

Surround inhibition in dystonia; a TMS study in patients with writers cramp.

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There is a complex organization in the motor system that channels the spatiotemporal commands necessary for a writing task and surround inhibition is a physiological mechanism to focus this neural activity. Surround inhibition (SI) aids the...

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

Summary

ID

NL-OMON34399

Source

ToetsingOnline

Brief title

Surround inhibition in dystonia.

Condition

- Movement disorders (incl parkinsonism)

Synonym

abnormal movement due to cocontractions of antagonist and agonist muscles, dystonia

Research involving

Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Sint Radboud

Source(s) of monetary or material Support: Prinses Beatrix Fonds

Intervention

Keyword: Dystonia, Premotor cortex, Surround inhibition, Transcranial Magnetic Stimulation

Outcome measures

Primary outcome

Surround inhibition

Writing test

Cortical excitability profile motor cortex

Secondary outcome

n.v.t.

Study description

Background summary

There are currently 6000 patients in the Netherlands diagnosed with a primary focal dystonia. A well recognized form of dystonia is writer*s cramp. Writer*s cramp is a focal hand dystonia where symptoms occur only during writing and not during other motor tasks, the trigger of this movement disorder is therefore specific.

We observe an overflow of muscle activation in patients with a task-specific dystonia. There is a complex organization in the motor system that channels the spatiotemporal commands necessary for a writing task and surround inhibition is a physiological mechanism to focus this neural activity. Surround inhibition (SI) aids the execution of movements in the central nervous system by facilitating the neurons of active muscles conducting the movement and inhibiting the neurons of competing surrounding muscles. The basal ganglia could possibly have a key role in the neurophysiology of this aspect of motor control.

It remains however incompletely understood how surround inhibition is generated and in which way it is relevant for the overflow of muscle activation seen in patients with writer*s cramp. In this study we therefore set out to further explore surround inhibition.

There are at present no good treatment options for patients with writer*s cramp and new therapeutic options should therefore thoroughly be investigated.

Previous research has shown that modulation of the premotor cortex by rTMS improves symptoms of writer's cramp. The rationale for the clinical improvement in dystonia after inhibitory rTMS over the premotor cortex remains however unidentified.

The aim of this study is therefore not only to expand the current knowledge about the pathophysiology of writer's cramp but to also investigate the foundation of this neuromodulatory intervention.

Study objective

There is a complex organization in the motor system that channels the spatiotemporal commands necessary for a writing task and surround inhibition is a physiological mechanism to focus this neural activity. Surround inhibition (SI) aids the execution of movements in the central nervous system by facilitating the neurons of active muscles conducting the movement and inhibiting the neurons of competing surrounding muscles. The basal ganglia could possibly have a key role in the neurophysiology of this aspect of motor control.

It remains however incompletely understood how surround inhibition is generated and in which way it is relevant for the overflow of muscle activation seen in patients with writer's cramp. In this study we therefore set out to further explore surround inhibition.

Transcranial Magnetic Stimulation (TMS) is the fundamental technique for this study. TMS is a non invasive technique that provides the opportunity to measure and modulate cortical excitability by means of a magnetic coil.

We will apply repetitive TMS to modulate the excitability of the premotor cortex in patients with writer's cramp as this method has been shown to improve writer's cramp in former studies. The objective of this study will be to expand these previous studies by investigating a possible improvement of surround inhibition and to thereby see whether a dysfunctional surround inhibition can be considered causal for the dystonic movement in writer's cramp.

Study design

The main question that we want to answer by this study is if an improvement of writer's cramp, evoked by rTMS over the premotor cortex, does indeed aid a normalization of surround inhibition and to thereby see whether a dysfunctional surround inhibition can be considered causal for the dystonic movement in writers cramp.

Primary measurements are therefore measurements of surround inhibition (measured by the making of a simple hand movement after an auditory cue) and writing before and after repetitive TMS over the premotor cortex. We will record the cortical excitability profile of these patients in addition.

Study burden and risks

TMS is currently a frequent applied method in neuroscience. Our department is well experienced in TMS research. Important is identification of contra-indications for his method. With TMS the main contraindication is epilepsy, risks are minimal with the greatest risk being occurrence of an epileptic insult. There is however worldwide regular appliance of TMS and the latest recorded epileptic insult dates from 1998. Dystonia is an infrequent movement disorder and we therefore ask relative small groups of patients and controls to participate. Patients and controls will be invited to the hospital on a single occasion where the research project will take place in approximately 60-90 minutes. The research question is relevant and a significant gain in the understanding of writer*s cramp can be obtained. The benefit of this study outweighs therefore the effort taken by the participants.

Contacts

Public

Universitair Medisch Centrum Sint Radboud

Reinier Postlaan 4
6525 GC Nijmegen
NL

Scientific

Universitair Medisch Centrum Sint Radboud

Reinier Postlaan 4
6525 GC Nijmegen
NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age

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

Inclusion criteria

15 patients with writerscramp, a primary focal dystonia
15 healthy controls
Informed consent
Age 18 years or older

Exclusion criteria

Contraindications for Transcranial Magnetic Stimulation (epilepsy)
Previous neurosurgery or implanted neurostimulator

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Basic science

Recruitment

NL	
Recruitment status:	Recruitment stopped
Start date (anticipated):	26-05-2011
Enrollment:	30
Type:	Actual

Ethics review

Approved WMO

Date: 20-01-2011
Application type: First submission
Review commission: CMO regio Arnhem-Nijmegen (Nijmegen)

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	NL33858.091.10