ISRCTN18006574 https://doi.org/10.1186/ISRCTN18006574

Climbing training in children with cerebral palsy

Submission date
01/05/2017

Recruitment status
No longer recruiting

Registration date
09/05/2017

Overall study status
Completed

Last Edited
13/11/2017

Condition category
Nervous System Diseases

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Cerebral Palsy (CP) is a term for a number of conditions that affect movement and co-ordination. It occurs when there is a problem in the parts of the brain responsible for controlling muscles. This can be due to abnormal development of the brain or damage caused before, during or after birth. CP leads to a range of symptoms, including muscle stiffness or weakness, random and uncontrolled body movements and balance and coordination problems. It has been shown that children with CP are less physically active than those who have developed normally. Climbing requires a range of different movements and can act as both a functional and cognitive (thought-process) challenge. Until now very few research projects have investigated the feasibility of climbing as a potential activity for increasing levels of physical activity in children with CP. The aim of this study is to test the feasibility of an intensive three weeks indoor-climbing training program in children with CP and typically developing (TD) peers.

Who can participate?
Children aged 10-15 years with and without CP.

What does the study involve?
All children take part in nine indoor-climbing training sessions over a period of three weeks, with three 2.5 hour-long sessions taking place each week. During these sessions, activity levels are monitored using activity measurement devices worn by the children. Two weeks before starting the programme, immediately before starting the programme and after the programme is complete, participants complete a range of tests and questionnaires to assess their physical and mental function and wellbeing. In addition, climbing abilities are assessed through observation of several sessions.

What are the possible benefits and risks of participating?
Participants may benefit form improved climbing skills, muscle strength, balance, as well as mental and social skills. There are no notable risks involved with participating.

Where is the study run from?
1. Elsass Institute (Denmark)
2. University of Copenhagen, Institute of Sports and Nutrition (Denmark)

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

Who is funding the study?
Ludvig and Sara Elsass Foundation (Denmark)

Who is the main contact?
Dr Jakob Lorentzen
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Contact information

Type(s)
Scientific

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Additional identifiers

Protocol serial number
1

Study information

Scientific Title
To be active through indoor-climbing: An exploratory feasibility study in a group of children with cerebral palsy and typically developing children

Study objectives
The climbing gym, together with skilled instructors, in combination with the notion of climbing as an endogenously motivated activity in 3 weeks of intensive climbing training would:
1. Facilitate a high level of activity among children with CP
2. Improve hand coordination and increased pinch grip strength
3. Improve cognitive skills related to spatial working memory
4. Improve the participant’s own evaluation of their physical abilities as well as skills in general

Ethics approval required
Old ethics approval format

Ethics approval(s)
Ethics committee of Copenhagen, Denmark (Videnskabsetisk komite, Region hovedstaden), 01 /08/2014, ref: H-B-2009-017

Primary study design
Interventional

Study design
Unblinded non randomised feasibility study

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Cerebral Palsy

Interventions
All participants take part in a three week programme of intensive climbing training, three times a week for approximately 2.5 hours each time. Nine days of climbing are planned within a period of 17 days, on Monday, Tuesday and Friday in the first two weeks, and Monday, Tuesday and Wednesday in the third week

All climbing is performed in the afternoon after school hours. Each climbing day consists of approximately 2.5 hours of physical activity, split into approximately 30 minutes of warm up exercises specifically focused on climbing. Subsequently the participants were split into two half with an approximately equal number of children with CP and TD participants in each group, where one group started with bouldering exercises. The other half of the participants were engaged in wall climbing with a top rope as safety. In order to avoid long waiting times during the top rope session, 3-4 instructors were allocated for the top rope practice, and one instructor was responsible for the bouldering session. After approximately 1 h, the two groups swapped activity. Each climbing day ended with a wrap up where the participants told what they had learned during the day. The intervention was planned as a sports activity, where the focus for the participants was to improve their climbing performance and experience that they learned new skills. Without focusing on specific needs of the individual participant with disabilities, we hoped that the focus of climbing performance also would give rise to therapeutical benefits, but intentionally without focusing on these specifically.

All participants are assessed two weeks prior to onset of the intervention; just before onset of the intervention; and the following week immediately after the last day of the thee week long intervention period. The testing consists of a range of tests including physiological, psychological and cognitive tests. The amount of time spent being physically active during the 9 indoor-climbing training sessions, and climbing abilities is also measured.

Intervention Type
Behavioural

Primary outcome(s)
Physical activity is measured using activity mesaurement devices (SenseWear) worn during each climbing session.

Key secondary outcome(s)
1. Climbing performance is measured using video-filming of the participant while climbing one specific route on day 3 and day 8 of climbing days
2. Functionality is measured using Sit-to-stand test and Romberg 30 s balance test at both baseline tests and after the intervention period
3. Hand strength is measured using an analog hand-dynamometer at both baseline tests and after the intervention period
4. Pinch strength is measured using EMG and force recordings during maximal pinch at both baseline tests and after the intervention period
5. Coherence is measured using EMG from the finger muscles during at precision pinch grip at both baseline tests and after the intervention period
6. Ankle stiffness, range on motion and strength is measured using hand-held dynamometer at both baseline tests and after the intervention perio
7. Cognitive abilities are measured using CogState which is a set of computerized tests that can be assembled from a large battery of various cognitive tests at both baseline tests and after the intervention period
8. Physical abilities are measured using a series of strength and precision test for the fingers, hands and ankles at both baseline tests and after the intervention period
9. Skills and abilities are measured using the recorded speed of the route climbed on day 3 and 8 of the climbing days
10. Mental well-being is measured using the questionnaire ”Saadan er jeg” at the first baseline test and after the intervention period
11. Relationship to parents is measured using the questionnaire ”Saadan er jeg” at the first baseline test and after the intervention period
12. Relationship to others is measured using the questionnaire ”Saadan er jeg” at the first baseline test and after the intervention period

Completion date
01/09/2016

Eligibility

Key inclusion criteria
Patients:
1. Diagnosis of cerebral palsy
2. Aged 10-15

Age-matched controls:
1. Systemically healthy
2. Aged 10-15

Participant type(s)
Mixed

Healthy volunteers allowed
No

Age group
Child

Lower age limit

10 Years

Upper age limit
15 Years

Sex
All

Key exclusion criteria
Patients:
Severe functional dysfunction that made climbing impossible.

Date of first enrolment
01/01/2015

Date of final enrolment
01/06/2015

Locations

Countries of recruitment
Denmark

Study participating centre
Elsass Institute
Holmegaardsvej 28
Charlottenlund
Denmark
2920

Study participating centre
University of Copenhagen, Institute of Sports and Nutrition
Panum Institute
Nørre Alle
Copenhagen
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2200

Sponsor information

Organisation
Institute of Sports and Nutrition

ROR
https://ror.org/035b05819

Funder(s)

Funder type
Charity

Funder Name
Ludvig and Sara Elsass Foundation

Results and Publications

Individual participant data (IPD) sharing plan
Anonymised data from the study will be made available upon request from jlo@elsassfonden.dk

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	15/06/2017		Yes	No