

# Peripheral Neuropathy

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# Declaration of interests

# Aims and objectives

# Peripheral Neuropathy

- A 57 year old textile worker reports pins and needles in her hands, following a fall at work
  - what is the most appropriate investigation?
    - Fasting glucose
    - Serum protein electrophoresis
    - Nerve conduction studies
    - X ray of hands
    - MRI cervical spine



# Peripheral Neuropathy

Acknowledgement: Dr Luke Bennetto

History

# Peripheral Neuropathy

- What is it
- Not a diagnosis
- Any nerve
  
- Syndrome
- Differential diagnosis
- Management

# Peripheral Neuropathy

- Motor, sensory, autonomic
- Patchy / uniform
- Focal / length dependent
- Painful / painless
- PNS, CNS, systemic
- Tempo
- Cranial nerves



# Peripheral Neuropathy

- 39 year old man
- PMH
  - Panic attacks
  - Otherwise well

# Peripheral Neuropathy

- One month history
  - Tingling hands and feet
  - Progressed to waist
  - No pain
  - Bladder, Bowel, Sexual function normal
  - Unsteady walking since one week

# Peripheral Neuropathy

- O/E
  - Apyrexial
  - BP 120/72, Pulse 72rr
  - CVS, Abdo, RS normal
  - Cranial nerve examination unremarkable

# Peripheral Neuropathy

- O/E (cont)
  - Tone and bulk normal
  - Power reduced at wrists, hips and ankles
  - Absent left biceps and supinator jerks
  - Brisk knee jerks, ankle jerks with reinf.
  - Plantars downgoing

# Peripheral Neuropathy

- O/E (cont)
  - PP – impaired to knees and MCPs
  - Cold sensation – normal
  - Vibration – normal in DIPs, decreased to sternum
  - JPS – errors in toes and DIPs

# Peripheral Neuropathy

- O/E
  - Athetoid movements of hands
  - Steppage gait – foot drop

# Peripheral Neuropathy

- Syndrome

- Tests

- U&E, LFT, Ca/Mg/PO<sub>4</sub> Normal
- Fasting glucose 4.7mmol/l
- FBC Normal

# Peripheral Neuropathy

- Neurophysiological studies
  - Peroneal and tibial motor studies – absent or significantly attenuated. Normal CVs
  - EMG of tibialis anterior and gastrocnemius – large amount of spontaneous activity
  - Broadly normal sensory studies



# Peripheral Neuropathy

- Further tests

– Plasma viscosity	low
– ANA, ANCA	Negative
– TSH	1.2 mU/l
– Copper	14.5 $\mu$ mol/l
– Serum electrophoresis	Negative

# Peripheral Neuropathy

- Even more tests...

– Serum folate	10.8 $\mu$ g/l
– Vitamin B12	120pg/ml (180-900)
– Ferritin	Normal
– Methylmalonic acid	6757nmol/l (<280)
– Homocysteine	63.8 $\mu$ mol/l (2.0-14.2)

# Peripheral Neuropathy

- Diagnosis
  - Vitamin B12 deficiency myeloneuropathy
  - What next ?

# Peripheral Neuropathy

- Red flags
- Syndrome
- Tests

# Peripheral Neuropathy

'It is () unwise to demand any but the simplest introspection from patients, to whatever class they may belong'

But....

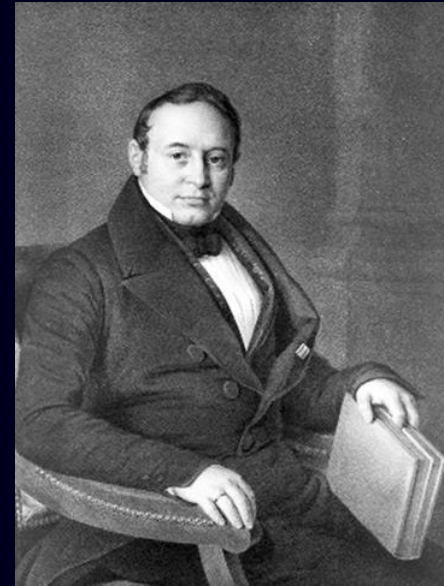


# Peripheral Neuropathy

- Neurological examination
- Guided by history

# Peripheral Neuropathy

- Sensory function
  - Pinprick (temperature)
  - Vibration sense
  - Joint position sense (Romberg)
  - Light touch
- Other tests
  - Gait, vestibular, L+S BP, rating scales



