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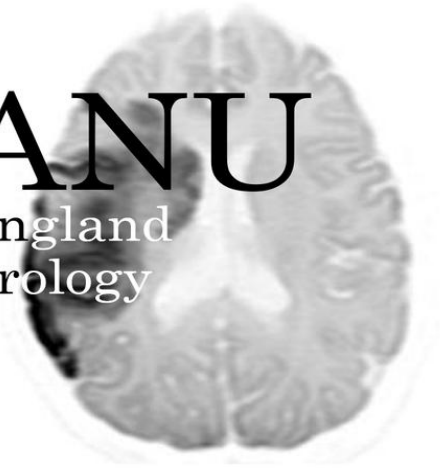

‘Off legs’ – focussed history taking

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Mark Maskery

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The University of Manchester

Manchester Centre for Clinical Neurosciences

Salford Royal NHS
NHS Foundation Trust

Disclosures

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Dan Whittam

- Has accepted sponsorship for educational meetings from Roche & Novartis, and speaker's fees from Teva

Mark Maskery

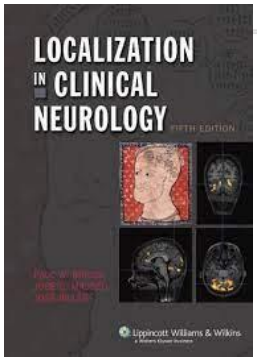
- Has accepted sponsorship for educational meetings from Roche & Novartis.

What do neurologists love most?

- Coffee
- MRI scans
- Leather satchels
- Localising
- Embarrassing medical students
- Grammatically correct clinic letters

What do neurologists love most?

- Coffee
- MRI scans
- Leather satchels
- **Localising**
- Embarrassing medical students
- Grammatically correct clinic letters



Objectives

- Discuss a simple approach to focused neurological history taking
  - Define the problem
  - **Localise the lesion**
  - Narrow down the aetiology based upon onset, progression and associated symptoms

- Examine to refine further and guide investigations

Case 1

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- PC:
  - 43M presents ‘off legs’, has been unable to walk since the weekend.
- PMH:
  - Hypertension
- DH:
  - Ramipril
- SH:
  - Non-smoker
  - 14u alcohol/week
  - Works as a solicitor

Differential diagnosis?

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- Decompensation / frailty!
- Vascular
  - Brain
  - Spine
- Infective/inflammatory
  - Multiple sclerosis
  - ADEM
  - Meningoencephalitis
- Trama
  - BPPV
- Autoimmune
  - Sarcoidosis
  - Vasculitis
- Metabolic
  - Vitamin B12 deficiency
  - Hyponatraemia
  - Nutritional
- Iatrogenic
  - Drug side effects
- Neoplastic/infiltrative
  - Lymphoma
  - Paraneoplastic
- Congenital
  - Charcot Marie Tooth
- Degenerative
  - Cervical myelopathy
  - Multi-level radiculopathy
  - Motor neurone disease
- Endocrine
  - Addisons
- Functional
- Neuromuscular junction
  - Myasthenia Gravis
- Muscle
  - Myopathy

- At this stage, endless.

Approach

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- Define the problem:
  - Open ended questions
    - Why can't you walk?
    - What do you mean by dizzy?
    - Where is the pain?
  - Not able to tell you?

Case 1: Why can't you walk?

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- Both legs feel **weak**, R > L
- Started 4 days ago & progressing since.

- Tingling started in his toes spreading up to the level of his chest with a tight squeezing sensation.
- Today, hands feel weak – can't use phone
- No pain.
- His speech, swallowing, breathing normal.
- Urinary urgency and one episode of incontinence.

