Inhibition during unilateral and bilateral contractions in young and older adults

Published: 01-12-2015 Last updated: 19-04-2024

We aim to determine whether cortical inhibition is changed with age and to determine whether the amount of inhibition and associated activity are associated.

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

Summary

ID

NL-OMON42517

Source ToetsingOnline

Brief title Inhibition during bilateral contractions in older adults

Condition

• Other condition

Synonym not applicable

Health condition

fundamenteel onderzoek met 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

1 - Inhibition during unilateral and bilateral contractions in young and older adult ... 19-05-2025

Intervention

Keyword: aging, bilateral contractions, transcranial magnetic stimulation

Outcome measures

Primary outcome

We will determine the amplitude of the motor evoked potential (MEP). The MEP is expressed as a percentage of the electrically evoked muscle response (M-max). The MEP is a measure of cortico-spinal excitability. We expect the MEP to be modulated by performing unilateral or bilateral contractions. We also expect that the modulation will be age-related. MEP amplitude is also the outcome of different inhibitions protocols, expressed as an percentage of the baseline value.

Secondary outcome

The inhibition measures of different TMS protocols (SICI, IHI, SP) en the amount of associated activity. These measures are linked to the primary parameters (MEP amplitude).

Study description

Background summary

There are structural and functional changes in the brain with age. One of the age-related changes is a change in the level of inhibition. It is unclear whether inhibition increases or decreases with age. Changes in inhibition can be measured with transcranial magnetic stimulation (TMS). Another age-related change is increased associated activity. Associated activity is the activity in muscles contralateral to the task-limb. Associated activity is more explicit when a task requires more effort or is fatiguing, also in young adults. We have observed an age-related increase in the amount of associated activity already in middle-aged adults (Heetkamp et al., 2014). We hypothesize that the increased associated activity could be due to age-related

decline in inhibition. Therefore, we would like to study the effect of age effect on inhibition, the relation between inhibition and associated activity and determine the cortical origin of the age-related increase in associated activity.

Study objective

We aim to determine whether cortical inhibition is changed with age and to determine whether the amount of inhibition and associated activity are associated.

Study design

This is an intervention study in which we determine the effect of age on cortical inhibition, the origin of associated activity and the association between associated activity and inhibition. We use different measures of inhibition and excitability to do so.

A group of young adults and a group of older adults produce force with both index finger abductors. During the contractions we stimulate the motor cortex using transcranial magnetic stimulation to determine the excitability of the cortico-spinal system as well as the inhibition in one hemisphere and the inhibition between hemispheres.

Intervention

Subjects produce force with one and/or both index finger abductors. During the contractions we stimulate the motor cortex with transcranial magnetic stimulation (TMS).

Study burden and risks

There are no know risks to TMS and electric nerve stimulation. The electric nerve stimulation is uncomfortable, but lasts very short and is only repeated a few times. Subject need to visit the lab twice and the measurement takes two hours. So, the time investment is also limited.

Contacts

Public Universitair Medisch Centrum Groningen

```
Hanzeplein 1
Groningen 9700AV
NL
```

3 - Inhibition during unilateral and bilateral contractions in young and older adult ... 19-05-2025

Scientific Universitair Medisch Centrum Groningen

Hanzeplein 1 Groningen 9700AV NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

righthandedness age: 18-35 or 45 years and older

Exclusion criteria

neurological or muscle disorders epilepsy migraine pregnancy

Study design

Design

Study type: Interventional Masking:

Open (masking not used)

4 - Inhibition during unilateral and bilateral contractions in young and older adult ... 19-05-2025

Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL	
Recruitment status:	Recruitment stopped
Start date (anticipated):	30-03-2016
Enrollment:	30
Туре:	Actual

Ethics review

Approved WMO	
Date:	01-12-2015
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 CCMO **ID** NL54747.042.15