Neurophysiology: When to Refer for EMG/ NCS?

Dr Anna Whelehan 5th April 2025

Internal use only by approved personnel. Unpublished Work © Beacon Hospital. All rights Reserved. In Strict Confidence.



THIS IS MODERN MEDICINE

1. Organisation of the Nervous system- Central, peripheral

- 2. Differentials in neuromuscular disease:
 - Pathology at each level of the PNS
- 3. Interpretation of NCS/EMG
- 4. Who to refer?





It Looks Peripheral!.... What are the Differentials





- 1. <u>Extension of the neurological</u> <u>examination in selected patients</u>
- 2. To narrow differential diagnosis in suspected neuromuscular disease

What do we do?

Directed history and examination followed by:

(a) Sensory nerve conduction(b) Motor nerve conduction+/- (c) Electromyography



How Do We Do It?





SENSORY





MOTOR









1. LOCALISATION

(A) Nerve (Neuronopathy/ Root/ Plexus/ Nerve)
 (B) Neuromuscular junction
 Pre-synaptic/ Post-synaptic
 (C) Muscle

2. DISTRIBUTION

Focal/widespread

<u>3. CHARACTERISATION</u>

(A) Fibre type- motor / sensory(B) Axonal /Demyelinating

4. TIME FRAME

Acute/Subacute/Chronic





- > There *is tingling and weakness* in the hand. Is there a trapped nerve?
- There is a <u>wrist drop/ foot drop</u>. Is this from a nerve root or peripheral nerve being trapped or a more diffuse process affecting the nerves?
- There is <u>pain</u> and tingling radiating down one of the limbs with weakness...Is this radiculopathy (usually from a disc) or entrapment neuropathy?
- > There is **tingling in both legs**, Is this peripheral neuropathy? What type?
- The patient has <u>injured a nerve</u> from a traumatic injury- is the nerve intact and is the lesion improving or recoverable, or is surgery required?
- The patient is experiencing <u>weakness</u>...does the patient have motor neurone disease (neurogenic) or myasthenia gravis (NMJ) or a myopathy (muscle)?















Numb Feet, +/- Distal Weakness





Acquired

(A) Axonal neuropathy(B) Inflammatory – CIDP

Genetic / hereditary

CMT1 - demyelinating CMT2 - axonal



Footdrop? Cause







Focal Limb Weakness With Radicular Pain











Dx: Myopathy Inclusion body myositis on muscle biopsy





Scapular Winging



















- EMG/ NCS are an extension of the neurological examination- to narrow differential diagnosis or confirm diagnosis in suspected neuromuscular disorders
- Many patients can be referred directly for certain symptoms (eg peripheral neuropathy, entrapment neuropathy) and EMG/ NCS very helpful in diagnosis, grading severity in these scenarios
- In complex cases e.g. anterior horn cell disorder or myopathy recommend initial referral to neurology before the studies are done, for workup and follow-up of results



Thank You