Localising weakness

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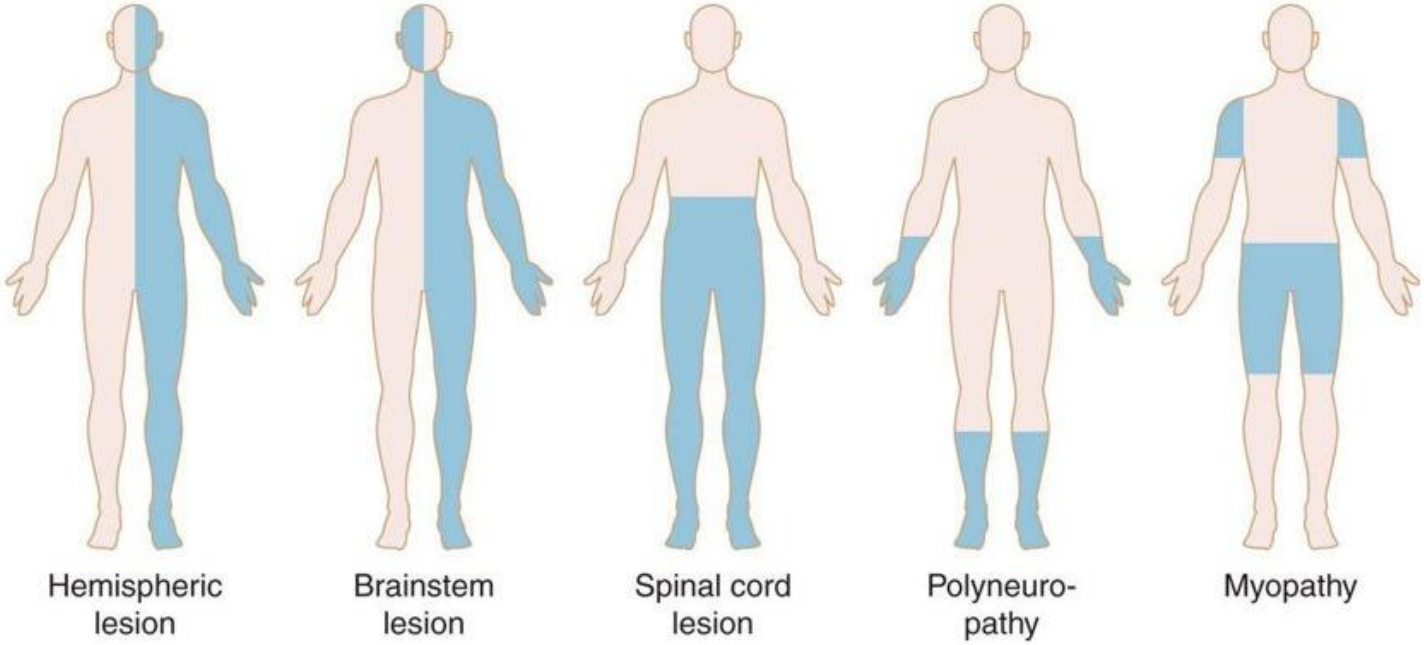

Localising weakness

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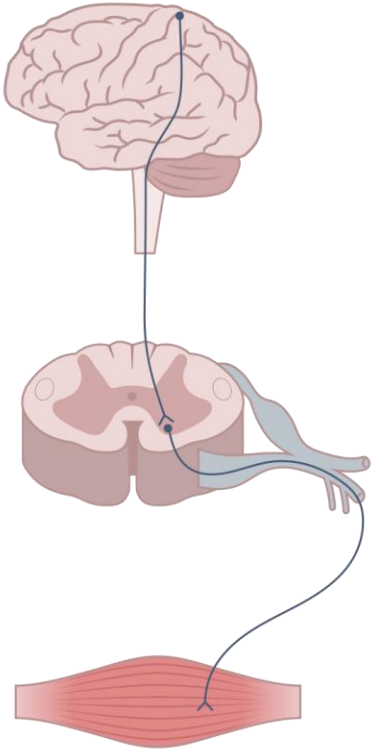
- Brain
  - Structural
  - Functional
- Brainstem
- Spinal cord
- Anterior horn cell
- Nerve root
- Plexus
- Peripheral nerve
  - Mononeuropathy (multiplex)
  - Polyneuropathy
- Neuromuscular junction
- Muscle



Localising weakness

- **Brain**
  - **Structural**
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- Brainstem
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- Anterior horn cell
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- Plexus
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  - Mononeuropathy (multiplex)
  - Polyneuropathy
- Neuromuscular junction
- Muscle

- Unilateral
- Face, arm & leg
- Aphasia, hemianopia, sensory extinction / neglect
- Encephalopathy
- Seizure activity

Localising weakness

- Brain
  - Structural
  - Functional
- **Brainstem**
- Spinal cord
- Anterior horn cell
- Nerve root
- Plexus
- Peripheral nerve
  - Mononeuropathy (multiplex)
  - Polyneuropathy
- Neuromuscular junction
- Muscle

- Crossed signs
- Face, arm & leg
- Eye movement, face, bulbar or respiratory involvement
- Sphincter involvement

Localising weakness

- Brain
  - Structural
  - Functional
- Brainstem
- **Spinal cord**
- Anterior horn cell
- Nerve root
- Plexus
- Peripheral nerve
  - Mononeuropathy (multiplex)
  - Polyneuropathy
- Neuromuscular junction
- Muscle

- Bilateral
- Face spared
- Sensory involvement
  - Sensory level
  - Lhermitte's
  - "Hug"
  - Dissociated (Brown-Sequard)
- Sphincteric / sexual dysfunction

Localising weakness

- Brain
  - Structural
  - Functional
- Brainstem
- Spinal cord
- **Anterior horn cell**
- Nerve root
- Plexus
- Peripheral nerve
  - Mononeuropathy (multiplex)
  - Polyneuropathy
- Neuromuscular junction
- Muscle

- Pure motor

- UMN:
  - Cramps
  - Stiffness

- LMN:
  - Noticeable wasting
  - Fasciculation

- Bulbar involvement common
- Spares EOM

Localising weakness

- Brain
  - Structural
  - Functional
- Brainstem
- Spinal cord
- Anterior horn cell
- **Nerve root**
- Plexus
- Peripheral nerve
  - Mononeuropathy (multiplex)
  - Polyneuropathy
- Neuromuscular junction
- Muscle

- Focal / multifocal
- Myotomal
- Dermatomal
- Painful

Localising weakness

- Brain
  - Structural
  - Functional
- Brainstem
- Spinal cord
- Anterior horn cell
- Nerve root
- **Plexus**
- Peripheral nerve
  - Mononeuropathy (multiplex)
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- Neuromuscular junction
- Muscle

- Single limb / bilateral asymmetric
- Marked wasting and weakness
- Sensory involvement
- Painful

Localising weakness

- Brain
  - Structural
  - Functional
- Brainstem
- Spinal cord
- Anterior horn cell
- Nerve root
- Plexus
- **Peripheral nerve**
  - **Mononeuropathy (multiplex)**
  - Polyneuropathy
- Neuromuscular junction
- Muscle

- Deficits localising to single nerve
- E.g. wrist drop & sensory loss over dorsum of hand

→ radial neuropathy

Localising weakness

- Brain
  - Structural
  - Functional
- Brainstem
- Spinal cord
- Anterior horn cell
- Nerve root
- Plexus
- **Peripheral nerve**
  - Mononeuropathy (multiplex)
  - **Polyneuropathy**
- Neuromuscular junction
- Muscle

- Bilateral, often symmetrical
- Arms, legs, sometimes face

- Can be:
  - Pure sensory
  - Sensory predominant
  - Motor predominant
  - Pure motor

- Length-dependent or non-length dependent

- Autonomic involvement?
- Pain?

Localising weakness

- Brain
  - Structural
  - Functional
- Brainstem
- Spinal cord
- Anterior horn cell
- Nerve root
- Plexus
- Peripheral nerve
  - Mononeuropathy (multiplex)
  - Polyneuropathy
- **Neuromuscular junction**
- Muscle

- Pure motor
- Bilateral, proximal

- Ptosis, diplopia
- Bulbar involvement
- Neck weakness

- Variability / fatigability

Localising weakness

- Brain
  - Structural
  - Functional
- Brainstem
- Spinal cord
- Anterior horn cell
- Nerve root
- Plexus
- Peripheral nerve
  - Mononeuropathy (multiplex)
  - Polyneuropathy
- Neuromuscular junction
- **Muscle**

- Pure motor
- Bilateral, proximal
- Muscle pain / cramps

Case 1

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- Both legs feel weak, R > L
- Started 4 days ago & progressing since.

- Tingling started in his toes spreading up to the level of his chest with a tight squeezing sensation.
- Today, hands feel weak – can't use phone
- No pain.
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Localising weakness

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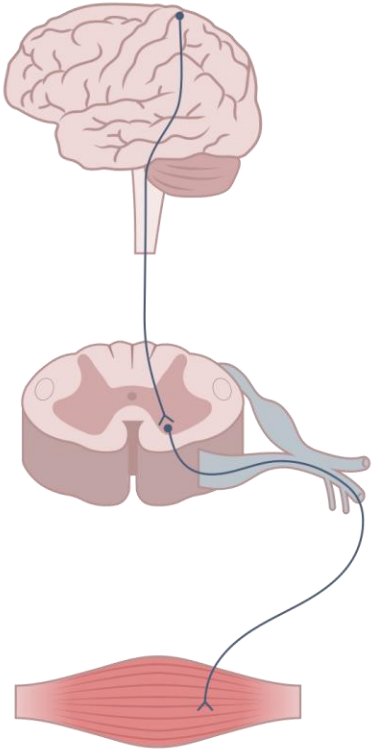

Localising weakness

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- Spinal cord
- ~~Anterior horn cell~~
- Nerve root
- Plexus
- Peripheral nerve
  - Mononeuropathy (multiplex)
  - Polyneuropathy
- ~~Neuromuscular junction~~
- ~~Muscle~~

- Sensory involvement

Localising weakness

- ~~Brain~~
  - ~~Structural~~
  - Functional
- Brainstem
- Spinal cord
- ~~Anterior horn cell~~
- ~~Nerve root~~
- ~~Plexus~~
- Peripheral nerve
  - ~~Mononeuropathy (multiplex)~~
  - Polyneuropathy
- ~~Neuromuscular junction~~
- ~~Muscle~~

- Sensory involvement

- Bilateral, diffuse

Localising weakness

- ~~Brain~~
  - ~~Structural~~
  - Functional
- ~~Brainstem~~
- Spinal cord
- ~~Anterior horn cell~~
- ~~Nerve root~~
- ~~Plexus~~
- Peripheral nerve
  - ~~Mononeuropathy (multiplex)~~
  - Polyneuropathy
- ~~Neuromuscular junction~~
- ~~Muscle~~

- Sensory involvement
- Bilateral, diffuse
- No facial / bulbar involvement

Localising weakness

- ~~Brain~~
  - ~~Structural~~
  - ~~Functional~~
- ~~Brainstem~~
- **Spinal cord**
- ~~Anterior horn cell~~
- ~~Nerve root~~
- ~~Plexus~~
- ~~Peripheral nerve~~
  - ~~Mononeuropathy (multiplex)~~
  - ~~Polyneuropathy~~
- ~~Neuromuscular junction~~
- ~~Muscle~~

- Sensory involvement
- Bilateral, diffuse
- No facial / bulbar involvement
- Sensory & sphincteric symptoms suggestive of cord lesion

Now the aetiology?

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- Narrow down the aetiology
  - **Onset / progression**
  - Triggers / alleviating factors
  - Associated symptoms
  - Previous episodes? (same or different)
  - Risk factors / FH

Onset:

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Diurnal variation
- ?MG

Acute (hours-days):
- Most infections
- Inflammation
- Metabolic crisis / decomp

Chronic (months)
- Neurodegenerative
- Malignancy
- Metabolic

Seconds

Months

Hyperacute (seconds):
- Vascular
- Traumatic
- Epileptic

Subacute (weeks):
- Inflammation
- Indolent infections (TB)
- Infiltrative

Case 1

NEANU
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- Both legs feel weak, R > L
- **Started 4 days ago & progressing since.**

- Tingling started in his toes spreading up to the level of his chest with a tight squeezing sensation.
- Today, hands feel weak – can't use phone
- No pain.
- His speech, swallowing, breathing normal.
- Urinary urgency and one episode of incontinence.
- No triggers / recent travel

- **Previous episodes? Not like this, but did have eye pain and loss of vision 4 years ago.**

Onset:

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Update

Diurnal variation
- ?MG

Acute (hours-days):
- Most infections
- Inflammation
- Metabolic crisis / decomp

Chronic (months)
- Neurodegenerative
- Malignancy
- Metabolic

Seconds

Months

Hyperacute (seconds):
- Vascular
- Traumatic
- Epileptic

Subacute (weeks):
- Inflammation
- Indolent infections (TB)
- Infiltrative

Case 1:

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- Diagnosis?
  - Why can't you walk:
    - Weakness and sensory disturbance
  - Localisation
    - Cervical cord
  - Onset:
    - 4 days ago – acute progressive course
  - Other relevant history:
    - Episode of eye pain and visual loss 5 years ago

Case 1:

