Clinical Trial Protocol
Iranian Registry of Clinical Trials

07 Nov 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
+98 911 279 9319
Email address
gholizade.atiye@gmail.com

Recruitment status
Recruitment complete

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
Street address
Tarbiat Modares University, Shahid Chamran Blvd., Tehran, Iran
City
Tehran
Province
Tehran
Postal code
۱۴۱۱۵۱۱۱۱
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) (فعالیت، والیبال)

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 interventionسلام.
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

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

City
Tehran

Province
Tehran

Postal code
۱۴۱۱۵۱۱۱۱

Phone
+98 21 8288 5063

Email
abbas.hasan@modares.ac.ir

Sponsors / Funding sources

1

Sponsor

Name of organization / entity
Tarbiat Modares University

Full name of responsible person
Dr. Mohammad Javan

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

City
Tehran

Province
Tehran

Postal code
۱۴۱۱۵۱۱۱۱

Phone
+98 21 8288 5063

Email
mjavan@modares.ac.ir

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

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

City
Tehran

Province
Tehran

Postal code
۱۴۱۱۵۱۱۱۱

Phone
+98 21 8288 5063

Email
abbas.hasan@modares.ac.ir

Person responsible for scientific inquiries

Contact

Name of organization / entity
Tarbiat Modares University

Full name of responsible person
Dr. Shahnaz Shahrbanian

Position
Associate Professor of Exercise Sciences
Latest degree
Ph.D.
Other areas of specialty/work
Exercise Physiology
Street address
Tarbiat Modares University, Shahid Chamran Blvd., Tehran, Iran
City
Tehran
Province
Tehran
Postal code
۱۴۱۱۵۱۱۱۱
Phone
+98 21 8288 5063
Email
sh.shahrbanian@modares.ac.ir

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
Street address
Tarbiat Modares University, Shahid Chamran Blvd., Tehran, Iran
City
Tehran
Province
Tehran
Postal code
۱۴۱۱۵۱۱۱۱
Phone
+98 21 8288 5063
Email
gholizade.atiye@gmail.com

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.