

What is Clinical Neurophysiology?

Clinical Neurophysiology is a branch of medicine concerned with diagnosis and monitoring of disease by measurement of the electrical activity of the brain, the spinal cord, nerves and muscles. It is also called Electrodiagnostics (EDX) by some rheumatologists and Electrophysiology, mainly by ophthalmologists.

The methods used fall into three groups:

EEG

- The **electroencephalogram** is a recording of the electrical activity of the brain - often called "brain waves" in the media.

EEG is mainly used in the management of patients with epilepsy. It can contribute to the initial diagnosis of epilepsy, but is more usually used to work out which of the several types of epilepsy a patient has. In specialist epilepsy units more complex EEGs are performed, sometimes with recordings made directly from the brain rather than through the scalp. EEG can also be used more generally to assess brain function – in this role it is used in child development problems, in dementia, psychiatric problems and on intensive therapy units and special care baby units.

EMG

- The **electromyogram** is, strictly speaking, a recording of electrical activity of muscle, but is also used to refer to studies on nerves. (Nerve conduction studies or NCS)

EMG and nerve conduction studies assess the peripheral nervous system – basically the nerves and muscles in the limbs. This covers a huge range of problems from simple trapped nerves to complex neurological cases. About half of the EMG workload is due to carpal tunnel syndrome – a trapped nerve at the wrist which in severe cases can lead to loss of use of the hand. Although simple and common this is therefore a very important problem. At the other end of the scale, EMG is used in the diagnosis of motor neurone disease and myasthenia gravis. Peripheral neuropathy – a general deterioration of the nerves in the limbs – and nerve injuries are other common problems in the clinic.

Evoked potentials

- **Evoked Potentials** are recordings of the changes in nervous system activity in response to external stimuli, for instance clicks or flashing lights.

EPs only form about ten per cent of our workload. They are used for specialist investigation of the eyes and ears but have some role in general neurological investigation too, such as in multiple sclerosis. There are some rarer tests, often performed by doctors with particular interests, which do not fit easily into these categories.

Our Patients

We see patients of all ages from new-born upwards. They may be basically healthy outpatients, inpatients, or very severely ill in ITU and Special Care Baby Units. We have some special portable recording equipment that allows us to take recordings in these difficult areas. Patients are referred to us from nearly every medical discipline – orthopaedics, rheumatology, neurology and paediatrics are the commonest.

Our Staff

Clinical Neurophysiology tests are recorded by both doctors and technicians. The technicians have great expertise in recording EEGs and EPs, which is not as simple as it looks. In our department technicians also perform some of the nerve conduction studies but this is not always the case. Technician training is now degree based, with plenty of practical training too. Doctors perform the remaining nerve conduction studies and all of the EMG, as well as providing a report on every test for the referring doctor. Most specialists in clinical neurophysiology come from a background in general medicine and neurology. The UK is short of both technicians and doctors so there are good opportunities for attractive careers. The interest comes from the great variety of cases we see and the chance to apply science and technology in a very direct way for the benefit of patients.

Further general information can be found at www.clinicalneurophysiology.org.uk and information about the department at www.clinicalneurophysiology.org.uk/~wscn/

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