

## Nerve conduction and EMG studies

Dr Arul Selvan MD DM FRCP  
FRCP(Edin)

Consultant Clinical  
Neurophysiologist & Clinical Lecturer  
Walton Centre for Neurology



## Questions

É Is nerve conduction & EMG study is helpful in non compressive radiculopathies?

É **Yes**

É It is helpful especially when MRI scan is normal like diabetes and inflammatory radiculopathies.

É Is nerve conduction & EMG are helpful in patients with foot drop?

É **TRUE**

É It differentiates common peroneal nerve palsy from L5 root lesion

É In nerve injuries neurophysiological evaluation can give prognosis as early in 2 weeks?

É **FALSE**

É Wallerian degeneration takes 2-3 weeks to develop. It is always best to do EMG after this time for accurate assessment

## What can NCS tell you?

É Entrapment neuropathy

É Peripheral neuropathy

É Nerve conduction studies are useful to assess the severity of compressive neuropathies

carpal tunnel syndrome

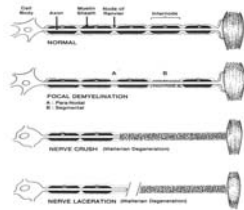
ulnar neuropathy

peroneal nerve palsy

**Axonal loss**

É Wallerian degeneration 2-3 weeks

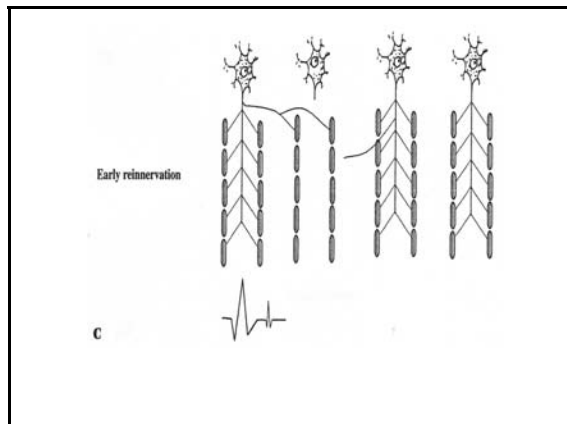
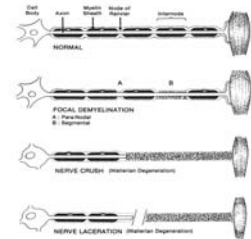
É Regeneration is a slow process, 1mm/day



Complete

É No recovery possible

É Often requires surgical repair



**Case study 1**

É 56 years old female for a persistent foot drop 3 weeks after coronary by pass surgery. He noted difficulty in dorsiflexing the right foot and toes with paresthesias. on examination there was marked weakness of right ankle dorsiflexion and eversion. There was a suggestion of mild weakness of foot inversion. Normal deep tendon reflexes. Sensory examination revealed sensory loss over dorsum of foot and lateral calf.

**DD**

É Common peroneal nerve palsy (lateral popliteal nerve palsy)

É L5 root



## Neurophysiology

- É Slow motor conduction velocity of peroneal nerve across the fibula
- É Mild denervation changes in the right tibialis anterior muscle
- É Right common peroneal nerve palsy

## Case study 2

- É 66 year old female has left foot weakness for the past 6 months. She had back pain for several years. She underwent a successful L3/4 discectomy a year ago for pain and weakness. On examination SLR is restricted to 50 on the left leg. There was mild sensory loss over the dorsum which was not consistent. There was mild weakness of ankle dorsi and plantar flexion. Ankle jerks diminished on both legs.

## Investigations

- É MRI lumbosacral spine
- É Neurophysiology: is suggestive of Left L5 and S1 root involvement

## Case 3

- É 67 year old female referred to orthopaedic clinic by her GP with MRI. The scan suggested bulging discs at both L4-5 and L5-S1. She had history of Diabetes. A month ago she developed severe pain in the right thigh. Pain was worse despite 2 weeks of rest.
- É Examination reveals moderate weakness and wasting of right quadriceps, iliopsoas and adductor group of muscles. Deep tendon jerks are difficult to elicit and sensory loss up to midshins.

- É Neurophysiology

- É Diabetic amyotrophy

## Case 4

- É A 40 year old female referred with right foot drop. Six weeks earlier she delivered a baby girl after prolonged labor which resulted in caesarean section. Postoperatively she developed weakness of right foot. On call registrar made a diagnosis of peroneal nerve palsy secondary to anaesthesia and bed rest.
- É 6 weeks later she had complete foot drop. Weakness of inversion and eversion. There was also weakness of knee flexion, hip abduction and extension.
- É Decreased knee and absent ankle jerk.

É Urgent MRI of lumbosacral spine- NAD

É Neurophysiology ó confirmed a severe lumbosacral plexus damage secondary to prolonged labor

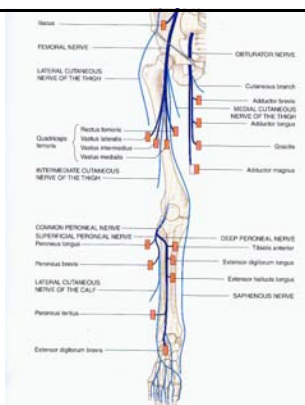
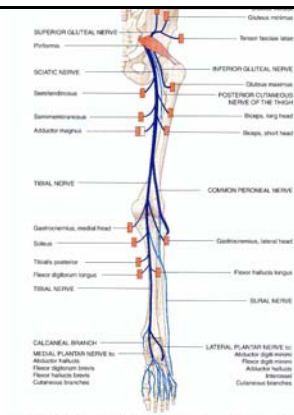
## Case 5

É 62 year old retired consultant haematologist referred for persistent right foot drop. He underwent right hip replacement privately. Postoperatively he noted to have week right foot.

É Complete right foot drop. Weakness of plantar flexion, inversion and hamstrings. Right ankle jerk is absent.

É MRI Lumbar spine showed a mild disc bulge at right L4-L5 level with degenerative changes.

É Neurophysiology; severe right Sciatic nerve palsy- axonotemesis



É 54 year old woman referred with weak legs. Weakness began as right foot drop 6months ago.4 months later similar symptoms started on the other leg. She had R-discectomy at L5-S1 level 18months ago.

É Examination revealed wasting of right tib anterior and fasciculations in the calf. Deep tendon jerks were brisk.

É MRI ó unre markable

É Neurophysiology- severe denervation  
changes in both legs indicative of early  
stage of Motor neurone disease

thank you!!

[arul.selvan@thewaltoncentre.nhs.uk](mailto:arul.selvan@thewaltoncentre.nhs.uk)

Tele: 0151 5295602