# Peripheral Neuropathy

- History
- Exam / NCS to confirm
- Syndrome



# Peripheral Neuropathy

- 76 year old man
- Symptoms in feet since 5 years
- 'Not right'
- 'Pebbles in shoes'
- Limited tingling
- Can't walk as far

# Peripheral Neuropathy

- Carotid endarterectomy after amaurosis
- Hypertension
- Perindopril
- Clopidogrel
- Stopped statin

# Peripheral Neuropathy

- Retired policeman
- 6-8 pints beer per week
- Ex smoker

# Peripheral Neuropathy

- O/E
  - Tone / bulk
  - All tendon jerks present
  - Co-ordination normal
  - Power normal

# Peripheral Neuropathy

- O/E (cont)
  - General Examination unremarkable
  - Light touch altered to knees
  - Pinprick decreased to mid shins
  - Vibration decreased to knees
  - Joint position sense normal
  - Romberg negative, gait normal

# Peripheral Neuropathy

- FBC, U&E, LFT, Bone, CRP, PV/ESR
- Fasting glucose\*
- B12/Folate/Ferritin
- Serum electrophoresis

# Peripheral Neuropathy

- Neurophysiological results
  - Conduction velocities within normal limits
  - Amplitudes reduced, more distally, more in sensory nerves
  - EMG within normal limits

# Peripheral Neuropathy

- History
- Exam / Neurophysiology
- Tests



# Peripheral Neuropathy

- Diagnosis:
  - Idiopathic axonal neuropathy
- Issues:
  - Progression
  - Pain
  - Statin
  - Genetics

# Peripheral Neuropathy

- Idiopathic axonal neuropathy
  - Diagnosis of exclusion
    - Pain
    - Age
    - Rapid progression
    - Early hand involvement
    - Early motor involvement (power, reflex)
    - Asymmetry
    - Potential cause – systemic disease, drugs

# Peripheral Neuropathy

- Causes
  - Inherited
    - Primarily Neuropathy
    - Multisystem
  - Acquired
    - Tempo

# Peripheral Neuropathy

- Inherited
  - CMT
  - SMA
  - HNPP
  - HSAN
  
  - SCA, FA, AIP

# Peripheral Neuropathy

- Acquired

- Toxins/ drugs

- Alcohol

- Chemotherapy

- Metronidazole

- Nitrofurantion

- Phenytoin

- Pyridoxine

- Colchicine

- Lead

- Dapsone

- Anti-TNF

- Statins

- HAART

- Isoniazid

- Lithium

# Peripheral Neuropathy

- Acquired
  - Guillain Barre syndrome
  - CIDP / MMN
  - MND
  - Diabetes / Impaired glucose metabolism
  - Copper Deficiency
  - B<sub>12</sub> Deficiency (?)

# Peripheral Neuropathy

- Acquired
  - Renal failure
  - Nutritional states
  - Compression
  - Sarcoidosis

# Peripheral Neuropathy

- Acquired
  - HIV, Polio, West Nile, (Hepatitis)
  - Lyme, Leprosy
  - Botulism
  - Paraneoplastic
  - Paraproteinaemic
  - Sjogren's
  - Vasculitides



