

Cortical reorganisation after Constraint Induced Movement Therapy in children with unilateral Cerebral Palsy - an EEG approach

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To study if, how, and to what extent, cortical reorganization occurs in children with unilateral Cerebral Palsy after mCIMT.

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Congenital and peripartum neurological conditions
Study type	Observational non invasive

Summary

ID

NL-OMON37759

Source

ToetsingOnline

Brief title

Cortical reorganisation after CIMT

Condition

- Congenital and peripartum neurological conditions

Synonym

Unilateral Cerebral Palsy / Spasticity in children

Research involving

Human

Sponsors and support

Primary sponsor: Radboud Universiteit Nijmegen

Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: Constraint Induced Movement Therapy (CIMT), Cortical reorganisation, EEG/ERP, Unilateral Cerebral Palsy

Outcome measures

Primary outcome

Changes in source localization of ERP components as reaction to target stimuli and motor responses between measurement 1 and 2 in group 1 and 2.

Secondary outcome

Reaction times, number of errors during the task and demographic variables.

Study description

Background summary

Plasticity is an important characteristic of the brain. Although different cortical areas execute different functions, changes occur. Such changes have been observed after loss of certain functions, for example due to the amputation of a limb, but also as a result of gaining new skills. Such a shift in the localization of a brain function is known as Cortical Reorganization.

Children with unilateral Cerebral Palsy (CP) use the affected side of the body less than the non-affected side. A common therapy of these children consists of modified Constraint Induced Movement Therapy (mCIMT) in which the children are stimulated to perform activities with the affected arm/hand, by immobilizing the not-affected arm/hand for several hours per day during several weeks during active game-therapy. It is generally assumed that mCIMT leads to cortical reorganization as a result of which the functionality of the affected arm/hand will permanently increase.

Functional MRI research has indicated that adult patients with a hemiparesis due to CVA indeed show cortical reorganization after CIMT (Cramer, et al. 1997). The effect of such a therapy has never been systematically researched in children with unilateral CP. This is important because these children are often born with their functional impairments by early damage of the brain. Aspects of cortical reorganization might be even more extensive in this group than in adult patients after a CVA. Because fMRI research is considered to be too invasive for (young) children, the current research proposal is based on

non-invasive EEG measurements. With the use of the advanced method of source-localization (Van der Lubbe, et al. in press) it is possible to study cortical reorganization following mCIMT in this patient group. Comparable research has been done in the past in children with Dyslexia (Spironelli, et al. 2010). The expectation is that the proposed research will give new important information with relation to the treatment of children with unilateral Cerebral Palsy.

Study objective

To study if, how, and to what extent, cortical reorganization occurs in children with unilateral Cerebral Palsy after mCIMT.

Study design

The study is designed as an open randomised study, in which the participants serve their own controls (comparing affected side with non-affected side).

Study burden and risks

The amount of discomfort which the participants will experience is minimal and exists of the placement of a 32-channel EEG-cap and the execution of a simple, playful computer task of about 10 minutes. In earlier comparable research with this task it appears that children like to perform this task very much. The measurement will be performed twice on the location of the therapy and will take, including the attachment of the EEG equipment, maximally 1 hour at a time. There are no risks involved with the EEG research. This study is focused on studying cortical reorganization which will be expected to occur in children with unilateral cerebral palsy after participation of mCIMT.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age

Children (2-11 years)

Inclusion criteria

Children with unilateral Cerebral Palsy enrolled at the "Pirat group" for modified CIMT

Exclusion criteria

Severe hearing or visual disability, inability to understand the task

Study design

Design

Study type: Observational non invasive

Masking: Open (masking not used)

Control: Uncontrolled

Primary purpose: Other

Recruitment

NL

Recruitment status: Recruitment stopped

Start date (anticipated): 01-04-2012

Enrollment: 24

Type: Actual

Ethics review

Approved WMO

Date: 28-03-2012

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	NL39607.091.12