Investigating changes in the human stretch reflex characteristics with Transcranial Magnetic Stimulation applied in the refractory period between the short and long latency reflex response

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The present proposal comprises the combination of aforementioned techniques to study reflex modulation by the CNS of peripheral reflexes. The influence of careful timed TMS pulses on the contralateral sensorimotor cortex of healthy subjects on EMG...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Movement disorders (incl parkinsonism)
Study type	Observational non invasive

Summary

ID

NL-OMON34193

Source
ToetsingOnline

Brief title
Modulation of stretch reflexes with Transcranial Magnetic Stimulation

Condition

- Movement disorders (incl parkinsonism)

Synonym
stroke

Research involving

Human

Sponsors and support

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

Intervention

Keyword: Long latency stretch reflex response, Motor cortex, Stroke, Transcranial Magnetic Stimulation

Outcome measures

Primary outcome

Primary outcome parameter is the amplitude of the M2 response as assessed by

EMG activity. Dependents are characteristics of ramp-and-hold stretches and

timed TMS pulses. Repeated measures Analysis of Variance will be applied for

statistical analysis. Statistical significant differences of 30% in normalized

M2 amplitude will confirm CNS modulation of peripheral reflex activity.

Secondary outcome

nvt

Study description

Background summary

Humans have the ability to adjust their reflexes according to the environmental conditions and task to perform. Modulation of reflexes is paramount for optimal movement in daily life. In central neurological like diseases like stroke, inability to modulate reflexes may be the cause for the observed movement disorders. Therefore it is of importance to understand if and how the central nervous system (CNS) modulates peripheral reflexes. Peripheral reflex activity can be assessed by stretch reflexes of the m. flexor carpi radialis evoked by a wrist manipulandum and measured by EMG (electromyography). EMG results in typical short (M1) and long latency (M2) reflex bursts. CNS activity can be evoked by Transcranial Magnetic Stimulation (TMS).

Study objective

The present proposal comprises the combination of aforementioned techniques to study reflex modulation by the CNS of peripheral reflexes. The influence of careful timed TMS pulses on the contralateral sensorimotor cortex of healthy subjects on EMG activity evoked by motorized stretches of the m. flexor carpi radialis is investigated.

Study design

N=10 healthy subjects will be included to participate in the present experiment. Total experimental time will be 3 hours. Subjects are asked to exert low flexion torques around the wrist, while ramp-and-hold stretches with a fixed velocity of 1,5 rad/s and various stretch durations (30-70 ms) are imposed by a wrist manipulandum. Simultaneous and variable timed sub threshold single pulse TMS is imposed. Burden and risks for the subjects is minimal, because of small perturbation amplitude and subthreshold TMS single pulses. Subjects with any history of epilepsy will be excluded.

Study burden and risks

The burden for the subject involved is restrained to holding a flexion force with the wrist repeatedly. Sufficiënt rest will be allowed to prevent fatigue. The Transcranial Magnetic Stimulation is applied in a very low frequency with subthreshold intensity and therefore has a very low burden and risk level.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

- Age between 40-70

Exclusion criteria

cardiac pacemakers; any metal implant within the brain;any medical history of general and local neurological disorders, especially epilepsy; any history of orthopedic problems with the upper extremities; current medication that may influence nervous function.

Study design

Design

Study type: Observational non invasive

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

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	13-12-2010

Enrollment:	10
Type:	Actual

Ethics review

Approved WMO Date:	06-12-2010
Application type:	First submission
Review commission:	METC Leids Universitair Medisch Centrum (Leiden)

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	NL33936.058.10