# Sensory axons in multifocal motor neuropathy (MMN)

Published: 22-07-2015 Last updated: 19-04-2024

To assess if resting membrane potential or ion channel activity is abnormal in sensory axons of affected nerves in MMN patients.

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Peripheral neuropathies
Study type	Observational invasive

# **Summary**

## ID

NL-OMON42685

**Source** ToetsingOnline

Brief title Sensory axons in MMN

## Condition

• Peripheral neuropathies

#### Synonym

multifocal motor neuropathy (MMN). This term is familiar to all MMN patients.

## **Research involving**

Human

## **Sponsors and support**

**Primary sponsor:** Universitair Medisch Centrum Utrecht **Source(s) of monetary or material Support:** Prinses Beatrix Spierfonds

## Intervention

Keyword: excitability-tests, ion-channels, Multifocal motor neuropathy, sensory axons

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## **Outcome measures**

#### **Primary outcome**

Excitability-variables of motor and sensory axons of the median nerve at the

wrist.

#### Secondary outcome

Not applicable.

# **Study description**

#### **Background summary**

Multifocal motor neuropathy (MMN) is a peripheral nerve disorder characterized by focal lesions which affect only the motor fibers within nerves. MMN results in muscle weakness and atrophy especially of hand muscles. The pathophysiology in MMN is unclear because biopsies of peripheral nerves are not possible without causing additional weakness. One of the points that are unclear is why the lesions in MMN affect motor axons only and leave neighboring sensory axons in the same nerve apparently unaffected. This project addresses the hypothesis that sensory axons in MMN lesions are affected but that they can compensate this because their ion-channel repertoire slightly differs from that in motor axons. To investigate this, we will investigate motor and sensory axons in affected hand nerves of 20 MMN patients by means of excitability-testing. This is an advanced electrophysiological method enabling non-invasive assessment of different ion-channel types in peripheral axons.

#### **Study objective**

To assess if resting membrane potential or ion channel activity is abnormal in sensory axons of affected nerves in MMN patients.

#### Study design

We will investigate 20 MMN patients with conduction block in median nerve motor axons in the forearm. The median nerve was chosen because the sensory nerve response for excitability testing is robust. Per patient, two excitability-tests will be performed on the median nerve at the wrist: one for motor axons and one for sensory axons. In order to avoid treatment effects on ion channel function, tests will be performed on the day before starting a new immunoglobulin course. The investigation takes 1 hour and 30 minutes and consists of the following procedures:

1. Motor nerve conduction study of the median nerve in the forearm in order to verify the EMG-abnormalities still occur; this entails delivering electrical stimuli at the wrist and elbow. Sensory conduction of the median nerve of the third finger to exclude carpal tunnel syndrome; this is important since carpal tunnel syndrome affects excitability-variables. Duration: 10 minutes.

2. Warming the forearm and hand to 37°C by wrapping them into a plastic blanket through which water at 37°C flows. Duration: 30 minutes.

3. Excitability-test of median nerve motor axons at the wrist. Duration: 15 minutes.

4. Excitability-test of median nerve sensory axons at the wrist. Duration: 30 minutes.

5. Clinical assessment of the median nerve by (i) MRC grading of the abductor pollicis brevis muscle, (ii) joint position sense of the distal phalangeal joint of the middle finger, (iii) 2-point discrimination of the distal phalanx of the middle finger. Duration: 5 min.

#### Study burden and risks

Slight physical discomfort due to electrical stimulation and brief local skin reddening due to skin electrode adhesive gel may occur. There are no known risks for the study procedure based on the literature and on our experience in previous excitability and nerve conduction studies. Patients will benefit indirectly from the study because more will be known about pathogenetic mechanisms in MMN which, in turn, may lead to development of treatment strategies aimed at axonal protection.

# 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**

1. Diagnosis of MMN according to internationally accepted criteria of the European Federation of Neurological Societies and Peripheral Nerve Society (EFNS/PNS criteria).

2. One median nerve (left or right) with any of the following abnormalities in the motor nerve conduction studies:

a) conduction block in motor axons in the forearm segment, defined as segmental reduction of compound muscle action potential (CMAP) area of at least 30%;

b) signs of demyelination: conduction velocity decrease up to 38 m/s or less and/or DML 5.3 ms or more and/or increase CMAP duration in the forearm of at least 30%;

c) motor axon loss defined as decreased CMAP amplitude of 3 mV or less;

3. Age range 18-99 years old.

## **Exclusion criteria**

- 1. Other causes for neuropathy than MMN, including carpal tunnel syndrome (CTS).
- 2. Use of medication affecting ion-channels in nerves.

# Study design

# Design

Study type:	Observational invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial

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Masking:

Primary purpose: Basic science

## Recruitment

NL	
Recruitment status:	Recruitment stopped
Start date (anticipated):	17-11-2015
Enrollment:	20
Туре:	Actual

# **Ethics review**

Approved WMO	
Date:	22-07-2015
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Utrecht (Utrecht)
Approved WMO	
Date:	28-10-2015
Application type:	Amendment
Review commission:	METC Universitair Medisch Centrum Utrecht (Utrecht)
Approved WMO	
Date:	23-02-2016
Application type:	Amendment
Review commission:	METC Universitair Medisch Centrum Utrecht (Utrecht)

# **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

ССМО

**ID** NL53422.041.15