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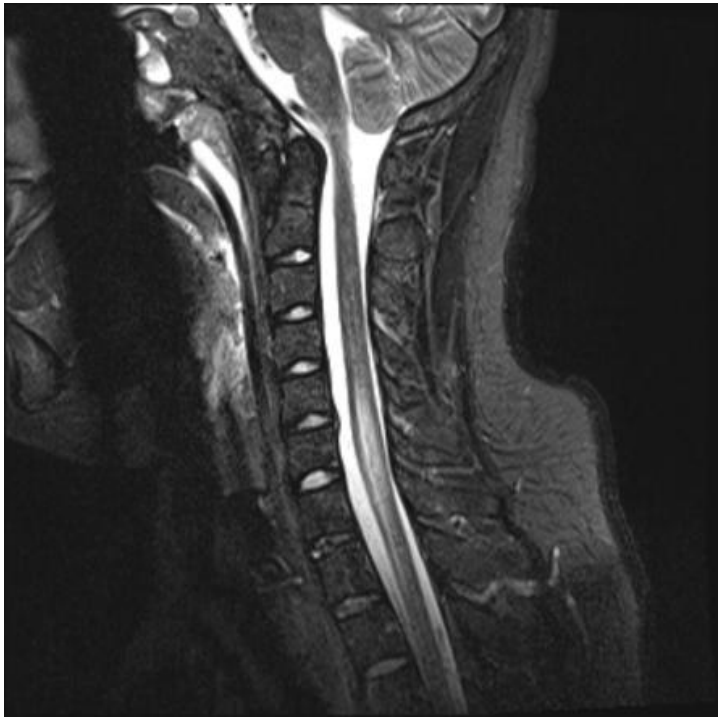
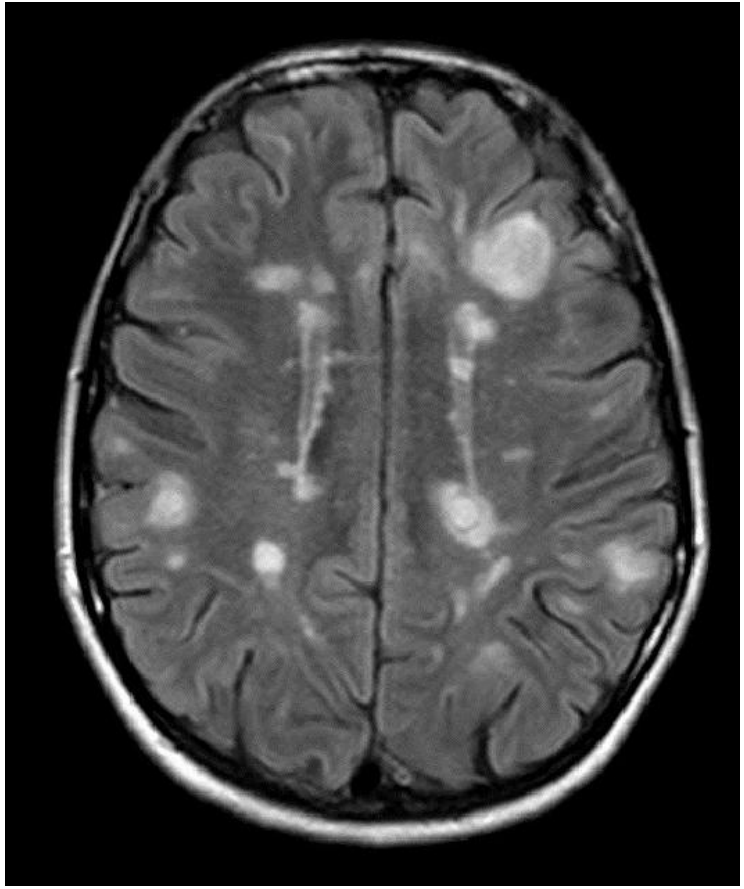
- Diagnosis?
  - Inflammatory spinal cord lesion
  - Previous episodes of ? optic neuritis

→ Suggests MS

Case 1:





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- Questions about case 1?

Case 2:

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- PC:
  - 56F presents ‘off legs’ with unsteadiness.
  - Symptoms started 6 weeks ago, she developed pins and needles in her hands bilaterally which gradually spread towards her elbows, as well as from her toes to her knees. She has burnt herself several times whilst cooking and she feels clumsy. She denies any significant weakness, but she began feeling unsteady at night and had a fall in the shower. Recently she has struggled to walk any distance. There is no back pain nor sphincter disturbance and she is systemically well.

Case 2:

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- PMH:
  - Hypertension
  - Coeliac disease
- DH:
  - Ramipril
- SH:
  - Smoker, 40u alcohol/week, no substance use, vegan diet
  - Works as an accountant

Localisation of imbalance

- Vestibular
- Cerebellum
- Sensory ataxia
  - Dorsal columns
  - Sensory polyneuropathy
- Postural hypotension
- “Central postural instability”

Localisation of imbalance

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- **Vestibular**
- Cerebellum
- Sensory ataxia
  - Dorsal columns
  - Sensory polyneuropathy
- Postural hypotension
- "Central postural instability"

Vertigo:

- Acute spontaneous:
  - Labyrinthitis
  - Cerebellar infarction
- Recurrent positional:
  - BPPV
- Recurrent spontaneous:
  - Vestibular migraine
  - Meniere's disease

Localisation of imbalance

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- Vestibular
- **Cerebellum**
- Sensory ataxia
  - Dorsal columns
  - Sensory polyneuropathy
- Postural hypotension
- "Central postural instability"

Cerebellum:
- Speech
- 'Jumpy' vision
- Unilateral clumsy limb
- Vascular risk factors

Localisation of imbalance

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- Vestibular
- Cerebellum
- **Sensory ataxia**
  - Dorsal columns
  - Sensory polyneuropathy
- Postural hypotension
- "Central postural instability"

Sensory ataxia:
- Lack of proprioception
- Rhomberg's positive
  - Dark environments
  - Washing hair

- Dorsal columns:
  - Sensory level
  - 'Tight band'
  - Sphincter involvement

- Sensory polyneuropathy:
  - Distal, limbs

Localisation of imbalance

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- Vestibular
- Cerebellum
- Sensory ataxia
  - Dorsal columns
  - Sensory polyneuropathy
- **Postural hypotension**
- "Central postural instability"

Postural hypotension:
- Pre-syncopal symptoms
- Positional
- Sitting/standing
- Past medical history
- Medication history

Localisation of imbalance

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- Vestibular
- Cerebellum
- Sensory ataxia
  - Dorsal columns
  - Sensory polyneuropathy
- Postural hypotension
- **"Central postural instability"**

- 'Crumbly'
- Cognitive issues
- Frailty
- Parkinsonism
- Medically unwell (but no specific neurological problem)

Case 2:

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- PC:
  - 56F presents ‘off legs’ with **unsteadiness**.
  - Symptoms started **6 weeks ago**,
  - **Pins and needles** in her hands bilaterally which gradually spread towards her elbows, as well as from her toes to her knees. She has burnt herself several times whilst cooking and she feels clumsy.
  - She **denies any significant weakness**, but she began feeling **unsteady at night and had a fall in the shower**. Recently she has struggled to walk any distance. There is no **back pain nor sphincter disturbance** and she is **systemically well**.

Localisation of imbalance

- Vestibular
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- Sensory ataxia
  - Dorsal columns
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Localisation of imbalance

- ~~Vestibular~~
- ~~Cerebellum~~
- Sensory ataxia
  - Dorsal columns
  - Sensory polyneuropathy
- ~~Postural hypotension~~
- ~~"Central postural instability"~~

Case 2:

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- On examination:
  - Normal cranial nerves
  - Tone flaccid
  - Power normal
  - Areflexic
  - Pseudoathetosis and impaired coordination with eyes closed
  - Proprioception reduced to the wrist and knees, vibration to the elbows and hips, pin-prick reduced distally.

Case 2:

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- Diagnosis?
  - Why can't you walk:
    - Sensory loss, imbalance
  - Localisation:
    - Sensory ataxia (sensory neuropathy)
    - No sensory level, no sphincter disturbance
  - Onset:
    - 6 weeks ago, sub-acute progressive course
  - Other relevant history:
    - Alcohol dependence, veganism

Case 2:

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- Diagnosis?
  - Subacute non-length-dependent sensory neuropathy
    - Alcohol / nutritional
    - Paraneoplastic
    - Sensory variant of CIDP (this is rare)
  - How would you differentiate?

Case 2

- Bloods: low folate, B12 and copper.
- Nerve conduction studies: Absent sensory nerve action potentials
- **Diagnosis:**
- Nutritional neuropathy
- Optimised nutrition, thiamine, PT/OT assessments

- Questions about case 2?

Summary:

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- History important in neurological presentations
  - For episodic problems (e.g. headache, blackouts), history is all you have!
  - Contextualises examination findings and investigation results
- Identifying the time course and sequence of events reveals the typical pattern of neurological disorders

Thank you

- **Questions?**

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- **Mark Maskery**
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- Mark.Maskery@nca.nhs.uk