-100)

3

Description

Shoulder and Arm Pain and Functional Disability

Timepoint

Before the intervention and after 8 weeks of intervention

Method of measurement

Shoulder Pain and Disability Index (13 items in two sections: pain and disability; scored 0-100, higher score indicates more severe pain and disability)

4

Description

Foot and Ankle Pain and Functional Disability

Timepoint

Before the intervention and after 8 weeks of intervention. سلام

Method of measurement

Foot and Ankle Disability Index (26 items regarding performance of various activities; scored 0-100, lower score indicates greater disability)

5

Description

Vertical Jump Performance

Timepoint

Before the intervention and after 8 weeks of intervention

Method of measurement

Vertical Jump Test (countermovement jump from standing position; measuring jump height in centimeters using Vertec device or My Jump 2 app)

6

Description

Agility

Timepoint

Before the intervention and after 8 weeks of intervention

Method of measurement

T-Test Agility (running in a T-shaped course; recording total time in seconds)

7

Description

Health-Related Quality of Life

Timepoint

Before the intervention and after 8 weeks of intervention

Method of measurement

36-Item Short Form Health Survey (36 items in eight domains: physical functioning, role limitations due to physical health, bodily pain, general health, vitality, social functioning, role limitations due to emotional health, and mental health; scored 0-100, higher score indicates better health status)

Secondary outcomes

empty

Intervention groups

1

Description

Intervention group 1 (Plyometric): Plyometric training for 8 weeks, three sessions per week, each session lasting 45 minutes. Each session includes 10 minutes of warm-up with fast walking, light jumps, and dynamic stretching, 20 to 30 minutes of specialized plyometric exercises including double-leg vertical jumps with emphasis on landing technique, lateral hops, box jumps with progressive heights, single-leg forward and backward jumps, depth jumps with controlled height, and explosive bounding with gradual progressive overload (weekly increase in repetitions and intensity), and 5 to 8 minutes of cool-down with static stretching and deep breathing. The number of repetitions is 8 to 10 per set with 3 to 5 sets and 60 to 90 seconds rest between sets.

Category

Behavior

2

Description

Intervention group 2 (Traditional): Traditional strength training for 8 weeks, three sessions per week, each session lasting 45 minutes. Each session includes 8 to 10 minutes of warm-up with light walking, dynamic movements, and core muscle activation, 25 to 35 minutes of strength exercises with weights including squats with weights or body weight, forward and lateral lunges, light deadlifts, bench press with barbell or dumbbells, shoulder press, rotator cuff exercises for shoulder injury prevention, leg curls and leg extensions, and wrist and forearm flexion and extension with intensity of 60 to 70% of one repetition maximum in early weeks increasing to 75 to 80% in later weeks, and 5 minutes of cool-down with gentle stretching and

relaxation. The number of repetitions is 8 to 12 per exercise with 3 to 4 sets.

Category

Behavior

3

Description

Intervention group 3 (Combined): Combined training (50% plyometric and 50% traditional) for 8 weeks, three sessions per week, each session lasting 45 minutes. Each session includes 8 to 10 minutes of warm-up with dynamic movements, core muscle activation, and light balance exercises, 15 to 20 minutes of strength exercises (squats, lunges, leg press, core stability exercises, and rotator cuff exercises), 15 to 20 minutes of plyometric exercises (vertical jumps, box jumps, single-leg hops, and lateral hops with emphasis on landing quality), and 5 minutes of cool-down with static stretching. The order of exercises is arranged so that muscle fatigue does not prevent proper execution of the plyometric section.

Category

Behavior

Recruitment centers

1

Recruitment center

Name of recruitment center

Tarbiat Modares University

Full name of responsible person

Abbas Hasan Al-Qazzaz

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Tarbiat Modares University

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?

Yes

Title of funding source

Tarbiat Modares University

Proportion provided by this source

100

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

Tarbiat Modares University

Full name of responsible person

Abbas Hasan Al-Qazzaz

Position

PhD Candidate in Exercise Physiology

Latest degree

Master

Other areas of specialty/work

Exercise Physiology

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Person responsible for scientific inquiries

Contact

Name of organization / entity

Tarbiat Modares University

Full name of responsible person

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Position

Associate Professor of Exercise Sciences

Latest degree

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Other areas of specialty/work

Exercise Physiology

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

Tarbiat Modares University

Full name of responsible person

Atiyeh Gholizadeh

Position

Research Assistant

Latest degree

Ph.D.

Other areas of specialty/work

Exercise Physiology

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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

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

No - There is not 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

De-identified individual participant data, study protocol, statistical analysis plan, informed consent form, clinical study report, and data dictionary: All collected data related to outcome variables (incidence and severity of upper and lower limb injuries, pain and functional disability, sports performance, and health-related quality of life) will be shared completely without identifying information. Documentation regarding methodology, forms used, and analysis plan will also be provided.

When the data will become available and for how long

Six months after publication of study results

To whom data/document is available

Researchers affiliated with reputable academic and scientific institutions who have an approved research proposal by their institutional ethics committee.

Under which criteria data/document could be used

Data may be used solely for research purposes and secondary analyses related to injury prevention and exercise physiology. Commercial use of the data is not permitted. All users must adhere to ethical requirements and maintain data confidentiality, and must report any findings from their analyses to the primary authors. Requests must include a detailed description of the project and its objectives.

From where data/document is obtainable

To request data, please contact the corresponding author, Mr. Abbas Hasan Al-Qazzaz, via email at abbas.hasan@modares.ac.ir. Requests may also be submitted through the Department of Exercise Sciences at Tarbiat Modares University.

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

Upon submission of a request via email, the corresponding author will review the application. After approval by the university ethics committee, the request will be forwarded to the research team. If finally approved, de-identified data will be provided within two to four weeks via email or a secure data-sharing platform.

Comments

Data will be provided solely for non-commercial purposes, with full adherence to ethical principles and confidentiality of participant information.