Effect of gravity compensation and resistance on muscle activation patterns and kinematics in healthy elderly.

No registrations found.

Ethical review	Positive opinion
Status	Other
Health condition type	-
Study type	Observational non invasive

Summary

ID

NL-OMON24591

Source
NTR

Brief title
Gravity compensation and resistance in elderly.

Health condition

stroke, CVA, kinematics, muscle, elderly, resistance, dampening
beroerte, ouderen, kinematice, spier, weerstand

Sponsors and support

Primary sponsor: Ministry of Economic Affairs, the Netherlands
Source(s) of monetary or material Support: Ministry of Economic Affairs, the Netherlands

Intervention

Outcome measures

Primary outcome

Muscle activation patterns (EMG) and kinematics of the shoulder and elbow during mvoement

execution of different tasks.

Secondary outcome

N/A

Study description

Background summary

Rationale:
After a stroke, many patients suffer from an impaired motor task performance. Optimal restoration of arm and hand function are essential for stroke patients. To indepen-dently perform activities of daily life. To further stimulate restoration of arm function, rehabilitation must consist of intensive, active and functional movement exercises, adjusted to the abilities of each patient. To achieve high intensity of training, active movements are often facilitated by the application of gravity compensation. To stimulate muscle activation, movements can be resisted, to optimize training. It is unknown what the effect of gravity compensation and resistance is on the muscle activation patterns and kinematics in stroke patients. To get more insight in these muscle activation patterns and kinematics, it is necessary to first get more knowledge of the why and how in healthy elderly. Therefore in this study the effects of gravity compensation and resistance are investigated in healthy elderly to provide a framework for interpretation of findings for stroke patients.

Objective:
The main objective of this study is to get more insight in the muscle activity patterns of healthy elderly during cyclic reach and retrieval movements and circle drawing tasks. Additionally, the kinematics of elbow and shoulder joints during these movements are investigated.

Study design:
This study has a cross-sectional study design. The experiment is completed within one measurement session, with several movement tasks consisting of repeated arm movements. The muscle activation patterns and kinematics are investigated during flexion and extension movements of the elbow during shoulder abduction. A total of four conditions is studied:

1. With gravity compensation without resistance;

2. With gravity compensation and resistance;

3. Without gravity compensation without resistance;

4. Without gravity compensation with resistance.

During the circle drawing tasks the circular movements are performed in clockwise and counter clockwise directions in three different conditions:

1. Without gravity compensation and without resistance;

2. With gravity compensation and without resistance;

3. Without gravity compensation and with resistance.

Study population:
Twenty healthy human volunteers in the age of 45-80 years will participate.

Intervention (if applicable):
No Intervention will be given in this study.

Main study parameters/endpoints:
In this study we are mainly interested in the muscle activation patterns (measured by surface electromyography, EMG of 8 muscles) and the kinematics of the elbow and shoulder (measured by movement analysis techniques), during movement execution of different tasks.

Nature and extent of the burden and risks associated with participation, benefit and group relatedness:
The risks for the subjects are limited to a minimum, since the movement tasks are familiar and not beyond the capabilities of the subject. In addition the measure-ments in this study (EMG and kinematics) are all non-invasive and involve no risks to the subjects in any way. Participation of the subject in this experiment has no direct benefit for him/her, other than expanding knowledge about the muscle activation and kinematics during certain movements. This may eventually aid in the development of new applications or adaptations to existing treatments in the rehabilitation of arm function after stroke.

Study objective

It can be expected that the during the tasks with resistance, the movements are performed slower, less smooth and with less movement range. Also a larger amplitude in muscle activation can be expected. During the tasks with gravity compensation, less muscle activation of the muscles against gravity can be expected. No influence on smoothness, speed or range of motion is expected.

Study design

1 x 1,5 h.

Intervention

This study has a cross-sectional design. The experiment will take one measurement session of approximately one hour. In this session several movement tasks are executed with repeated arm movements. The muscle activation patterns and kinematics are investigated during flexion and extension movements of the elbow during shoulder abduction. A total of four conditions is studied:

1. With gravity compensation without resistance;

2. With gravity compensation and resistance;

3. Without gravity compensation without resistance;

4. Without gravity compensation with resistance.

The gravity compensation is applied to both elbow and shoulder, whereas the resistance is only applied on the elbow joint.

The circular movements are performed in clockwise and counter clockwise directions in three different conditions:

1. Without gravity compensation and without resistance;

2. With gravity compensation and without resistance;

3. Without gravity compensation and with resistance.

The resistance is applied on both shoulder and elbow joint.

Contacts

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Eligibility criteria

Inclusion criteria

Age of 45-80 years.

Exclusion criteria

1. Shoulder pain;

2. Neurological, orthopaedic or rheumatological disease of right upper extremity.

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non controlled trial
Masking:	Open (masking not used)
Control:	N/A , unknown

Recruitment

NL

Recruitment status:	Other
Start date (anticipated):	16-03-2009
Enrollment:	20
Type:	Unknown

Ethics review

Positive opinion

Date:	12-03-2009
Application type:	First submission

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
NTR-new	NL1627
NTR-old	NTR1724
Other	Ministry of Economic Affairs : 1-5160
ISRCTN	ISRCTN wordt niet meer aangevraagd

Study results

Summary results

N/A