# Optimization of the recording of the CMAP scan and assessment of its reproducibility

Published: 24-10-2007 Last updated: 09-05-2024

This study aims to determine choices for stimulus number, frequency and duration that cause minimal discomfort to subjects. In addition, it will assess reproducibility and the effect of going up or down in stimulus intensity for the APB.

Ethical review	Approved WMO
Status	Recruiting
Health condition type	Neuromuscular disorders
Study type	Observational non invasive

# Summary

## ID

NL-OMON31026

**Source** ToetsingOnline

Brief title The CMAP Scan

## Condition

• Neuromuscular disorders

#### Synonym

**Research involving** Human

## **Sponsors and support**

**Primary sponsor:** Erasmus MC, Universitair Medisch Centrum Rotterdam **Source(s) of monetary or material Support:** Ministerie van OC&W

## Intervention

Keyword: Compound muscle action potential, Motor unit, Scan, Stimulus-response curve

## **Outcome measures**

#### **Primary outcome**

Optimal aquisition parameters for the CMAP Scan, subject discomfort and

reproducibility.

#### Secondary outcome

# **Study description**

#### **Background summary**

Most neuromuscular disorders have in common that they affect motor units (MUs). Motor units are the functional units of the peripheral motor system. They consist of a single motoneuron together with the muscle fibres that this neuron innervates.

Considering the MU in a pathological context, a basic distinction can be made between the neurogenic disorders that primarily affect the cell bodies in the spinal cord and/or their nerve fibres (axons), and the myogenic diseases with a major impact on the muscle fibres. In neurogenic disorders that affect the nerve cells, loss of functioning motoneurons leads to a reduced number of MUs. Loss of motoneurons, even when severe, may be masked by sprouting of other, still intact nerve fibres.

In myogenic disorders, the number of axons tends to be preserved, at least initially. However, the number of muscle fibers that are innervated by each axon decreases, resulting in a smaller MU size and a reduction of the force that can be delivered by the affected muscles.

#### The CMAP scan

The CMAP scan is a noninvasive neurophysiological tool that records the electrical activity of a muscle in response to repetitive transcutaneous stimulation of the motor nerve. It is based on the fact that MUs differ with respect to stimulus intensity that is required to activate them (differing thresholds). If stimulus intensity is gradually increased from subthreshold to supramaximal values, all MUs in the muscle are successively activated. Thus, by plotting response size versus stimulus intensity, a visual assessment of the

entire muscle can be obtained.

Patterns in or properties of the CMAP scan (steps, maximum, variability, decrements, stimulus intensities used) provide clinically relevant information regarding motor unit number, size and stability, and neuromuscular transmission and axonal excitability. The scan can be recorded noninvasively in about 5 minutes and is fairly easy to interpret. Because it is built up from contributions of all functioning motor units, the scan shows if and how many large motor units are present. There is no sample bias. De CMAP scan can provide important adjuvant information to the standard neurophysiological investigations. It helps to interpret the results of investigations and can help to decide if more extended neurophisiological investigation has additional value.

## Study objective

This study aims to determine choices for stimulus number, frequency and duration that cause minimal discomfort to subjects. In addition, it will assess reproducibility and the effect of going up or down in stimulus intensity for the APB.

## Study design

In this multicenter study (3 centers) 36 subjects in total will be measured. Each lab studies 4 subjects at each of 20-39, 40-59, 60-80 yrs. This yields data on 12 subjects per lab. The department of Clinical Neurophysiology of the Erasmus MC in Rotterdam will study 2 variables: stimulus duration and stimulus frequency. On the first day, the CMAP scan will be measured with different stimulus frequencies. The second day, the CMAP scan will be measured with different stimulus durations.

The Mayo Clinic Rochester and the Royal Brisbane and Women's Hospital will study the effect of going up and down in stimulus intensity and the optimal choice for stimulus number, respectively.

#### Study burden and risks

The investigations are noninvasive. There are no risks, nor are there immediate benefits for individual subjects.

# Contacts

#### Public

Erasmus MC, Universitair Medisch Centrum Rotterdam

#### Postbus 2040

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# **Trial sites**

# **Listed location countries**

Netherlands

# **Eligibility criteria**

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

## **Inclusion criteria**

age 20-80 normal nerve conduction study of the median nerve written informed consent

## **Exclusion criteria**

neurological disease Any psychological, familial, sociological and geographical condition potentially hampering compliance with the study protocol. Judgment is up to the investigator.

# Study design

# Design

Study type: Observational non invasive	
Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Diagnostic

## Recruitment

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NL	
Recruitment status:	Recruiting
Start date (anticipated):	03-12-2007
Enrollment:	12
Туре:	Actual

# **Ethics review**

Approved WMO	
Date:	24-10-2007
Application type:	First submission
Review commission:	METC Erasmus MC, Universitair Medisch Centrum Rotterdam (Rotterdam)

# **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** CCMO **ID** NL18965.078.07