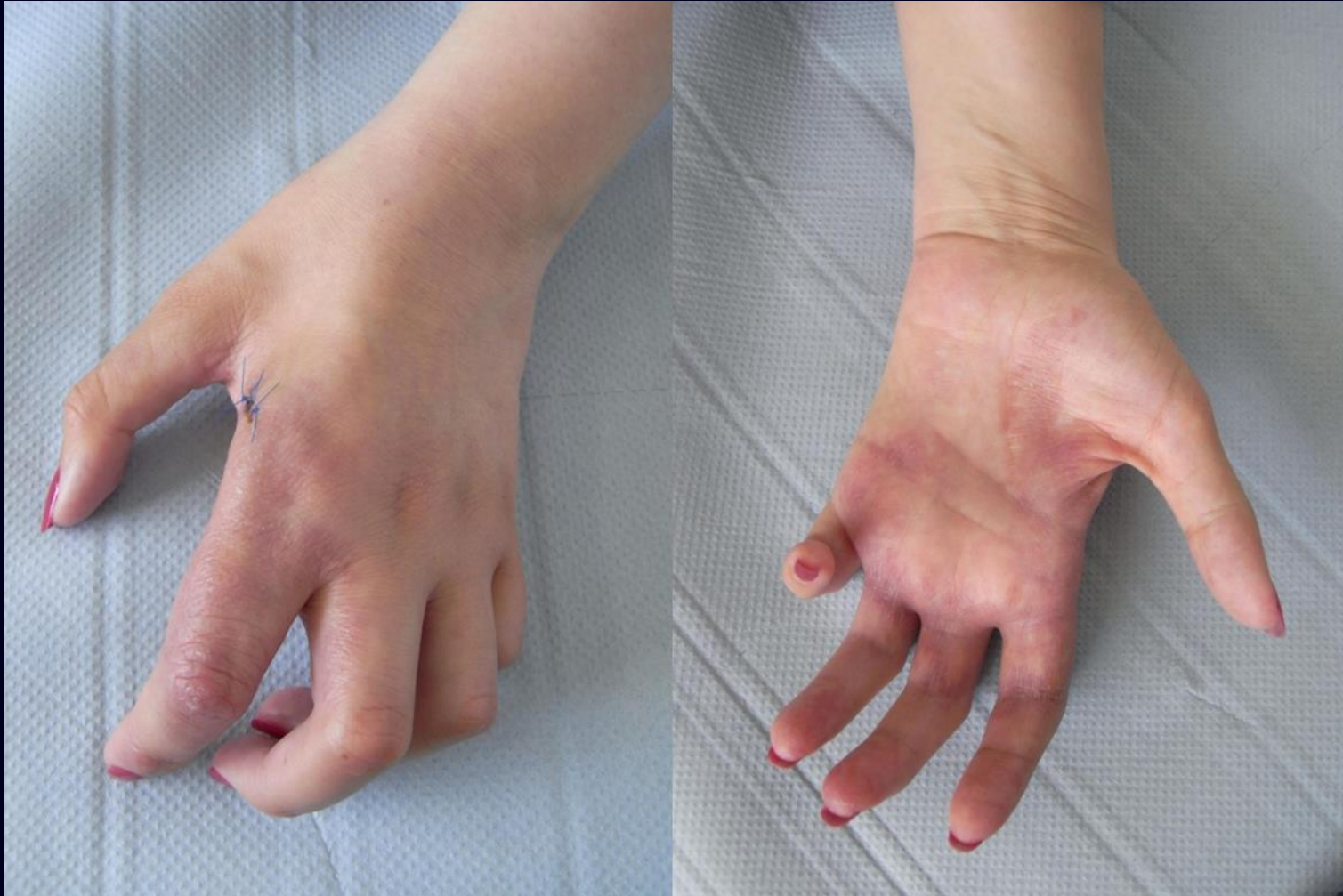
# Peripheral Neuropathy

- 27 year old lady      Dr Claire Rice
- R-handed
- Brazilian, In UK for 14 months
  
- 7 months      L upper limb tingling
- 4 months      Increasing discomfort and weakness  
                    Difficulty straightening the fingers  
                    Weak grip
  
- Subsequent pain around L shoulder
- Few days      Electric shock sensations down to L foot

# Peripheral Neuropathy

- Congenital camptodactyly 5th fingers - bilateral
- OCP
- Ibuprofen
- Cleaner
- Non-smoker, no alcohol
- Lives with husband and children

# Peripheral Neuropathy



# Peripheral Neuropathy

- Fixed flexion deformities at proximal and distal interphalangeal joints of both 5th fingers
- Weakness of all left sided intrinsic hand movements, particularly thumb opposition and finger adduction
- L-sided sensory abnormalities
  - Decreased pinprick approx C6-8
  - Decreased temperature sensation
  - Decreased proprioception and vibration sensation

# Peripheral Neuropathy

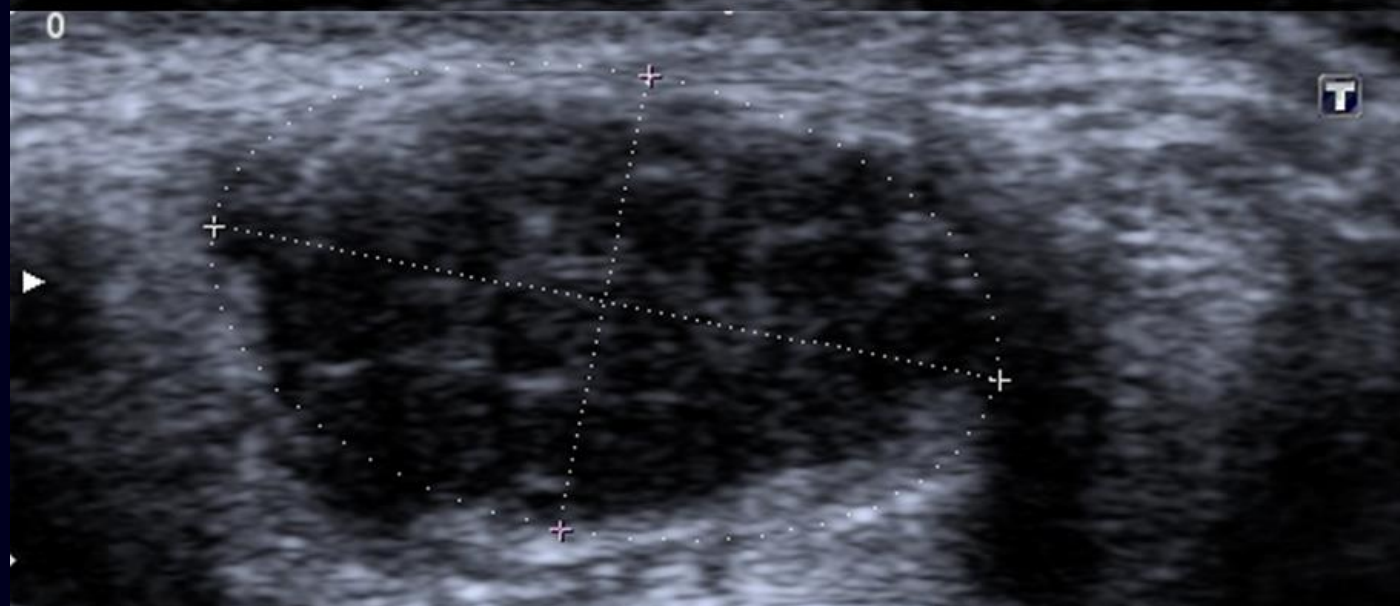
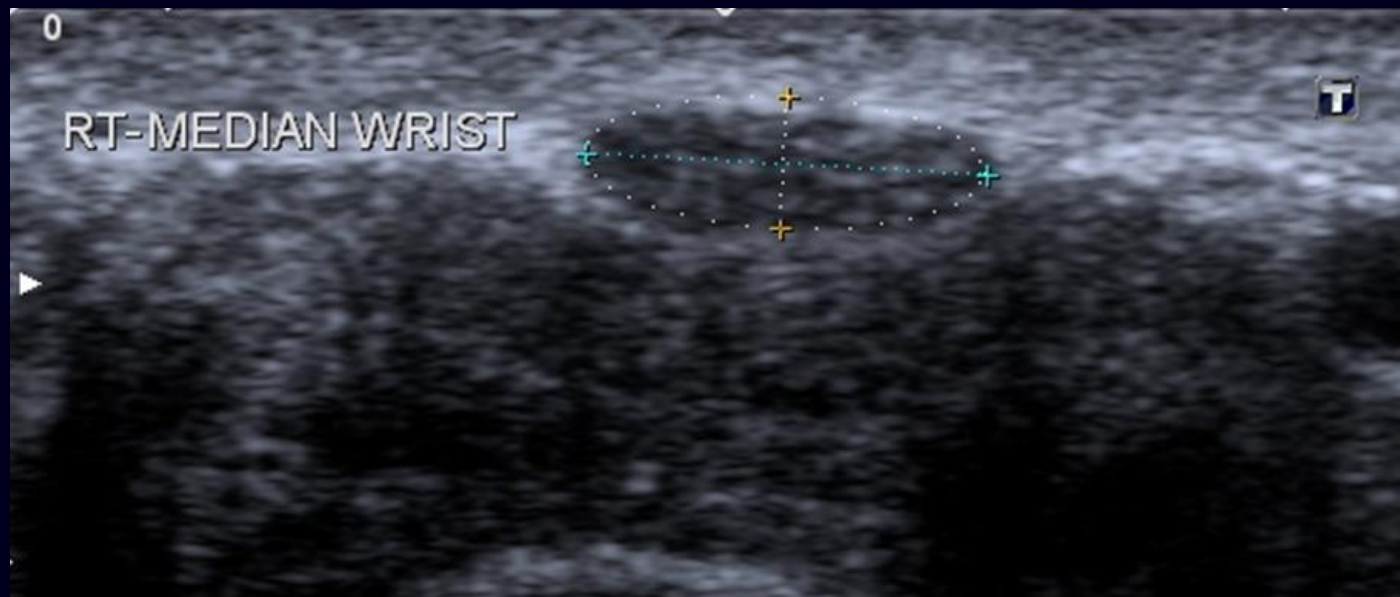
- Neurophysiological studies:

Multifocal sensory and motor neuropathy with axonal degeneration

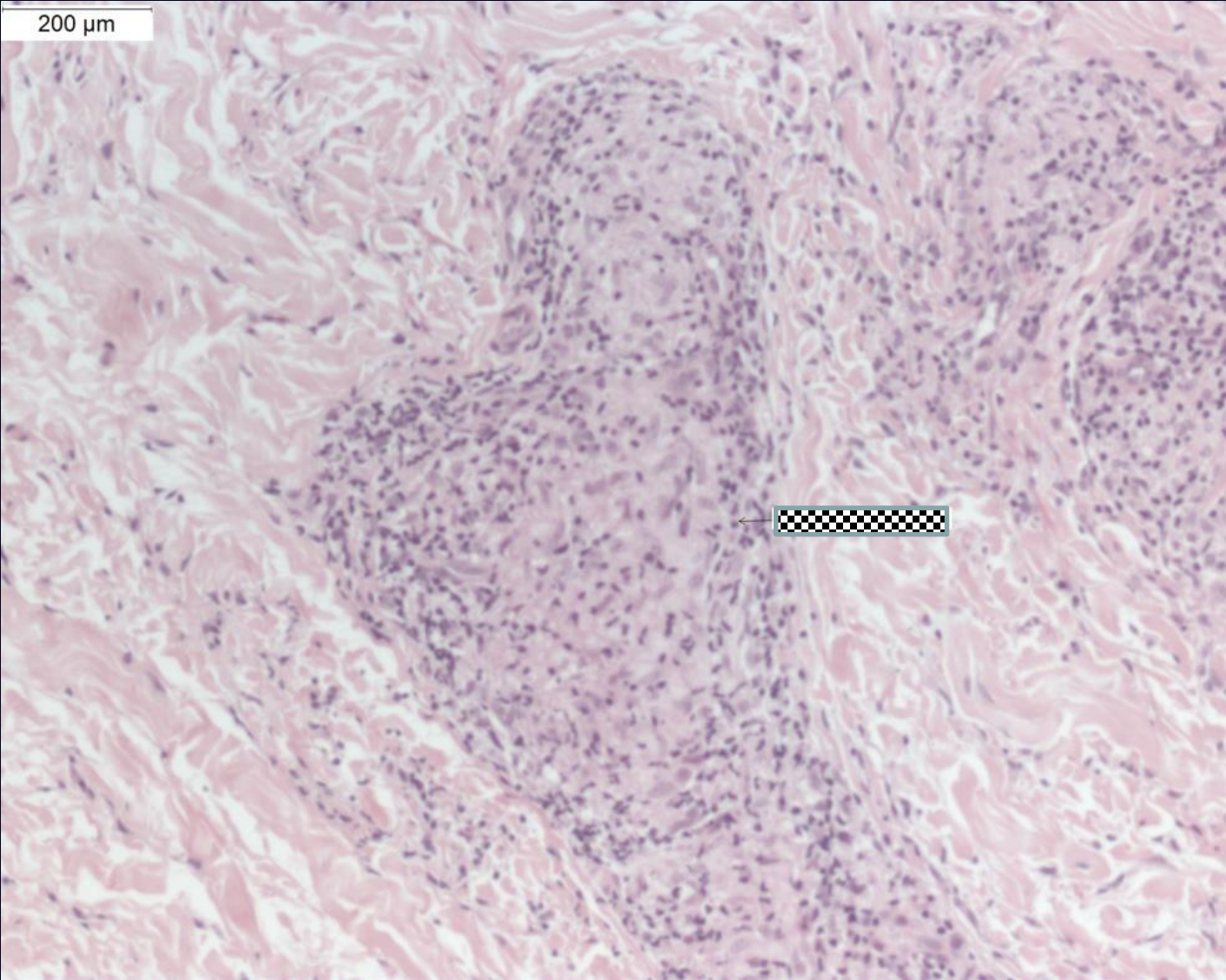
Some features of segmental demyelination.

