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Effects of sling exercises on pain, function, and brain-muscle coordination in individuals with chronic low back pain

Submission date
17/05/2023

Recruitment status
No longer recruiting

Registration date
22/05/2023

Overall study status
Completed

Last Edited
22/05/2023

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
Chronic low back pain (CLBP) is a disabling condition that affects all populations. Exercise training has been proven to achieve promising outcomes for pain and function among patients with CLBP. Nevertheless, the mechanism that mediates pain reduction after exercise training is not well understood. Some studies have found deficits in neural connection and decreased trunk control in people with CLBP. Whether training-related symptom reduction is attributed to enhanced brain-trunk muscle control has not yet been explored. Therefore, this study aims to investigate whether improvement of back pain and function is attributed to a change in the link between brain and trunk muscle activities.

Who can participate?
Healthy volunteer control people and patients with chronic low back pain aged between 20-50 years old

What does the study involve?
All participants receive 40 minutes of sling exercises twice a week for 6 weeks. Selected exercises include chess press, hamstring curl, hip abduction in plank, and single-leg squat. All training is supervised by a licensed physical therapist. Exercise intensity and rest are adjusted according to each participant's performance.

What are the possible benefits and risks of participating?
Participants with back pain may benefit from some extent of symptom relief. For healthy volunteers, they may experience the benefits of engaging in physical activities, and contribute to scientific understanding of the mechanism of exercise therapy on back pain. The risks involved in the intervention are similar to participating in daily exercises, where participants may experience soreness during or after exercises.

Where is the study run from?
Department of Physical Therapy and Assistive Technology, National Yang-Ming Chao Tung University (Taiwan), and Department of Rehabilitation Medicine, Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation (Taiwan)

When is the study starting and how long is it expected to run for?
July 2014 to October 2016

Who is funding the study?
Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation (Taiwan)

Who is the main contact?
Prof Li-Wei Chou, lwchou@nycu.edu.tw

Contact information

Type(s)
Principal investigator

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
Nil known

Study information

Scientific Title
Effects of sling exercises on pain, function, and corticomuscular functional connectivity in individuals with chronic low back pain - A preliminary study

Study objectives
Patients suffering from chronic low back pain can greatly benefit from performing sling exercises. The reason behind this improvement can be attributed to the enhancement of corticomuscular coherence.

Ethics approval required
Old ethics approval format

Ethics approval(s)
1. Approved 10/11/2014, Institutional Review Board of National Yang-Ming University (now National Yang Ming Chao Tung University) (No. 155, Sec. 2, Linong Street, Beitou Dist., Taipei City, 112, Taiwan; +886228239753; rec@nycu.edu.tw), ref: YM103090E
2. Approved 20/10/2014, Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation (No. 289, Jianguo Rd., Xindian Dist., New Taipei City, 231405, Taiwan; +886266289779 ext. 1136; hrpc@tzuchi.com.tw), ref: 03-XD14-039

Study design
Quasi-experimental design

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Nonspecific chronic low back pain

Interventions
There are two study groups, namely a patient group with chronic low back pain and a healthy control group. Patients diagnosed with nonspecific chronic low back pain are screened by a physiatrist at the Department of Rehabilitation Medicine of Taipei Tzu Chi Hospital. The eligible patients are interviewed by a licensed physical therapist (Bo-Jhen Chen, one of the principal investigators). For healthy controls, asymptomatic adults (aged 20-50) are recruited at National Yang-Ming Chao Tung University (formerly called National Yang-Ming University). The principal

investigator Professor Li-Wei Chou will explain the purpose and method of the study for candidates. Written informed consent is obtained from each participant before the commencement of assessment and training, which is conducted at the laboratory of the Department of Physical Therapy and Assistive Technology, National Yang-Ming Chao Tung University.

Both the healthy control and patients receive 40 minutes of sling exercises twice a week for 6 weeks. Selected exercises include chess press, hamstring curl, hip abduction in plank, and single-leg squat. All training is supervised by a licensed physical therapist, who receives formal training in TRX (a sling exercise toolkit). Exercise intensity and rest are adjusted according to each participant's performance.

Intervention Type
Behavioural

Primary outcome(s)
The following primary outcome measures are assessed at baseline and 6 weeks:
1. Pain measured using the Numeric Pain Rating Scale
2. Disability measured using the Oswestry Disability Index
3. Neuromuscular activity measured by calculating corticomuscular (electroencephalogram [EEG] –electromyography [EMG]) coherence

Key secondary outcome(s))
There are no secondary outcome measures

Completion date
29/10/2016

Eligibility

Key inclusion criteria
1. Chronic low back pain for more than 3 months
2. Aged 20-50 years old

Participant type(s)
Healthy volunteer, Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
20 years

Upper age limit
50 years

Sex

All

Total final enrolment
23

Key exclusion criteria
Patient:
Spinal stenosis/fracture, radiculopathy, or history of surgery

Healthy adults:
1. Aged outside of 20–50 years
2. Neurological diseases

Date of first enrolment
23/11/2014

Date of final enrolment
19/10/2016

Locations

Countries of recruitment
Taiwan

Study participating centre
Taipei Tzu Chi Hospital
Buddhist Tzu Chi Medical Foundation
No. 289, Jianguo Rd.
Xindian Dist.
New Taipei City
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231405

Sponsor information

Organisation
Taipei Tzu Chi Hospital

ROR
https://ror.org/00q017g63

Funder(s)

Funder type
Hospital/treatment centre

Funder Name
Taipei Tzu Chi Hospital

Alternative Name(s)

Funding Body Type
Private sector organisation

Funding Body Subtype
Other non-profit organizations

Location
Taiwan

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study are/will be available upon request from the corresponding author Prof Li-Wei Chou, lwchou@nycu.edu.tw. The patient group is recruited from the Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Taiwan (R.O.C.), and their associated medical records are governed by the Personal Data Protection Act in Taiwan (R.O.C.). Prior to requesting access to these data from the corresponding author, please inform the Human Research Protection Center of Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Taiwan (R.O.C.) (hrpc@tzuchi.com.tw) in advance.

Standardized written informed consent was obtained from each participant. All personal information will be de-identified. The demographic data (number of included subjects, age, body mass index, and symptom duration and severity) and the brain-muscle activities of the participants will be shared upon request.

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes