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## What happens during a neurological examination?

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In neurological examinations, specialized doctors known as neurologists carry out tests in order to identify medical conditions affecting the nervous system. There are a lot of different neurological (nervous system) conditions, including strokes, Parkinson's disease, chronic migraines, meningitis, epilepsy and multiple sclerosis. They can cause a wide variety of symptoms, such as varying degrees of paralysis in a leg or arm, dizziness or speech problems, muscle weakness, unusual sensations or confusion.

So neurological examinations consist of a whole range of tests to look at things like your muscle strength, coordination and memory. An eye test may also be done.

### How can you prepare?

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There is no need to prepare for a neurological examination. The doctor will try to reach the right diagnosis by testing normal movements and reactions. Neurological examinations can sometimes take a long time to carry out because so much in the body is controlled by the nervous system – from breathing and muscle movements to digestion and the sense of touch. The examinations usually don't hurt but they may sometimes be a little unpleasant.

### What do neurological examinations involve?

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Neurological examinations follow a clear structure. They always start off with a talk in which the doctor asks you about your symptoms and any other medical conditions you have or had in the past (medical history). Then he or she will look for visible signs of a medical condition. These may include things like the way you walk, your posture, your sense of balance or any difficulties with certain movements. The doctor will carry out a short physical examination in which they will listen to your lungs and heart and measure your pulse.

They will then do various tests. The exact procedure and the amount of testing needed will depend on your symptoms and any suspected medical conditions. Every part of the body – from the brain to a leg muscle – could be affected by a neurological condition, so tests could theoretically be carried out in any of those areas. If a patient is not (fully) able to answer questions or actively participate in tests on their own, family members or friends can help. Generally speaking, the following nerves and bodily functions are tested:

#### Cranial nerves

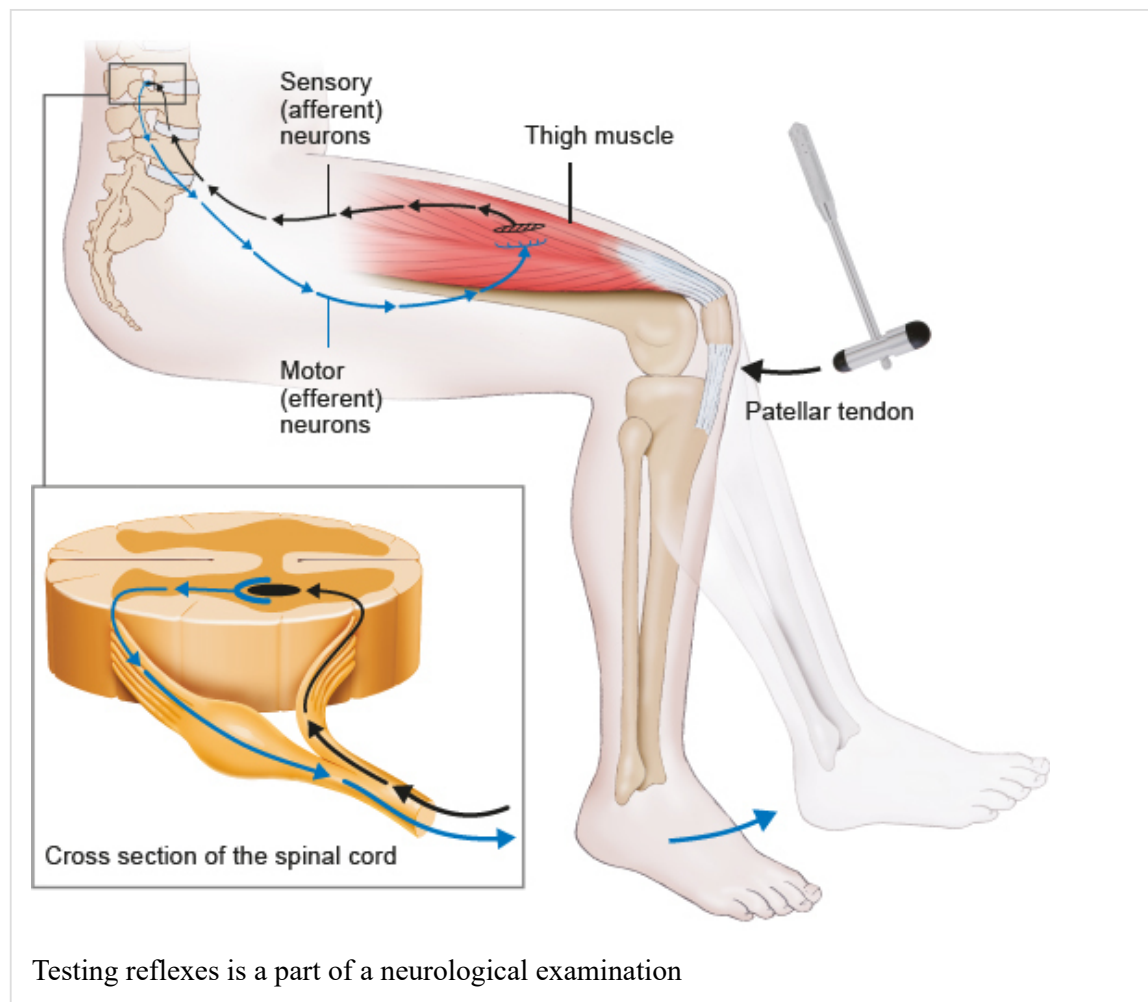
Everyone has twelve cranial (brain) nerves. They control things like your eye muscles, jaw muscles and tongue. Other cranial nerves include the olfactory nerve (smell), the optic nerve (vision) and the vestibulocochlear nerve (hearing and balance). If someone has a problem with their vision, hearing, sense of smell, sense of taste or speech, they may have a neurological disorder.