# Peripheral Neuropathy

- Red Flags:
  - Young
  - Upper limb onset
  - Rapid progression / disability
  - Asymmetric
  - Painful
  - Weakness
  - Demyelination



200  $\mu$ m





# Peripheral Neuropathy

- Diagnosis: Paucibacillary Leprosy
- Hansen's disease - neuropathy and neuronopathy caused by *Mycobacterium leprae* and the host immunological response to the organism
- Small skin lesions on philtrum, nostril and L sole
- Ganglionitis and myelitis in association with skin lesions, thickened peripheral nerves and a 'claw' hand characteristic of lepromatous infection

# Peripheral Neuropathy

- Treatment
  - Corticosteroids
  - Rifampicin
  - Dapsone

# Peripheral Neuropathy



# Peripheral Neuropathy

- 'Standard' blood screen
- Assumptions
- FBC, U&E, LFT, Bone, CRP, PV/ESR
- Fasting glucose\*
- B12/Folate/Ferritin
- Serum electrophoresis

# Peripheral Neuropathy

- Atypical
- CK, LDH
- Homocysteine, Methylmalonic acid
- Igs, BJP, anti-MAG, Anti-ganglioside, VEGF
- ANA, ENA, ANCA, Cryoglobulin, Complement
- ACE
- HIV, VDRL, Hepatitis
- Weil, Lyme

# Peripheral Neuropathy

- Even more atypical
- Lipids
- Lead, other toxins
- WCE, VLCFA, Phytanate
- Genetics\*

# Peripheral Neuropathy

- Take home points:
  - History and assessment
  - Red flags
  - Classify syndrome
  - Basic tests - mostly blood
  - If in doubt, do ask

# Peripheral Neuropathy

- Questions



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# Peripheral Neuropathy

- Appearance
- Tone
- Power
- Muscle stretch reflexes
- Co-ordination

# Peripheral Neuropathy

- What else to ask and why
- Distribution
- Autonomic
- Tempo
- Other medical

# Peripheral Neuropathy

- Cases:
- IAN
- DM
- CIDP
- Vasculitis
- B12 defic
- DRG
- CMT

# Title

- RGB – 0,0,30
- Text – 250,250,150