Plasticity of the right hemisphere following perturbation of the left middle temporal gyrus: An exploratory study

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To investigate whether perturbation of the left middle temporal gyrus results in immediate adaptation in the right hemisphere, indexed by a shift of alpha-beta oscillatory effects from the left to the right hemisphere.

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

Summary

ID

NL-OMON44497

Source
ToetsingOnline

Brief title
Right hemisphere plasticity

Condition

- Other condition

Synonym
not applicable

Health condition

onderzoek bij gezonde vrijwilligers

Research involving
Human

Sponsors and support

Primary sponsor: Radboud Universiteit Nijmegen
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: cTBS, language production, neuroplasticity, oscillations

Outcome measures

Primary outcome

Alpha-beta oscillations in the EEG as well as naming latencies and error rates

in the language production task following real or sham cTBS

Secondary outcome

AMTs of the left and right primary motor cortex and resting-state EEG prior to

cTBS

Study description

Background summary

Language impairment is common after left-hemisphere stroke. However, it is not clear whether, and if so, how fast the right hemisphere can accommodate for left-hemisphere lesions. The aim of this study is to investigate whether a shift of alpha-beta oscillatory effects elicited in a picture naming task from the left to the right hemisphere can be observed immediately after healthy speakers receive continuous theta-burst stimulation (cTBS) to the left middle temporal gyrus (MTG). By transiently disrupting MTG, it is possible to examine immediate adaptation effects in the contralateral hemisphere. If this is indeed the case, we hypothesise that cTBS will cause a shift of alpha-beta oscillatory effects from the left to the right hemisphere. Additionally, left and right active motor thresholds (AMTs) as well as resting-state EEG will be measured to investigate whether basal neural activity is predictive for the effects of cTBS.

Study objective

To investigate whether perturbation of the left middle temporal gyrus results

in immediate adaptation in the right hemisphere, indexed by a shift of alpha-beta oscillatory effects from the left to the right hemisphere.

Study design

single-blind, sham-controlled, crossover

Intervention

transcranial magnetic stimulation: continuous theta-burst stimulation (three 50 Hz pulses every 200 ms for 40 seconds, 80% AMT) with a Magpro-X-100 magnetic stimulator (MagVenture, Farum, Denmark)

Study burden and risks

The currently proposed cTBS paradigm does not carry any significant risks. Safety guidelines as acknowledged by the International Federation of Clinical Neurophysiology will be followed strictly. Potential side-effects are muscle tension and headache. These are generally mild discomforts that respond promptly to common analgesics. Volunteers can withdraw from the study at any given time and there are no direct benefits for the participants.

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

Between 18 and 35 years of age* Righthanded* Nonsmoking* Normal or corrected to normal vision* Willingness and ability to give written informed consent and willingness and ability to understand the nature and content, to participate and to comply with the study requirements.

Exclusion criteria

(1) Average use of more than 3 alcoholic beverages daily* (2) Use of psychotropic medication or recreational drugs* (3) Skin disease* (4) Pregnancy* (5) Serious head trauma or brain surgery* (6) Neurological or psychiatric disorders* (7) Large or ferromagnetic metal parts in the head (except for a dental wire)* (8) Implanted cardiac pacemaker or neurostimulator* (9) Participation in a NBS study in the past 28 days* (10) Previous participation in 10 or more NBS studies; (11) epilepsy or family history of epilepsy

Study design

Design

Study type:	Interventional
Intervention model:	Parallel
Allocation:	Randomized controlled trial
Masking:	Single blinded (masking used)
Control:	Placebo
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	02-02-2018
Enrollment:	16
Type:	Actual

Ethics review

Approved WMO

Date:	18-01-2018
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	NL64141.091.17

Study results

Date completed:	26-04-2018
Actual enrolment:	16