

# Community-based exercise training for continuing recovery after spinal cord injury

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		<input type="checkbox"/> Protocol
<b>Registration date</b> 11/07/2023	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan
		<input type="checkbox"/> Results
<b>Last Edited</b> 07/08/2024	<b>Condition category</b> Injury, Occupational Diseases, Poisoning	<input type="checkbox"/> Individual participant data
		<input type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

People affected by spinal cord injury (SCI) can lose the ability to move their body, including arms and legs, significantly reducing their independence in carrying out self-care and their mobility, impacting on their quality of life. Based on the standard of care, a patient with SCI stays in a spinal unit of the NHS to undergo intensive rehabilitation for approximately 3 months, then will be discharged from the hospital and return home. Once the patient leaves hospital, they have very little access to physiotherapy for their continuing recovery from the injury. Research has shown that individuals with SCI can continue to improve function for up to 2 years from the time of the injury. It is therefore necessary to provide continuing therapeutic exercise for the patients in the community. Hence, the study aims to evaluate the feasibility of a self-directed, home-based, arm-crank exercise training (ACET) programme as continuing rehabilitation for individuals with a spinal cord injury (SCI) who live at home and do not receive ongoing rehabilitation care for their continuing recovery from the injury.

### Who can participate?

Patients aged 16 years or older with a spinal cord injury (SCI) who live at home and do not receive ongoing rehabilitation care for their continuing recovery from the injury.

### What does the study involve?

This is a feasibility randomised controlled trial study with two study groups: the ACET group and the control group. Both groups will undertake activity-based rehabilitation exercise for 8 weeks and will undergo functional assessments, including balance and fitness tests, before and after the rehabilitation exercise at home. We will test whether individuals with SCI are willing to be recruited and randomised, to undertake the exercise at home, and to adhere to the exercise protocol. We will also interview participants and their medical teams via focus groups to understand their views about the self-directed, home-based rehabilitation programme.

### What are the possible benefits and risks of participating?

The possible benefits of participating may include improved physical function and mood. There are minimal risks from participating in this study. All assessments will be performed within

participants' limits of tolerance. Some participants may experience mild muscle soreness following the exercise training. The discomfort can be managed by taking pain killers or hot/cold packs.

Where is the study run from?  
University of Birmingham (UK)

When is the study starting and how long is it expected to run for?  
June 2023 to December 2024

Who is funding the study?  
1. University of Birmingham (UK)  
2. Academy of Medical Sciences (UK)

Who is the main contact?  
Dr Shin-Yi (Chloe) Chiou, s.chiou@bham.ac.uk

## Contact information

**Type(s)**  
Principal Investigator

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## Additional identifiers

**EudraCT/CTIS number**  
Nil known

**IRAS number**  
326143

**ClinicalTrials.gov number**  
Nil known

**Secondary identifying numbers**  
IRAS 326143, CPMS 56434

# Study information

## Scientific Title

Community-based exercise training for continuing recovery after spinal cord injury

## Study objectives

Home-based arm crank exercise training programme is feasible and acceptable to individuals with spinal cord injury who is in the transition of setting back in the community from a specialised hospital after their injuries.

## Ethics approval required

Ethics approval required

## Ethics approval(s)

Approved 15/06/2023, West Midlands - Black Country Research Ethics Committee (2 Redman Place, Stratford, London, E20 1JQ, United Kingdom; +44 2071048210; blackcountry.rec@hra.nhs.uk), ref: 23/WM/0121

## Study design

Multicentre feasibility randomized controlled trial

## Primary study design

Interventional

## Secondary study design

Randomised controlled trial

## Study setting(s)

Community, Home

## Study type(s)

Quality of life, Treatment

## Participant information sheet

See additional files

## Health condition(s) or problem(s) studied

Adults with spinal cord injury

## Interventions

The arm-crank exercise training (ACET) group will undertake 8 weeks of home-based ACET, 30 minutes/day, 5 days/week, at a moderate intensity. A stationary arm bike will be provided to each participation in the ACET group for training at home. Adherence will be recorded in a provided exercise calendar.

Participants in the control group will undergo the standard of care, which is no prescribed treatment. Participants are free to undertake any forms of exercise of their choice and will be monitored for 8 weeks.

A minimisation randomisation method will be used to ensure balance of severity of injury (AIS scores) and age being the same between the two groups. Randomisation will be performed using an online tool Sealed Envelope™.

