# Clinical Trial Protocol
# Iranian Registry of Clinical Trials

11 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**

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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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**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**
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## Sponsors / Funding sources

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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**

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**Latest degree**
Master

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Exercise Physiology

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## Person responsible for scientific inquiries

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## Person responsible for updating data

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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.