

# How balance and hamstring exercises can help relieve lower back pain

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<b>Registration date</b> 28/05/2024	<b>Overall study status</b> Completed	<input checked="" type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 28/02/2025	<b>Condition category</b> Musculoskeletal Diseases	<input type="checkbox"/> Individual participant data

## Plain English Summary

Background and study aims

Low back pain negatively affects people's lives. We don't yet know if balance and hamstring training can help.

We studied 26 adults with low back pain to see if balance combined with hamstring training can be an effective treatment.

Who can participate?

Patients with lower back pain, aged 18 - 65 years

What does the study involve?

We invited participants to do balance and hamstring exercises for 6 weeks. We tested them on pain intensity, balance ability, back and abdominal strength and endurance, and hamstring flexibility and strength. These tests showed if they felt better after 6 weeks of these exercises. We measured these tests at the beginning and end of the study.

What are the possible benefits and risks of participating?

Participants will receive guidance from a professional sport therapist during the 6-week study period. Exercise intervention is moderate physical activity and will be done under the supervision of the researcher, Thus the intervention is not expected to be associated with any risks.

Where is the study run from?

Shenzhen University (China)

When is the study starting and how long is it expected to run for?

October 2021 to September 2022

Who is funding the study?

Investigator initiated and funded

Who is the main contact?

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## Contact information

### Type(s)

Principal Investigator

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### Type(s)

Public, Scientific

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## Additional identifiers

### EudraCT/CTIS number

Nil known

### IRAS number

### ClinicalTrials.gov number

Nil known

### Secondary identifying numbers

Nil known

## Study information

### Scientific Title

Evaluating the therapeutic effect of combined balance and hamstring training (CBHT) in patients with nonspecific low back pain: a randomized controlled trial

**Acronym**

BALANCE-HAM

**Study hypothesis**

A 6-week of balance and hamstring training is effective in reducing pain intensity, improving back strength, abdominal and back endurance, and hamstring strength.

**Ethics approval required**

Ethics approval required

**Ethics approval(s)**

Approved 07/06/2022, Medical Ethics Committee, Department of medicine, Shenzhen University (No. 3688, Nanhai Road, Nanshan District, Shenzhen, 518060, China; +86 755-86671906; spchen@szu.edu.cn), ref: PN-202200024

**Study design**

Single-center interventional single-blinded randomized controlled trial

**Primary study design**

Interventional

**Secondary study design**

Randomised controlled trial

**Study setting(s)**

University/medical school/dental school

**Study type(s)**

Treatment

**Participant information sheet**

See study outputs table

**Condition**

Non-specific low back pain

**Interventions**

This study, conducted in the laboratory of the College of Physical Education, Shenzhen University, randomly allocated 26 patients with non-specific lower back pain into either an experimental group, receiving balance combined with hamstring training, or a control group with no intervention, using computer-generated randomization and employing assessor-blinded masking, with outcomes assessed over a 6-week period.

Participants in the experimental group (EG) were given balance combined with hamstring training, and control group (CG) received no intervention. EG completed the training program for a 45-min session, with 3 sessions per week for up to 6 weeks. Each training session consisted of 4 parts: warm-up (5min), balance training (20min), hamstring training (15min), and relaxation (5min). The goal of the warm-up was to activate the low back and abdominal muscles through some simple gymnastics. Balance training was the combination of static and dynamic balance, using the TOGU Balance training system. During balance training, participants were constantly reminded to tighten the abdomen and exert strength with the buttocks and thighs to control

the core stability of the body. Hamstring training involved stretching and strength training. The goal was to release overstrained muscles and increase hamstring contraction. Relaxation included abdominal stretching, back stretching, and releasing muscle with a roller. In this part, participants used a roller to relax the muscles in the low back and legs. The goal was to relax the tired muscles after training and promote physical recovery.

### **Intervention Type**

Behavioural

### **Primary outcome measure**

Pain is measured using a visual analogue scale (VAS) at baseline and at the week 7, following completion of the 6 week exercise programme

### **Secondary outcome measures**

1. Balance ability is measured using the TOGU Balance Test system at baseline and at the week 7, following completion of the 6 week exercise programme
2. Abdominal and back muscles strength is measured using isometric force testing device at baseline and at the week 7, following completion of the 6 week exercise programme
3. Abdominal and back muscles endurance is measured using holding time at baseline and at the week 7, following completion of the 6 week exercise programme
4. Hamstring extensibility is measured using sit-and-reach test at baseline and at the week 7, following completion of the 6 week exercise programme
5. Hamstrings strength is measured using isometric force testing device at baseline and at the week 7, following completion of the 6 week exercise programme

### **Overall study start date**

01/10/2021

### **Overall study end date**

30/09/2022

## **Eligibility**

### **Participant inclusion criteria**

1. Pain in the 12th costal to gluteal fold in the past year, with or without numbness and radiating pain in the lower extremities
2. Normal cognitive function, no craniocerebral injury, cerebrovascular disease, epilepsy, and other complications
3. No pacemaker and stent implantation in the body.

### **Participant type(s)**

Patient

### **Age group**

Adult

### **Lower age limit**

18 Years

### **Upper age limit**

65 Years

**Sex**

Both

**Target number of participants**

35

**Total final enrolment**

30

**Participant exclusion criteria**

1. Tumor, tuberculosis, fracture, or specific low back pain caused by definite infection
2. Sciatica or radicular pain syndrome
3. A definite history of spinal trauma and surgery
4. Patients with severe heart disease and visceral disease
5. The lumbar injury is in the acute phase

**Recruitment start date**

10/06/2022

**Recruitment end date**

29/06/2022

## **Locations**

**Countries of recruitment**

China

**Study participating centre**

**Shenzhen University**

Faculty of Physical Education

Shenzhen

China

518060

## **Sponsor information**

**Organisation**

Shenzhen University

**Sponsor details**

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**Sponsor type**  
University/education

**Website**  
<http://www.szu.edu.cn/2014/en/>

**ROR**  
<https://ror.org/01vy4gh70>

**Funder(s)**

**Funder type**  
Other

**Funder Name**  
Investigator initiated and funded

**Results and Publications**

**Publication and dissemination plan**  
The results of this study will be submitted for publication in a peer-reviewed journal and presented at conferences.

**Intention to publish date**  
15/10/2024

**Individual participant data (IPD) sharing plan**  
Data will be available upon reasonable request  
1900371004@email.szu.edu.cn

**IPD sharing plan summary**  
Available on request

**Study outputs**

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Participant information sheet</a>			24/05/2024	No	Yes
<a href="#">Statistical Analysis Plan</a>			24/05/2024	No	No
<a href="#">Results article</a>		28/02/2025	28/02/2025	Yes	No