Feasibility of multisensory stimulation to improve visual detection in stroke patients with hemispatial neglect

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The main objective of this study is to assess whether multisensory stimulation (i.e., visuo-tactile cues), enhances the ability of hemispatial neglect patients to detect sensory stimuli presented on the neglected hemispace.

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Neurological disorders NEC
Study type	Observational non invasive

Summary

ID

NL-OMON42471

Source
ToetsingOnline

Brief title
Multisensory stimulation in patients with hemispatial neglect.

Condition

- Neurological disorders NEC

Synonym
hemi-spatial neglect, visual neglect

Research involving
Human

Sponsors and support

Primary sponsor: Radboud Universiteit Nijmegen
Source(s) of monetary or material Support: HealthPAC (EU)

Intervention

Keyword: multisensory, neglect, tactile, visual

Outcome measures

Primary outcome

The main objective of this study is to assess the functional efficacy of multisensory stimulation (i.e., visuo-tactile cues), on the ability of hemispatial neglect patients to detect sensory stimuli presented on the neglected hemispace. To this purpose, we will compare the performance of patients in detecting sensory stimuli presented in the neglected hemispace under two different conditions that differ from each other by the properties of the sensory stimuli; 1) unisensory (i.e., only visual stimuli or only tactile stimuli) , 2) multisensory (i.e., synchronous visuo-tactile stimulation). We predict that synchronous visuo-tactile signals will facilitate the patients* intrinsic ability to voluntarily control attention towards the sensory stimuli in the neglected hemispace allowing them to be consciously processed.

Secondary outcome

To provide behavioral evidence for our future studies in which we will test whether multisensory stimulation can be applied as an effective intervention for stroke patients with hemispatial neglect. We predict that the multisensory rehabilitation tools will enhance the connectivity between damaged areas of the parietal cortex and nodes in the multisensory and voluntary attentional control networks (frontal eye fields, posterior parietal cortex and occipital-temporal areas).

Study description

Background summary

Hemispatial neglect is a frequent disorder following stroke and can be described as a failure of the patients to attend towards the sensory stimuli on the contralesional side of space. Hemispatial neglect is a major cause of disability and handicap in stroke patients that impedes functional recovery and is associated with a poor outcome (Buxbaum et al., 2004). Importantly, the visual cortex in patients with pure visual neglect from stroke is often still intact and the early visual processing is usually preserved. It is the route from this intact visual cortex to higher level processing *involving awareness of the visual targets* that is blocked because of the neural damage caused by the stroke (Driver & Vuilleumier, 2001). Consequently, the sensory stimuli on one side of space fail to receive enough attention to exceed the threshold needed to reach awareness. In many studies on healthy subjects, synchronous multisensory (e.g., tactile- visual) cues were found to enhance the voluntary control of attention. Information from multiple senses can circumvent the damaged routes in hemispatial neglect patients so that the intact visual cortex can be functionally reengaged. It remains a question whether multisensory stimulation can be applied as an effective intervention in stroke rehabilitation. We predict that the synchronous tactile and visual signals will facilitate the patients* intrinsic ability to voluntarily control attention towards parts of their visual field that they would normally neglect. Therefore, in the current study we will test the efficacy of synchronous multisensory cues on the ability of patients with hemispatial neglect to detect visual stimuli they would have otherwise missed.

Study objective

The main objective of this study is to assess whether multisensory stimulation (i.e., visuo-tactile cues), enhances the ability of hemispatial neglect patients to detect sensory stimuli presented on the neglected hemispace.

Study design

We will compare the performance of patients in detecting sensory stimuli presented in the neglected hemispace under two different conditions that differ from each other by the properties of the sensory stimuli; 1) unisensory with only visual or only tactile stimulation, 2) multisensory with synchronous visuo-tactile stimulation.

Study burden and risks

The patients will be recruited after contacting their neurologist or their

rehabilitation specialist from the rehabilitation unit. The neurologist or the specialist in rehabilitation will ask the patients if they are willing to participate in the experiment. Data will be collected from the patients during a non-invasive measurement of approximately 120 minutes. In order to reduce the cognitive load on the patients, there will be built-in breaks in between the blocks of the trials
We expect that multisensory stimulation (i.e., visuo-tactile cues) will enhance the ability of hemispatial neglect patients to detect sensory stimuli presented on the neglected hemispace. If this is true, it can be integrated in future therapies. The experiment is observational, non-invasive, harmless and there is no risk involved in participating in it. It has no consequences for the treatment of the patients. Therefore, this study is not dangerous and poses no risk to the participants.

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

• Men/women of 18 < age < 75 years.
• Presence of hemispatial neglect following stroke.
• Written informed consent after being fully informed about any possible discomfort they might experience during participation.
• Normal or corrected-to-normal visual acuity.
• Participants have a sufficient condition to sit in a chair for three hours, and are able to follow an hour of therapy without any problems.

Exclusion criteria

• Severe visual impairments (Diabetic retinopathy, cataracts) .
• Visual-field defects (e.g., Hemianopia).
• History of psychiatric disorders or substance abuse.
• Severe cognitive impairments (MMSE<18).

Study design

Design

Study type: Observational non invasive

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

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	11-03-2016
Enrollment:	20
Type:	Actual

Ethics review

Approved WMO

Date:	04-01-2016
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

ID: 29553
Source: Nationaal Trial Register
Title:

In other registers

Register	ID
CCMO	NL54611.091.15
Other	staat in geschreven bij nederlands trial register, nummer volgt.
OMON	NL-OMON29553