Influence of task manipulation on muscle activity

Published: 18-07-2007
Last updated: 08-05-2024

In this pilot experiment we want to see in which way we have to manipulate a task it that way that we have more CAC although the amount of force or fatigue in the target muscle is the same.

Ethical review	Approved WMO
Status	Pending
Health condition type	Other condition
Study type	Observational non invasive

Summary

ID

NL-OMON31365

Source
ToetsingOnline

Brief title
Task manipulation

Condition

- Other condition

Synonym
no disorder

Health condition

gezonde proefpersonen

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Groningen
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: Associated contractions, EMG, Force, Task manipulation

Outcome measures

Primary outcome

The amount of associated force and EMG delivered by the non-target hand during

voluntary contractions of the target hand.

Secondary outcome

force and EMG voluntary contractions

Study description

Background summary

When producing large amounts of force or during a sustained submaximal contraction except from contractions in the target-muscle also non-target muscles are activated. There are even muscles activated who are contralateral to the 'target' muscle (CAC, contralateraal associated contraction) (Gellhorn 1947; Dimitrijevic et al. 1992; Gandevia et al. 1993; Mayston et al. 1999; Zijdewind and Kernell, 2001). A recent study proved the contralateral motor cortex activated both the associated contractions and the voluntary contractions (Zijdewind, 2006).
Associated contractions are often researched with tasks which are known to influence the amount of CAC, like making contractions at different force levels or fatiguing the target muscle. However, during these kind of tasks all other kinds of processes can influence the outcome of the CAC research. For this, it would be very good to have a task were at a similar force level or fatigue level there is yet more CAC.

Study objective

In this pilot experiment we want to see in which way we have to manipulate a task it that way that we have more CAC although the amount of force or fatigue

in the target muscle is the same.

Study design

In this research we want to try different research protocols in order to see which task is the best to influence the amount of CAC. The tasks shall be executed in the same but sometimes in different sessions. Because of the fatigue which arises in three of the tasks, it is not possible to execute all tasks in one measure session. Because of this a part of the tasks will be executed in another measure session on another day. During all tasks force and EMG measurements of the FDI muscle will be executed. As well shall all subjects before all tasks be asked to make a maximal contraction with the left an right index finger.
For task 6 we will also measure the force of one of the feet and the EMG of accompanying tibialis anterior and gastrocnemicus muscle. Furthermore, the maximal contraction of the foot will be determined.
Task 1: Subjects will be asked to follow as good as possible a pyramid shaped line with the force of one index finger.
Task 2: Subjects will be asked to make a small contraction with the non-target FDI muscle while the target muscle makes contractions at different force levels.
Task 3: Subjectes will be asked to make 10 contractions of 15 seconds at 30% of their maximal contraction. The Gain of the screen at which the subjects recieve visual feedback will be changed, in order to make the task more difficult.
Task 4: In two sessions, subjects are asked to make a fatiguing contractions during which the target hand will be in same position, but the non-target hand will be change position between sessions. Similar hand positions would presumably result in more CAC.
Task 5: Subjects are asked to make a sustained contrantraction at 50% of their maximum force. They receive visual feedback of their force, however, they don't see the force of the target hand but the force of both hands add up together. With this protocol we can possibly influence the amount of CAC.
Task 6: Not the hand, but the foot will be fatigued, to see what the influence is on the amount of CAC in the hands.

Study burden and risks

There are no risks

Contacts

Public
Universitair Medisch Centrum Groningen

A.Deusinglaan 1

9713 AV Groningen
Nederland
Scientific
Universitair Medisch Centrum Groningen

A.Deusinglaan 1
9713 AV Groningen
Nederland

Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

Righ-handedness
informed consent
age > 18

Exclusion criteria

Neurological abnormalities
Muscle disorders

Study design

Design

Study type: Observational non invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	01-03-2007
Enrollment:	40
Type:	Anticipated

Ethics review

Approved WMO

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	NL16622.042.07