## **Intervention Type**

Behavioural

## **Primary outcome measure**

Primary outcome measure (pre- and post-intervention, unless specified):

1. Adherence to the intervention: exercise duration, intensity, and frequency recorded by the exercise diary will be analysed to evaluate participants' adherence to the arm-crank exercise training (ACET).
2. An exit survey for usability, perceived effectiveness, and satisfaction will be used at post-intervention only.
3. Focus groups results. Participants in the intervention group will be invited to attend a focus group to discuss their views on the ACET intervention. The focus group will consist of between 5-8 participants, last <60 minutes, and will be conducted in person in a mutually agreed place or remotely via Zoom. An experienced moderator will run the focus group and data will be audio recorded via a secure password protected digital recording device. The recorded discussions will subsequently be transcribed by members of the research team for further analysis.
4. The recruitment rate:  $[(\text{number recruited}/\text{number approached}) \times 100\%]$
5. The retention rate:  $[(\text{number completed}/\text{number recruited}) \times 100\%]$

## **Secondary outcome measures**

Secondary outcome measures (pre- and post-intervention)

1. Muscle activity of the key muscles below the level of injury during maximal and submaximal voluntary contractions (MVCs), measured by surface electromyography.
2. Functional reach tasks. This is to assess sitting balance. Participants will be instructed to reach to multiple directions (forward, right side, and left side) with one arm as far as they can without losing balance. Muscle activity of the trunk and movement of the trunk will be recorded using surface electromyography and inertial measurement units.
3. Modified Ashworth Scale (MAS). MAS is a clinical scale that measures resistance of a muscle in response to manual passive muscle stretching. It will be manually applied by a trained experimenter to assess spasticity in the knee extensors and ankle plantar flexor.
4. Fitness and endurance will be measured by the graded exercise test and 3-minutes arm test on an arm ergometer.
5. Mobility, assessed by accelerometer worn by the participant for 7 days.
6. Pain, psychological wellbeing and health-related quality of life will be assessed via questionnaires: a visual analogue scale, the Patient Health Questionnaire-9, Generalised Anxiety Disorder Assessment (GAD-7), and the short-form 36.

## **Overall study start date**

15/06/2023

## **Completion date**

31/12/2024

# **Eligibility**

## **Key inclusion criteria**

1. Are aged 16 years old and above
2. Have a cervical or thoracic spinal cord injury (AIS A-D)
3. Have had the injury for 2 years or less
4. Have the ability to voluntarily move the elbow to operate the arm bike, bandage or active grip can be used to help holding the pedals

**Participant type(s)**

Patient, Resident, Service user

**Age group**

Adult

**Lower age limit**

16 Years

**Upper age limit**

100 Years

**Sex**

Both

**Target number of participants**

30

**Key exclusion criteria**

1. Have ongoing issues with shoulder instability or shoulder pain
2. Are unable to use the bike due to lack of muscle activity to activate the bike (e.g., ASIA B or C at cervical level). This will assess case-by-case.
3. Have contraindications to exercise or have been advised to avoid exercise by their doctor (e.g., postural hypotension, ulcers, pregnancy)
4. Are not able to understand verbal explanations or written information given in English.
5. Are currently staying in a private medical centre or in a hospital for their continuing recovery from SCI.
6. Are currently participating in a trial involving an exercise intervention.

**Date of first enrolment**

17/07/2023

**Date of final enrolment**

05/08/2024

**Locations****Countries of recruitment**

England

United Kingdom

**Study participating centre**

**Robert Jones & Agnes Hunt Orthopaedic Hospital**  
Gobowen  
Oswestry  
United Kingdom  
SY10 7AG

**Study participating centre**  
**Northern General Hospital**  
Northern General Hospital NHS Trust  
C Floor, Huntsmnan Building  
Herries Road  
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**Study participating centre**  
**James Cook University Hospital**  
Marton Road  
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United Kingdom  
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## **Sponsor information**

**Organisation**  
University of Birmingham

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**Sponsor type**  
University/education

**Website**  
<http://www.birmingham.ac.uk/index.aspx>

**ROR**

## Funder(s)

### Funder type

University/education

### Funder Name

University of Birmingham

### Alternative Name(s)

### Funding Body Type

Private sector organisation

### Funding Body Subtype

Universities (academic only)

### Location

United Kingdom

### Funder Name

Academy of Medical Sciences

### Alternative Name(s)

The Academy of Medical Sciences

### Funding Body Type

Private sector organisation

### Funding Body Subtype

Other non-profit organizations

### Location

United Kingdom

## Results and Publications

### Publication and dissemination plan

Presentations at academic conferences, manuscript publications in peer-reviewed journals.

### Intention to publish date

01/06/2025

## Individual participant data (IPD) sharing plan

The dataset generated and analysed during the current study will be available upon request from the corresponding author.

s.chiou@bham.ac.uk

## 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>	version 2	02/06/2023	10/07/2023	No	Yes