# Cortical activation during voluntary contraction in spinal cord injured subjects

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In humans with SCI, we propose to use functional magnetic resonance imaging (fMRI) to: 1) examine the cortical areas that are activated during voluntary contractions, and 2) evaluate how cortical activation patterns change as a muscle is fatigued....

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

# Summary

### ID

NL-OMON39304

**Source** ToetsingOnline

**Brief title** Cortical activation in SCI

# Condition

• Other condition

**Synonym** spinal cord injury

### Health condition

fundamenteel wetenschappelijk onderzoek

#### **Research involving**

Human

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### **Sponsors and support**

**Primary sponsor:** Universitair Medisch Centrum Groningen **Source(s) of monetary or material Support:** NIH

### Intervention

Keyword: cortical activation, EMG spinal cord injury, force

### **Outcome measures**

#### **Primary outcome**

Brain activity (BOLD-data), force and EMG data

#### Secondary outcome

non applicable

# **Study description**

#### **Background summary**

After human spinal cord injury (SCI), muscles are usually weak and fatigable, characteristics that severely limit their function. An ability to maintain adequate voluntary drive to muscles over time, termed central fatigue, is a prevalent component of the functional deficits seen after SCI. While motor evoked potentials represent one way to examine central fatigue, the afferent contributions to the declines in muscle force have not been evaluated.

#### **Study objective**

In humans with SCI, we propose to use functional magnetic resonance imaging (fMRI) to: 1) examine the cortical areas that are activated during voluntary contractions, and 2) evaluate how cortical activation patterns change as a muscle is fatigued. We hypothesize that more areas of the brain are activated during voluntary contractions performed by spinal cord injured subjects compared to control subjects. In SCI subjects, we expect that the brain areas activated during voluntary contractions will include areas related to muscles that remain under voluntary control and areas that used to be activated during contractions of muscles that are now paralyzed by SCI. With respect to central fatigue, maintained contractions result in an increase in the intensity of the active brain areas in control subjects. How brain activity in SCI subjects is influenced by prolonged contractions is unknown. Thus, these fMRI studies are a

powerful way to explore in vivo changes in cortical function in SCI individuals as they perform functional tasks.

#### Study design

Subjects perform contractions in an MR-scanner. During the contractions EMG and brain activity is measured.

#### Intervention

Subjects perform contractions and a fatigue test in an MR-scanner

#### Study burden and risks

Subjects produce force in an MR-scanner, no risks are known. During the contraction the muscle is stimulated. The stiimulation could be a litle painfull.

# Contacts

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# **Trial sites**

# **Listed location countries**

Netherlands

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# **Eligibility criteria**

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

### **Inclusion criteria**

Spinal cord injury

### **Exclusion criteria**

Metal implants that are not compatible with the MR-scanner

# Study design

### Design

Study type:	Interventional
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Other

### Recruitment

NL	
Recruitment status:	Recruitment stopped
Start date (anticipated):	20-03-2008
Enrollment:	48
Туре:	Actual

# **Ethics review**

Approved WMO

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Date:	04-09-2007
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)
Approved WMO Date:	04-10-2013
Application type:	Amendment
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 NL18789.042.07