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Exploring how leg strength training may improve ankle strength and balance in people with chronic ankle instability

Submission date
13/11/2025

Recruitment status
No longer recruiting

Registration date
14/11/2025

Overall study status
Completed

Last Edited
14/11/2025

Condition category
Musculoskeletal Diseases

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[ ] Record updated in last year

Plain English summary of protocol

Background and study aims
Ankle sprain is one of the most common musculoskeletal injuries during physical activities, accounting for 16–40% of all sports-related injuries. Many studies have examined the effectiveness of strength training in managing chronic ankle instability (CAI). This pilot study aimed to investigate the effects of a 3-week lower limb strength training program in individuals with CAI.

Who can participate?
Adults aged 18–45 years with chronic ankle instability

What does the study involve?
Participants received 3 weeks of lower limb strength training. The severity of ankle instability, ankle strength and balance ability were evaluated at baseline and after the 3-week intervention. Participants received free and comprehensive exercise-based rehabilitation guidance for ankle instability.

What are the possible benefits and risks of participating?
Participants may benefit from improved ankle strength, balance, and stability. Risks are minimal and may include mild temporary muscle soreness following exercise.

Where is the study run from?
Shenzhen University (China)

When is the study starting and how long is it expected to run for?
The intervention and data collection took place between June and August 2022

Who is funding the study?
Investigator initiated and funded

Who is the main contact?
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Contact information

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Study information

Scientific Title
The effectiveness of lower limb strength training for individuals with ankle instability: a pilot study

Acronym
CAIST (Chronic Ankle Instability Strength Training)

Study objectives

Based on the concept that the lower extremity functions as an integrated kinetic chain, this pilot study investigated the effects of a 3-week lower limb strength training program in individuals with chronic ankle instability, aiming to evaluate its feasibility and potential benefits on ankle strength, balance, and self-reported stability.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 20/06/2022, Medical Ethics Committee, Department of Medicine, Shenzhen University (Department of Medicine, Shenzhen University, Shenzhen, 518060, China; +86 (0)755-86671906; spchen@szu.edu.cn), ref: PN-202200034

Primary study design
Interventional

Allocation
N/A: single arm study

Masking
Open (masking not used)

Control
Uncontrolled

Assignment
Single

Purpose
Prevention

Study type(s)

Health condition(s) or problem(s) studied
Chronic ankle instability (CAI)

Interventions
Participants in this study received a 3-week lower limb strength training program. Throughout the 3-week intervention, participants were provided with guidance and supervision by an experienced sports therapist during 45-minute sessions, held three times per week in the laboratory at Shenzhen University.

Intervention Type
Behavioural

Primary outcome(s)
1. The severity of ankle instability measured using the Cumberland Ankle Instability Tool (CAIT) at Baseline and after 3 weeks of intervention

2. Ankle strength measured using an isokinetic dynamometer (HUMAC NORM Isokinetic Testing and Rehabilitation System) at Baseline and after 3 weeks of intervention

3. Balance ability measured using the NeuroCom Balance Manager System at Baseline and after 3 weeks of intervention

Key secondary outcome(s)

Completion date
20/08/2022

Eligibility

Key inclusion criteria
1. Aged between 18 and 45 years (to avoid confounding factors related to older age)
2. Participants who had chronic ankle instability (CAI), defined as having experienced a significant ankle sprain and/or recurrent ankle sprain on the same ankle, and/or feel ankle instability, and/or experiencing giving way at least twice in the past 6 months
3. Normal cognitive function, with no history of craniocerebral injury, cerebrovascular disease, epilepsy, or other complications
4. Able to participate in moderate physical activity
5. No participation in any CAI-related exercise rehabilitation programs within the three months prior to the study
6. Provided written informed consent prior to participation
7. The affected ankle was not in the acute phase of injury

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 Years

Upper age limit
45 Years

Sex
All

Total final enrolment
8

Key exclusion criteria
1. Acute ankle sprain or other lower limb injuries within the last 3 months
2. History of ankle surgery, fracture, or significant joint deformity
3. Neurological or vestibular disorders affecting balance or movement
4. Inability to perform exercise safely or follow instructions
5. Current participation in other rehabilitation or strength training programs

Date of first enrolment

20/06/2022

Date of final enrolment
30/06/2022

Locations

Countries of recruitment
China

Study participating centre
School of Physical Education
Shenzhen University
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Sponsor information

Organisation
Shenzhen University

ROR
https://ror.org/01vy4gh70

Funder(s)

Funder type

Funder Name
Investigator initiated and funded

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available