High density EMG investigation of stimulus-driven muscle responses associated with covert orienting

Published: 04-02-2016
Last updated: 20-04-2024

Primary Objective: To determine the characteristics of the short-latency muscle response (SLR) in patients with Parkinson*s disease, in comparison to age-matched healthy controls.Secondary Objective(s): To correlate the characteristics of the SLR...

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

Summary

ID

NL-OMON42546

Source
ToetsingOnline

Brief title
Fast muscle responses and freezing in Parkinson's disease

Condition

- Movement disorders (incl parkinsonism)

Synonym
parkinsonism, Parkinson's disease

Research involving
Human

Sponsors and support

Primary sponsor: Radboud Universitair Medisch Centrum
Source(s) of monetary or material Support: Europese Unie

Intervention

Keyword: attention, EMG (electromyography), orienting response

Outcome measures

Primary outcome

The following parameters are evaluated:

- Amplitude and timing of short-latency muscle response (SLR) in a time window of 50-150 ms after stimulus presentation

- Suppression of EMG activity, in SLR time window, during orientation to ipsilateral side

- Reaction times of manual responses to visual stimuli presented

- Error rates for reaches and anti-reaches (towards and away from presented stimulus, respectively)

- Correlations between SLR and behavioral measures

Secondary outcome

none

Study description

Background summary

We hypothesize that freezing of gait in Parkinson*s disease (PD) may in part be explained by bilaterally simultaneous orienting responses accompanied by short-latency reflex-like activity in axial muscles. The bilaterally simultaneous nature of these responses interferes with the normally alternating activation pattern of these muscles during walking, thus inducing freezing. To evaluate this hypothesis in PD, we will investigate the characteristics of the short-latency muscle response in the pectoralis muscle, where the response is most easily picked up with surface EMG. We hypothesize that there is a disinhibition of the reflex in PD, evidenced by a higher amplitude of the reflex, possibly also a shorter latency. Confirmation of this hypothesis

provides the basis for further experiments to test the hypothesized pathophysiology in a more detailed fashion.

Study objective

Primary Objective: To determine the characteristics of the short-latency muscle response (SLR) in patients with Parkinson*s disease, in comparison to age-matched healthy controls.

Secondary Objective(s): To correlate the characteristics of the SLR with behaviour in an anti-reach task, to address a possible relation with impaired response inhibition.

Study design

The investigation concerns an observational study in patients with Parkinson*s disease and age-matched healthy volunteers. The study is of an exploratory nature, using high-density surface EMG to record reflex responses in the m. pectoralis during an anti-reaching task. The study assesses the presence, the amplitude, and the latency of the reflex responses and their sensitivity to the direction of visual orientation. The investigation will be carried out from February to December 2016. The investigation is conducted at the Social Science Faculty of the Radboud University, in the Sensorimotor Research lab (Prof. Medendorp) with neurological involvement from the Dept. of Neurology Radboud UMC.

Study burden and risks

Participants will be subjected to a single 2-hour experimental session in which they perform an anti-reach task with a robotic manipulandum. The task is simple and not physically or cognitively demanding. During the task surface EMG is recorded from the right m. pectoralis using an electrode grid with 64 electrode contacts. Application of the electrode array and the recording are painless and do not involve any health risk.

Contacts

Public
Radboud Universitair Medisch Centrum

Reinier Postlaan 4
Nijmegen 6525 GC
NL
Scientific

Radboud Universitair Medisch Centrum

Reinier Postlaan 4
Nijmegen 6525 GC
NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

PD patients:
A diagnosis of idiopathic PD
Age between 45 and 70 year
No musculoskeletal abnormalities of shoulder girdle and upper limbs
Normal or corrected to normal vision;Control subjects:
Age between 45 and 70 year
No musculoskeletal abnormalities of shoulder girdle and upper limbs
Normal or corrected to normal vision
No neurological disease

Exclusion criteria

Significant rest, postural or action tremor

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:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	12-01-2017
Enrollment:	24
Type:	Actual

Ethics review

Approved WMO

Date:	04-02-2016
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

No registrations found.

In other registers

Register	ID
CCMO	NL55869.091.15