The effect of eccentric and task oriented upper limb strength training in chronic stroke patients.

Published: 05-02-2014
Last updated: 23-04-2024

The objectives of the study in chronic stroke patients are 1) to determine whether eccentric strength training is an effective strength training program, 2) whether upper-limb task oriented strength training improves upper limb function in the...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Muscle disorders
Study type	Interventional

Summary

ID

NL-OMON38226

Source
ToetsingOnline

Brief title
Upper limb strength training in chronic stroke

Condition

- Muscle disorders

Synonym
Stroke

Research involving
Human

Sponsors and support

Primary sponsor: Revalidatiegeneeskunde
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: strength training, stroke, upper limb

Outcome measures

Primary outcome

The main study parameter for strength will be measured with the HHD. The upper limb function in the ICF activities domain will be the change in ARAT score. The ARAT assesses activities of daily living, coordination and dexterity of the upper limb.

Secondary outcome

Feasibility will be measured by the IMI and the attendance of the participants.

Study description

Background summary

Literature has shown that strength training can improve strength without increasing muscle tone or pain in chronic stroke patients (Ada et al., 2006, Pak and Patten, 2008, Harris et al., 2009, Borges et al., 2009). Furthermore, eccentric strength training is proven to be an effective strength training method in chronic stroke patients (Engardt et al., 1995; Clark et al., 2013). However, the feasibility of such a program is not known, due to the fact that the studies used an isokinetic exerciser. Isokinetic exercisers are expensive machines and only one patient can train at the time. Also, strength training can improve activities of daily living, although the research is only implemented for the lower limb. The study of Yang et al. (2006) showed that task oriented strength training could improve lower extremity muscle strength in chronic stroke patients and could carry over into improvement in functional abilities. No literature was found on the effects of a training program for upper limb combining strength training and task-oriented training. It could be possible that one needs a certain amount of strength before task oriented strength training will have a positive effect.
Therefore, a study in which eccentric strength training and task oriented strength training are investigated will be performed. The two main research questions are: *Is eccentric strength training of the upper limb an effective and feasible strength training program to provide to chronic stroke patients?*

and *Can task oriented strength training of the upper limb improve upper limb function in the ICF activities domain of individuals with chronic stroke?* The secondary effect that will be studied is the order of eccentric and task oriented strength training.

Study objective

The objectives of the study in chronic stroke patients are 1) to determine whether eccentric strength training is an effective strength training program, 2) whether upper-limb task oriented strength training improves upper limb function in the International Classification of Functioning, Disability and Health (ICF) activities domain, 3) whether task oriented strength training is more effective when preceded by eccentric strength training, 4) whether eccentric strength training is more effective when preceded by task oriented strength training, 5) whether eccentric strength training is a feasible strength training.

Study design

The study is a pilot study with a pre-post design similar to a cross-over design, but without a control intervention. All participants will receive two different interventions; an eccentric strength training and a task oriented strength intervention. Both interventions will take four weeks. Half of the participants will receive the eccentric training first (EST-TOST group), the other half will receive the task oriented training first (TOST-EST group). The participants will be allocated to a group randomly. Outcome measures are upper-limb strength measured with a hand-held dynamometer (HHD), the action research arm test (ARAT) to measure upper limb function in the ICF activities domain, and a combination of the intrinsic motivational inventory (IMI) and the attendance of the participants to measure feasibility. There will be three measurement moments; baseline, after the first intervention and after the second intervention. At baseline the strength and upper limb function will be measured and after the first and second intervention the strength, upper limb function and feasibility will be measured.

Intervention

An eight week (three days/week) program consisting of four weeks of upper-limb eccentric strength training and four weeks of upper-limb task oriented strength training will be carried out. Both strength interventions will be performed one day per week at Beatrixoord with a physiotherapist or occupational therapist and two days per week at home. During the first and second training session at home one researcher is present to assist the participant with the technical aspects of the program and possible other problems. If necessary, the researcher will assist the participant during the other training sessions at home.

Eccentric training: The participants will receive eccentric strength training for the upper limb 3 times a week for 30 minutes. The training consists of exercises for the major wrist-, elbow- and shoulder muscles. In each exercise the unaffected arm will help the affected arm against resistance, than the affected side moves slowly with the resistance, without the help of the unaffected arm. The exercises will start at 60% of one-repetition maximum (1RM) and repeated ten to fifteen times for one to three times. Every week the intensity will be increased.
Task oriented strength training: The task oriented strength training will be a bilateral upper-limb training using a movement-based game controller (Cy Wee Z), incorporated into a handlebar. The participant will play games on a PC using the movement-based game controller for 30 minutes. The weight of the handlebar will be increased over the four week intervention period.

Study burden and risks

The patient will have to visit Beatrixoord once a week, the total amount of site visits is eight times for the intervention and three times for the measurements. Also, the patient has to train twice a week at home, which is a total amount of sixteen times. There are three measurement moments. During every measurement moment strength (HHD) and ARAT will be tested. The second (after four weeks) and third (after eight weeks) measurement moment the IMI will also have to be filled out. The risks are negligible, because there is a physiotherapist or occupational therapist who will observe during the intervention at Beatrixoord. Also, the patient will sit on a chair during the interventions, reducing the risk of falling. The study is in chronic stroke patients since it is unknown what the effect is of eccentric strength training and task oriented strength training on chronic stroke patients and the influence of natural recovery is ruled out in this population. This can help to optimize the rehabilitation process of chronic stroke patients.

Contacts

Public
Selecteer

Hanzeplein 1
Groningen 9713GZ
NL
Scientific
Selecteer

Hanzeplein 1
Groningen 9713GZ

NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

Understanding Dutch language
A clinical definite diagnosis of stroke
At least six months post stroke
Mini-Mental State Examination (MMSE) score of at least 24
Reduced arm function (Brunnstrom Fugl-Meyer score lower than 20 points)
Ability of transport to Beatrixoord

Exclusion criteria

Severe visual deficits interfering with the comprehension or completion of presented games on the computer
Shoulder problems such as frozen shoulder
Treatment specifically focussed on the upper limb at the moment

Study design

Design

Study type: Interventional

Masking:	Single blinded (masking used)
Control:	Uncontrolled

Primary purpose:	Treatment

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	24-02-2014
Enrollment:	20
Type:	Actual

Ethics review

Approved WMO

Date:	05-02-2014
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL46866.042.13