The sense of smell is tested using certain scents. The doctor holds neutral-smelling test tubes filled with samples of things that have a common odor (e.g. coffee, vanilla, cinnamon or soap) under each nostril. The patient is then asked to identify the smell compared to an empty test tube.

Wrinkling your nose and baring your teeth is also part of the examination, to test if your facial nerve is okay. Vision is tested by asking the patient to identify letters or numbers on a board, just like eye tests at an ophthalmologist's (eye doctor). The doctor can also use the 'finger test' to see whether your field of vision is limited. Here you are asked to cover one eye while looking straight ahead with the other eye. The doctor moves one of their fingers from the side of your head to the area in front of you that you can see (while you keep looking straight ahead) and asks you to tell them when you can see their finger.

### Motor system and coordination

Tests to check your general mobility, fine motor skills and coordination are a further part of neurological examinations. For instance, how well can you move your arms and legs, undo buttons or write? How many steps does it take you to spin around once? How easily can you touch your nose with your finger when your eyes are closed, starting with your arm stretched out? Or how easily can you touch your knee with the heel of the foot on your other leg while lying down, without looking? Testing your reflexes is also part of neurological examinations - for instance, with the well-known "knee jerk" test using a reflex hammer. This test involves tapping the patellar tendon, which stretches the tendon and the quadriceps muscle in the thigh a little, causing the quadriceps to contract and the lower leg to jerk up suddenly.



### Sensation

The doctor usually checks your ability to feel pain and touch by using soft fabric and a needle. To test your ability to feel different temperatures, test tubes containing warm and cold water may

be held against your skin.

### **Cognitive abilities, memory and mind**

This category includes language and math tests as well as questions and tests concerning memory retention and orientation, which may involve asking about the time of year, the date, your job, or where you are. Problems concentrating or long-lasting fatigue and listlessness may be signs of mental health problems.

### **Vegetative nervous system**

The vegetative (autonomic) nervous system controls your body's subconscious vital functions, such as your pulse, breathing and the regulation of your body temperature and digestion. So neurological examinations also include things like questions about bowel movements and urination as well as blood pressure measurements.

### **Are further examinations necessary?**

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Depending on the results of the individual tests, other examinations may be performed, possibly including measurement of electrical activity in the brain (electroencephalography, EEG), muscle activity (electromyography, EMG) or nerve conductivity (electroneurography, ENoG). Imaging techniques such as ultrasound, computed tomography (CT) or magnetic resonance imaging (MRI) may also be used. Sometimes a lumbar puncture (spinal tap) is necessary to take a sample of your cerebrospinal fluid (CSF).

### **Sources**

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