

Complex Nerve Conduction Study (NCS) and Single Fibre EMG (SFEMG)

Information and advice for patients

Neurophysiology

What is a nerve conduction study?

A nerve conduction study (NCS) is a test to check how your nerves are working. It involves pads/rings being placed on your skin which cause a tingling/tapping sensation and then recording how your nerves respond.

What is an EMG?

An EMG is a test to check how your muscles are working and involves having a needle placed into the muscle to record its function.

What is a single Fibre EMG?

Single Fibre EMG stands for Single Fibre Electromyography and is an extremely sensitive test of the function of the neuromuscular junction. This is the connection between the nerve and muscle.

What is RNS?

RNS stands for repetitive nerve stimulation. It is a special type of nerve conduction study which uses a chain of tapping pulses over a few seconds to look at the connection between the nerve and the muscle.

What are the benefits of the tests?

The benefit of the tests is that they will show how your nerves and muscles are working. This will help your doctor to diagnose if there are any problems so that they can advise you on appropriate treatment if needed. The benefit of single fibre EMG and RNS is that it can assess types of muscle weakness or fatigue (tiredness) when other tests have been inconclusive.

What are the risks of the tests?

There is a risk that you may feel slight tenderness where the needle was inserted after an EMG, but this only occurs very occasionally. In very exceptional cases there may be a slight risk of bleeding and bruising, which resolves quickly.

The tests may affect implantable cardioverter defibrillator (ICD) or certain types of pacemakers so if you have a pacemaker or ICD please contact us on 0121 507 4319 so we can discuss this with you.

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What are the risks of not having the tests?

If you choose not to have the NCS, EMG or SFEMG, this may delay your doctor finding out what is causing your symptoms and therefore a delay to treatment.

Are there any alternative tests?

There is usually no alternative to this test that will give your doctor the information they need. In some cases, scans (such as an MRI scan) may provide some of the information, but not always. An EMG is the only way to check muscle function from inside.

Preparing for the tests

- If you are taking the following medications, you will need to talk to your doctor about the safety of stopping them for at least 8 hours prior to the test or as a minimum on the morning of the test.
 - Mestinon
 - Pyridostigmine

This is because if you have taken your morning dose it may affect the result of the test.

- Wear clothes that allow easy access to the tops of your arms and legs otherwise you may need to change into a hospital gown.
- Do not wear too much jewelry as you may need to remove it all for the test.
- Continue to take any medicines as usual and bring a list of these with you to the appointment.
- Try and make sure your hands and feet are warm for the test by wearing gloves and socks.
- Do not apply creams or ointments on the day of the test as they can make it difficult to get a good reading.
- Contact the department on 0121 507 4319 if you have a pacemaker, ICD or are taking blood-thinning medication such as warfarin as you may need more information.

If you are unable to keep your appointment please contact us on 0121 507 4319 so that alternative arrangements can be made and the appointment can be given to another patient waiting for the test.

Before the test we will ask you if you have read and understood this information and whether you consent to go ahead with it. We will explain the test and answer any questions you have.

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During the tests

The tests will be performed by a doctor and may take around 1 ½ hours to complete. This is what happens:

NCS & RNS

1. Pads, stickers and sometimes rings will be placed on your skin.
2. You will feel a tingling or tapping sensation from the pads/rings. For RNS these are in short bursts over a few seconds.
3. The response of your nerve and muscle is then recorded from stickers placed further along the nerve or on the muscle.
4. Different nerves are tested to compare and see which, if any, are affected.

EMG

1. A very fine needle will be placed into the muscle.
2. You will be asked to make the muscle move (for example by bending your arm).
3. The needle will record how the muscle is working.

The needle will be in place for a few seconds and will be quickly withdrawn if you feel too much discomfort.

SFEMG

1. You will be asked to lie down and relax. A very fine needle electrode will be placed into the muscle in your forehead above your eyebrow or the back of your hand. The needle will stay in place for the duration of the test to record activity from the muscle and may be moved to record from different sites.
2. There are 2 ways of doing single fibre EMG, both may not be necessary.
 - a. Voluntary SFEMG. The doctor will ask you to look up or down or frown slightly and maintain this position while they assess how the muscle is working. The amount you can cooperate with this will reduce the length of the test.
 - b. Stimulated SFEMG. The doctor may need to stimulate the facial nerve resulting in slight twitching of your eye and facial muscle.

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What do I feel during the tests?

During NCS you will feel a pulsing tapping sensation which may be slightly uncomfortable to some patients but is usually tolerated. During RNS you will feel short bursts of the pulsing tapping sensation. During EMG and SFEMG you will feel the needle, but it is unlikely to cause too much discomfort and nothing will be injected into you and no blood will be taken.

After the tests

After the test you will be able to go back to your normal activities. You may take your morning dose of Mestinon or Pyridostigmine after the single fibre EMG is finished so, please bring it with you.

When will I get the results?

You won't get the results straight after the test as they need to be analysed by the consultant. A full report will be sent to the doctor who referred you for the test after about 2 weeks and they will contact you to discuss the results.

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Sources used for the information in this leaflet

Johns Hopkins Medicine (2023). *Electromyography (EMG)*. [Online] Available at: <https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/electromyography-emg> (Accessed 1 June 2023).

Mayo Clinic (2023). *Electromyography (EMG)*. [Online] Available at: <https://www.mayoclinic.org/tests-procedures/emg/about/pac-20393913> (Accessed 1 June 2023).

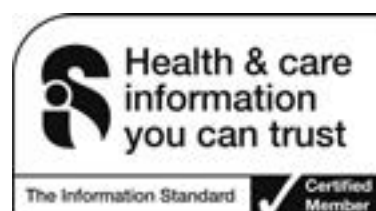
Medscape (2019). *Single-fiber EMG*. [Online] Available at: <https://emedicine.medscape.com/article/1832855-overview> (Accessed 1 June 2023).

National Health Service (2020). Myasthenia gravis. [Online] Available at: <https://www.nhs.uk/conditions/myasthenia-gravis/> (Accessed 1 June 2023).

AAEM Quality Assurance Committee. American Association of Electrodiagnostic Medicine (2001). Practice parameter for repetitive nerve stimulation and single fiber EMG evaluation of adults with suspected myasthenia gravis or Lambert-Eaton myasthenic syndrome: summary statement. *Muscle & nerve*, 24(9), 1236–1238. <https://doi.org/10.1002/mus.1139>

Gechev A, Kane NM, Koltzenburg M, Rao DG, van der Star R. Potential risks of iatrogenic complications of nerve conduction studies (NCS) and electromyography (EMG). *Clin Neurophysiol Pract*. 2016 Oct 13;1:62-66.

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